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STRATEGIES FOR THE PROMOTION OF BROADBAND SERVICES AND INFRASTRUCTURE: A CASE STUDY ON MAURITIUS

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Strategies for the promotion of broadband services and infrastructure: a case study on Mauritius

BROADBAND COMMISSION
FOR DIGITAL DEVELOPMENT

ITU

This report has been prepared for the International Telecommunication Union (ITU) by Sofie Maddens-Toscano.
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It is part of a new series of ITU reports on broadband that are available online and free of charge at the Broadband Commission website: http://www.broadbandcommission.org/ and at the ITU Universe of Broadband portal: www.itu.int/broadband.

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Preface

The past twenty years have been an extraordinary time for the development of information and communication technologies (ICTs) – with the 'mobile miracle', we have brought the benefits of ICTs within reach of virtually all the world's people. Through its technical standardization and spectrum management work, ITU has been at the forefront of technological change and is today committed to continue to drive positive change in the ICT sector and beyond. It is now time to make the next step, and to ensure that everyone – wherever they live, and whatever their circumstances – has access to the benefits of broadband. This is not just about delivering connectivity for connectivity's sake, or even about giving people access to the undoubted benefits of social communications. It is about leveraging the power of broadband technologies, and especially mobile technologies, to make the world a better place.

In 2010, ITU, in conjunction with UNESCO, launched the Broadband Commission for Digital Development to boost the importance of broadband on the international policy agenda. The Commission believes that expanding broadband access in every country is key to accelerating progress towards these goals by the target date of 2015. The Commission is co-chaired by President Paul Kagame of Rwanda and Carlos Slim Helú, President of the Carlos Slim Foundation. Some 60 Broadband Commissioners representing governments, industry, academia and international agencies contribute the benefit of their insights and experience to the Commission's work. At the Broadband Leadership Summit held in October 2011 in Geneva, the Broadband Commission recognized broadband as a critical modern infrastructure contributing to economic growth and established four new targets for making broadband policy universal and for boosting affordability and broadband uptake. Innovative new models that promote competition, innovation and market growth are now needed to make the broadband opportunity reachable for all world citizens.

At ITU, the United Nations specialized agency for ICTs and telecommunications, we are committed to playing a leading role in the development of the digital economy through extending the benefits of advances in broadband and embracing the opportunities it unleashes. ITU's three Sectors – Radiocommunication, Standardization and Development – are working together to meet these challenges and our collective success will be a key factor in ensuring the provision of equitable broadband access throughout the world. This series of ITU Broadband Reports represent one tangible contribution towards this commitment.

Dr Hamadoun I.Touré

Secretary-General, ITU

Foreword

Broadband has become a key priority of the 21st Century, and I believe its transformative power as an enabler for economic and social growth makes it an essential tool for empowering people, creating an environment that nurtures the technological and service innovation, and triggering positive change in business processes as well as in society as a whole. Increased adoption and use of broadband in the next decade and beyond will be driven by the extent to which broadband-supported services and applications are not only made available to, but are also relevant and affordable for consumers. And while the benefits of broadband-enabled future are manifest, the broadband revolution has raised up new issues and challenges.

In light of these developments, ITU has launched a new series of ITU Broadband Reports in 2012. The first reports in the series focus on cutting edge policy, regulatory and economic aspects of broadband. Other related areas and themes will be covered by subsequent reports including market analysis, broadband infrastructure and implementation, and broadband-enabled applications. In addition, a series of case studies will complement the resources already made available by ITU to all its many different types of readers, but especially to ICT regulators and policy-makers.

This new series of reports is important for a number of reasons. First of all, the reports will focus on topical issues of special interest for developed and developing countries alike. Secondly, the various reports build on ITU's recognized expertise in the area augmented by regular feedback from its Membership. Last but not least, this series is important because it provides a meaningful contribution to the work of the Broadband Commission for Digital Development. The findings of the ITU Broadband Reports will trace paths towards the timely achievement of the ambitious but achievable goals set recently by the Commission as well as provide concrete guidelines. As broadband is a field that is growing very fast, we need to constantly build knowledge for our economies and societies to thrive and evolve into the future.

For these reasons, I am proud to inaugurate this first series of the ITU Broadband Reports and look forward to furthering ITU's work on the dynamic and exciting broadband ecosystem.

Brahima Sanou

Director, ITU Telecommunication Development Bureau

1. Introduction

This country case study addresses the development of the ICT sector in Mauritius and in particular the development of ICT policy and how this has influenced the development of the National Broadband Policy 2012-2020 of January 2012 in Mauritius. The case study analyses the pre-existing conditions which have facilitated the implementation of broadband on the island, including the definition of ICT as a key pillar for the development of its economy through its Cyber Island Strategy and accompanying actions, including the definition of a clear institutional, policy and legal and regulatory framework.

The case study also reviews the role of the ICT regulator, sector Ministry and other ICT stakeholders involved in the broadband ecosystem from setting to achieving the goals of this Plan, fostering widespread application of modern technologies and reporting on the ensuing social and economic benefits for consumers/citizens.

Section 2 examines the Demographic, Political and Economic Context of Mauritius, and in particular how government actions have contributed to the development of the ICT sector. *Section 3* describes the evolution of the ICT market and its effect on the broadband market, giving a short overview of the telecommunication market and industry (including penetration, subscriptions - both for fixed and mobile/wireless as well as broadband technology, trends over last 10 years household/business penetration of PCs/laptops/tablets, and the prices of ICT equipment and services). *Section 4* describes the key elements of the Broadband Strategy/Policy, and details how actions to create a clear institutional, policy and legal and regulatory framework have contributed to the creation of a vibrant ICT sector. Finally, *Section 5* provides an overall assessment of the successful execution of the strategy, any shortfalls and a summary of where the targets appear to have been achieved/are likely to be achieved. It also provides some concluding comments describing lessons learned and highlights the remaining challenges emerging from the experience of Mauritius.

2. Demographic, Political and Economic context

The Republic of Mauritius is situated off the coast of Africa in the Indian Ocean. It is located 890 km to the east of Madagascar, between 19°50' and 20°32' of South Latitude and 57°18' and 57°46' of East Longitude. The Republic of Mauritius includes the islands of Mauritius, Cargados Carajos, Rodrigues and Agalega.[1]

The Republic of Mauritius covers a surface area of 2,040 square kilometres and is home to an estimated population of 1.3 million. It has a population density of 628 people per square kilometres.[2]

Figure 1: Map of Mauritius

Source: http://www.bbc.co.uk/news/world-africa-13882233

Although there are few natural resources to support economic and social development, successive Governments since the early 1970s have sought to ensure national wealth and development by diversifying the Mauritian economy from its original dependence on the production of sugar cane and by encouraging textile production, tourism, financial services and IT, the latter through a specific well-targeted Cyber Island strategy. [3] The Government has also actively sought to address poverty, amongst others through programs such as the National Endowment Fund (NEF) and the Corporate Responsibility Program, which requires all profitable firms to spend 2% of their profits on corporate responsibility

[1] http://www.gov.mu/portal/site/abtmtius/menuitem.37cd78c9e3a902984d57241079b521ca/
[2] World Bank Mauritius Country Brief, available at: http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/AFRICAEXT/MAURITIUSEXTN/0,,menuPK:381984~pagePK:141132~piPK:141107~theSitePK:381974,00.html
[3] Bertelsmann Stiftung, BTI 2012, Mauritius Country Report. Gütersloh: Bertelsmann Stiftung, 2012, available at: http://www.bti-project.org

projects. Such programs have resulted in over 60% of poor families having been helped and 2,000 families moved out of poverty.[4]

Table 1: Key Indicators

Population	mn.	1.3	HDI	0.728	GDP p.c.	$	13671
Pop. growth[1]	% p.a.	0.5	HDI rank of 187	77	Gini Index		-
Life expectancy	years	73	UN Education Index	0.659	Poverty[3]	%	-
Urban population	%	42.6	Gender inequality[2]	0.353	Aid per capita	$	122.0

Source: Bertelsmann Stiftung, BTI 2012, Mauritius Country Report. Gütersloh: Bertelsmann Stiftung, 2012, available at: http://www.bti-project.org

Footnotes:

(1) Average annual growth rate; (2) Gender Inequality Index (GII), (3) Percentage of Population being on less than 2 USD/day

This stance is also visible in the ICT sector where specific programs have been formulated to ensure universal access to ICT services, including by addressing affordability of such services. The Government has, for example, removed a tax on Personal Computers (PCs) and adopted measures ensuring the provision of low-cost loans for the purchase of PCs meaning that the majority of middle-class homes in Mauritius now have a PC.[5]

The Government also pursued a strategy of turning Mauritius into a financial regional hub, partly by creating the conditions for a low-tax gateway to invest in other countries, thus spurring the need for reliable IT services and networks.

Tourism accounts for close to 10% of Gross Domestic Product (GDP), 7% of employment and 29% of the exports of goods and services. The financial sector accounts for about 10% of GDP. Textiles contribute 5% to GDP, employ 11% of the workforce and account for 19% of foreign exchange earnings.[6] The service sector accounts for 70.5% of Mauritius's GDP.[7]

Foreign investment has been strong, largely due to a positive investment climate led by good governance and a stable political environment, a democratic and open economy, a modern legal framework, regulatory efficiency, and a reliable system of state justice.[8] Mauritius is ranked 20th in the World Bank's "Doing Business" Report 2011, which ranks countries according to their ease of doing business.

[4] Bertelsmann Stiftung, BTI 2012, Mauritius Country Report. Gütersloh: Bertelsmann Stiftung, 2012, available at: http://www.bti-project.org

[5] http://www.budde.com.au/Research/Mauritius-Telecoms-Mobile-Broadband-and-Forecasts.html

[6] African Development Bank Country Strategy for Mauritius 2009-2013, available at: http://www.afdb.org/fileadmin/uploads/afdb/Documents/Policy-Documents/MAURITIUS_2009_2013%20COUNTRY%20STRATEGY%20PAPER.pdf

[7] Bertelsmann Stiftung, BTI 2012, Mauritius Country Report. Gütersloh: Bertelsmann Stiftung, 2012, available at: http://www.bti-project.org

[8] http://www.mcci.org/Photos/document/MCCIMAGNO51.pdf

Mauritius's public administration is highly professional and reliable, with strong enforcement of laws being and efficient tax collection. Basic services are provided through the State and implemented efficiently. [9] The Constitution guarantees a well-functioning system of checks and balances that includes the executive, legislative and judicial branches and extends to the press, which is supposed to exercise a control function.[10]

Mauritius had the highest ranking of any African country in the 2010 UN Human Development Index in position 72, with a label of "high human development." In addition, the Economist Intelligence Unit (EIU) March 2009 Political Instability Index rates Mauritius as very low risk (8th out of 165 countries) [11] and its Index of Democracy places Mauritius among the world's first twenty-five "full democracies". The 2012 Index of Economic Freedom published by the Heritage Foundation, in partnership with the Wall Street Journal, lists Mauritius in its top 10 global league, making it the world's 8th freest economy, only two slots behind Canada. [12]

Box 1: Political and Social Stability - key factors underlying the success of ICT development in Mauritius

Factors that contribute to Mauritius's political and economic success include political stability generally based on consensus politics, as well as committed politicians who respect democratic principles and good governance principles, a hard-working population that generates wealth and prosperity, a well-developed education system, and a functioning welfare system. There is wide consensus on the main aspects of Mauritius's domestic and foreign policy.

The Government seeks to enhance prosperity for its citizens and to ensure that it is available to everybody on the island, to develop the island further in order to compete with other states in a globalized world and to expand and cultivate the welfare and education systems to promote de facto equal opportunity regardless of gender, ethnicity, social class or religion. This too is the case in terms of its ICT policy and strategies where a holistic approach has led to successive policies aimed at ensuring that ICTs contribute to the wealth and prosperity of the country.

Source: Bertelsmann Stiftung, BTI 2012, Mauritius Country Report. Gütersloh: Bertelsmann Stiftung, 2012, available at: http://www.bti-project.org and author

[9] Bertelsmann Stiftung, BTI 2012, Mauritius Country Report. Gütersloh: Bertelsmann Stiftung, 2012, available at: http://www.bti-project.org

[10] Bertelsmann Stiftung, BTI 2012, Mauritius Country Report. Gütersloh: Bertelsmann Stiftung, 2012, available at: http://www.bti-project.org

[11] http://viewswire.eiu.com/site_info.asp?info_name=social_unrest_table&page=noads&rf=0

[12] http://www.mcci.org/Photos/document/MCCIMAGNO51.pdf

3. Evolution of the ICT market

3.1. General Background

The ICT sector has effectively become the third pillar of the Mauritian economy with a GDP contribution nearing 6.8%,[13] and a turnover of USD1 billion, while directly employing over 15,000 people with flow-on benefits for many more.

Table 2: ICT Industry Statistics Mauritius

ICT INDUSTRY STATISTICS						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON VALUE ADDED						
Value Added in the ICT Sector (Rs million) by activity:	9,858	11,714	12,994	14,851	17,036	19,004
Telecommunications (% of Value Added in ICT Sector)	66	66	61	56	46	43
Wholesale & Retail Trade (% of Value Added in ICT Sector)	10	13	12	12	11	10.9
Other (% of Value Added in ICT Sector)	24	21	27	32	43	46.1
Value Added in the ICT Sector as a % of GDP	5.2	5.4	5.3	5.9	6.4	6.7
Growth Rate in the ICT Sector (%)	13	15.1	13.2	13.1	13.3	10.5
DATA ON ESTABLISHMENTS & EMPLOYMENT					.	
Number of Establishments in the ICT Sector	108	116	129	134	139	137
Number of Employed persons in the ICT Sector	7,970	10,170	11,250	12,360	12,826	13,116
Employment in the ICT Sector as a % of Total Employment	2.8	3.5	3.7	4.1	4.2	4.3
DATA ON ICT TRADE						
Imports of ICT Goods & Services (Rs million)	15,000	9,005	8,511	7,687	8,737	8,899
Exports of ICT Goods & Services (Rs million)	11,435	4,764	5,115	3,046	3,803	4,988
Imports of ICT Goods & Services as a % of Total Imports	10	5.5	4.7	4.7	4.6	4.1
Exports of ICT Goods & Services as a % of Total Exports	9	3.4	3.5	2.2	2.4	2.9

Notes:
1. Figures for ICT Industry Statistics are taken from the Economic & Social Indicators - ICT Statistics 2011 published by the Statistics Mauritius (SM)
2. Figures for Value Added in the ICT sector are based on the activities of manufacturing, telecommunications, wholesale and retail trade and other activities such as call centres, software development, website development and hosting. Multimedia, IT consulting and disaster recovery (Source: SM)
3. Establishments refer to Large establishments, i.e. employing 10 or more persons, as adopted by the SM
4. Number of Employed persons in the ICT sector refers to persons employed in Large Establishments, which is employing 10 or more persons

Source: ICTA Data

[13] http://www.gov.mu/portal/site/Mainhomepage/menuitem.a42b24128104d9845dabddd154508a0c/?content_id=4c94fbbd6c537310VgnVCM1000000a04a8c0RCRD

The Information Technology (IT)/Business Process Outsourcing (BPO) industry currently employs around 15,000 people. Some 400 companies are operating in this industry, with more than 20% of them housed at Ebene Cybercity, a cyber-park created by Government within the context of the promotion of ICT.[14]

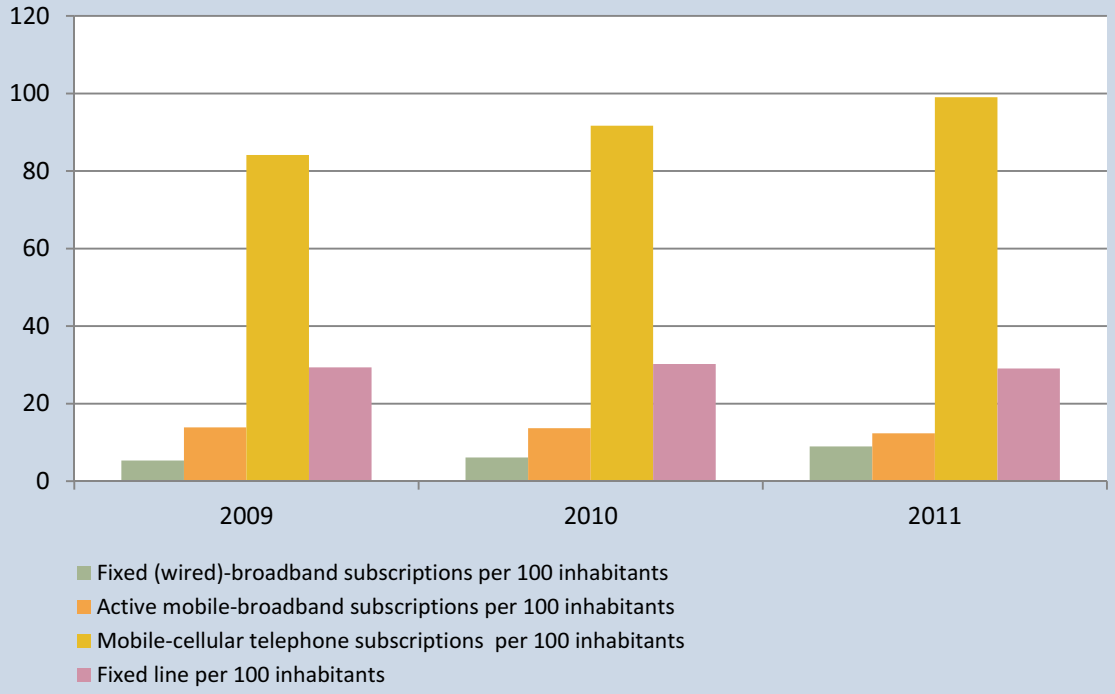
ICT penetration has increased significantly in the last decade. Thus, for example, the percentage of households with mobile cellular telephone increased from 82.8% in 2008 to 100.4% in 2011. Households with television increased slightly from 96.4% in 2008 to 96.9% in 2010. Some 11.9% of households had more than one television set in 2010, compared with 9.7% in 2008. Around 22.2% of households reported having paid TV channels (other than MBC) in 2010, against 16.9% in 2008. The proportion of households owning computers increased to 38.2% in 2011 and those having Internet access increased to 36.4 % in 2011 (Figure 3), compared with 29.9% and 20.2% respectively in 2008.

Further, research has suggested that in 2010, some 62.1% of households with no computer at home reported that a computer was not necessary, while a further 33.6% considered a computer to be too expensive for them to buy one. Around 62.1% of households with no computer had no intention to buy one; 6.2% intended to buy one over the next twelve months and 24% to buy one after a year. In 2010, among households with a computer, 71.5% had access to the Internet. More than half (51.2%) of those with Internet used ADSL. Among households without an Internet connection, 7.6% intended to obtain access within the next twelve months and another 20.8% after one year.[15]

[14] http://www.gov.mu/portal/sites/indicators/ICTSector.html

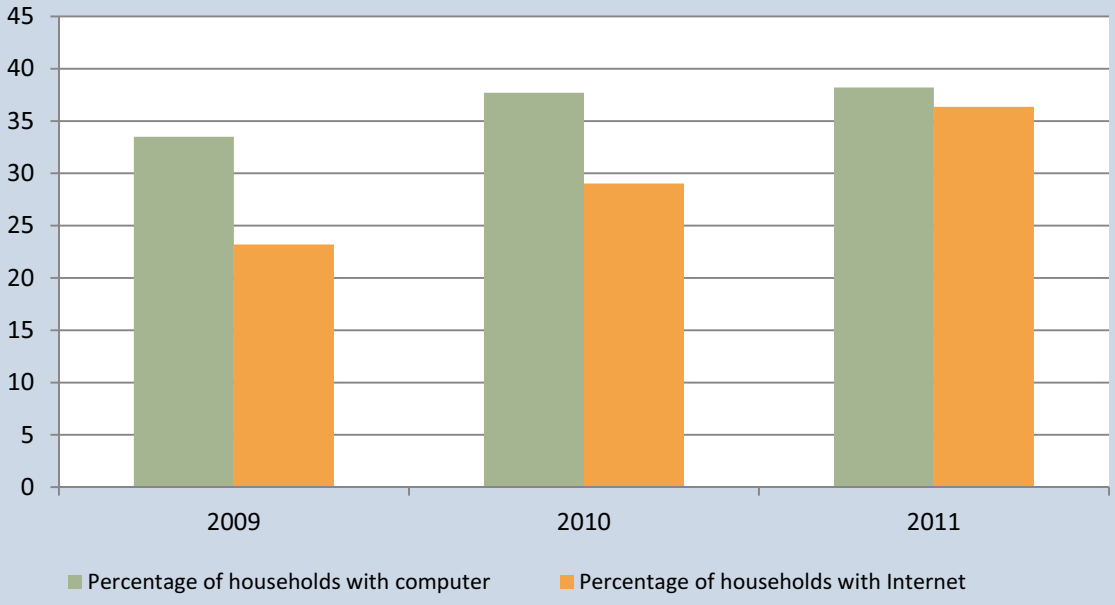
[15] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf and http://www.gov.mu/portal/sites/indicators/ICT%20Households/frequency%20usage.html

Figure 2: Growth in ICT penetration, 2009-2011



Source: ITU World Telecommunication /ICT Indicators database

Figure 3: Household Use of ICTs



Source: ITU World Telecommunication /ICT Indicators database

With liberalisation and the definition of a clear institutional, legal and regulatory framework, new operators have emerged in the Mauritian telecommunication market since the 1980's. Africa's first cellular system was launched in Mauritius in 1989, its first commercial 3G mobile service was launched in 2004, one of the world's first nationwide WiMAX wireless broadband networks in 2005, and one of Africa's first IPTV services in 2006.[16] Currently, several of the major access providers (including Mauritius Telecom Ltd. and Emtel Ltd.) have already elaborated development plans for their networks to ensure that they can continue offering the latest services on a competitive basis. Mauritius Telecom, for example has implemented its Next-Generation Network (NGN) upgrade in its core network. Emtel, on the other hand, has deployed a fibre optic cable network in several parts of the island.[17]

All sectors of the market are now open to competition, and Mauritius Telecom has been partially privatized in 2000. The aim of attracting an equity investor to help expand and modernise the Mauritian telecommunications infrastructure.[18] France Télécom acquired a 40% stake in MT for USD261 million. France Telecom holds its shares through its investment vehicle RIMCOM.[19] The Government of Mauritius, the State Bank of Mauritius (through its wholly-owned subsidiary SBM Investments Managers Ltd) and the National Pensions Fund hold 59% of shares in Mauritius Telecom ("MT"). 1% of MT shares were sold to eligible employees and pensioners in 2007 at a discounted rate under an Employee Share Participation Scheme. Mauritius Telecom is active in the mobile, fixed and Internet markets through its subsidiaries, CellPlus Mobile Communications Ltd and Telecom Plus Ltd. Since April 2008, Orange is the only brand used in the mobile and Internet markets.[20]

Companies active in the telecommunication sector are: Mauritius Telecom (40% owned by France Telecom), MTML (Indian-owned Mahanagar Telephone Mauritius Ltd); Emtel (a joint venture between local owners, Currimjee Jeewanjee & Co Ltd and Millicom); ADB (Africa Digital Bridges) Ltd, under the brand name NOMAD (owned by Dubai-based Galana); Bharat Telecom Ltd, , City Call Ltd (a venture of Outremer Telecom (French-owned)), DCL (Data Communications Ltd), Hotlink Co Ltd., T@Media.com Ltd, and TLC ltd.

At present, the companies active in the sector are:

- two fixed network access providers: Orange and Emtel,
- two fibre optic submarine cables for international connectivity: SAFE/SAT-3/WASC and LIONS,
- three mobile networks: Orange, Emtel and Mahanagar,
  as well as various broadband and other service providers.[21]

[16] http://www.budde.com.au/Research/Mauritius-Telecoms-Mobile-Broadband-and-Forecasts.html

[17] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

[18] http://www.mbendi.com/indy/cotl/tlcm/af/mr/p0005.htm

[19] http://www.mauritiustelecom.com/about_us/company_profile.htm

[20] http://www.orange.com/en/group/global-footprint/countries/Group-s-activities-at-Mauritius

[21] ICTA data http://www.icta.mu/telecommunications/licences.htm and http://www.budde.com.au/Research/Mauritius-Telecoms-Mobile-Broadband-and-Forecasts.html

3.2. Fixed Telecommunications

The fixed line market is characterized by a modern, digital network, with two operators offering services - Orange (Mauritius Telecom in partnership with France Telecom) and Mahanagar, a subsidiary of India's MTNL which is the island's second fixed-line operator using CDMA2000 technology.[22]

Table 3: Fixed Telephony Services

MARKET FOR FIXED TELEPHONY SERVICES INDICATORS FOR YEAR ENDED:	2006	2007	2008	2009	2010	2011
DATA ON SUBSCRIPTION						
Total Residential Lines	293,000	296,700	275,300	284,700	294,700	281,700
Total Business Lines	64,300	64,500	88,300	90,400	93,000	92,900
Total Fixed Lines	**357,300**	**361,200**	**363,600**	**375,100**	**387,700**	**374,600**
Fixed Line Population Penetration Rate (%)	28.43	28.56	28.58	29.35	30.21	29.07
Fixed Line Household Penetration Rate (%)	87.59	87.26	79.70	81.25	83.04	81.35

Notes:
1. Figures for subscriptions have been rounded to the nearest hundred where applicable
2. Figures for penetration rates and average call duration have been rounded to 2 decimal places where applicable
3. Total Fixed Lines refers to lines which have dedicated ports in the telephone exchange, connecting the subscribers to the PSTN by access technology (Analogue Fixed, ISDN and WLL)
4. Fixed Line population penetration rate refers to the total number of fixed line subscribers divided by the estimated mid-year population for Rep of Mauritius, as released by the CSO.
5. Fixed Line household penetration rate refers to the total number of residential fixed line subscribers divided by the estimated total number of households for the Rep of Mauritius, as released by the CSO.
6. Fixed to Fixed Calls are inclusive of Inter-Island Calls.
7. The statistics provided are based on the best available estimates for the period ending 2011 at the time of disclosure.

Source: ICTA Data

3.3. Mobile Networks

Mobile penetration rate was around 82% in 2009, paving way for intense competition among operators to retain their customers and acquire new ones. Today, mobile penetration is above 100%.[23]

There are three mobile networks – Orange (Mauritius Telecom in partnership with France Telecom), Emtel (operated by Millicom International) and Mahanagar, a subsidiary of India's MTNL.[24]

Analysts calculated that the mobile communications market earned revenues of USD174m in 2009 and is estimated to reach USDD 271m in 2016. High disposable income and a vibrant tourism industry, as well as growing demand for mobile broadband and multimedia, and the diminishing costs of handsets have contributed to these positive figures.[25]

The highest growth rates are currently seen in the mobile broadband sector, where HSPA and EV-DO based 3G services are competing with fixed-line DSL and other wireless broadband offerings, including WiMAX.

FTTC and FTTH roll-outs are in progress, with 100 Mb/s connections on offer to businesses, and nationwide coverage planned for 2015. [26]

[22] http://www.budde.com.au/Research/Mauritius-Telecoms-Mobile-Broadband-and-Forecasts.html

[23] http://www.budde.com.au/Research/Mauritius-Telecoms-Mobile-Broadband-and-Forecasts.html

[24] http://www.budde.com.au/Research/Mauritius-Telecoms-Mobile-Broadband-and-Forecasts.html

[25] Mauritian mobile communications market to reach USD271m in 2016: Frost & Sullivan, available at: http://telecoms.cbronline.com/news/mauritian-mobile-communications-market-to-reach-271m-in-2016-frost-sullivan-270710

[26] http://www.budde.com.au/Research/Mauritius-Telecoms-Mobile-Broadband-and-Forecasts.html and

Mauritius Telecom-Orange is the mobile telephony leader with a market share of 55%.[27] The number of mobile data customers has increased significantly and accounted for 16% of total customers by the end of 2011.[28] The number of mobile handsets and tablets sold in 2011 increased by 15% and doubled in the direct sales outlets.

As the second operator to join the mobile telephony market after Emtel, CellPlus Mobile Communications Ltd opened for business in October 1996 and developed its GSM service within the 900 and 1,800 MHz bands. GPRS service has been available since December 2004 and 3G became operational in November 2005.[29]

Emtel introduced High-Speed Downlink Packet Access (HSDPA) in 2007 in the main locations on the island, including Cybercity. It also introduced data services in the same year through its own WiMAX network.[30]

Table 4: Mobile Market Overview

MARKET FOR MOBILE TELEPHONY SERVICES						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON SUBSCRIPTION						
Total Prepaid Mobile Subscriptions	723,600	871,400	969,800	1,013,000	1,099,200	1,191,900
Total Postpaid Mobile Subscriptions	48,800	57,300	63,500	73,800	91,700	102,200
Total Mobile Subscriptions	**772,400**	**928,700**	**1,033,300**	**1,086,800**	**1,190,900**	**1,294,100**
Mobile Penetration Rate (%)	61.46	73.42	81.23	85.05	92.79	100.42

Notes:

1. Figures for subscriptions have been rounded to the nearest hundred where applicable
2. Figures for penetration rates and average call duration have been rounded to 2 decimal places where applicable
3. Mobile penetration rate refers to the total number of mobile subscribers divided by the estimated mid-year population for Rep of Mauritius, as released by the CSO.
4. The statistics provided are based on the best available estimates for the period ending 2011 at the time of disclosure.

Source: ICTA

3.4. International Access

Total international bandwidth capacity reached nearly 10 Gbps in 2011, some forty times greater than its initial level in 2005, which has benefited various ICT-related activities such as ITES-BPO, call centres, international voice traffic, and Internet access among others. [31]

With regard to the actual capacity available in terms of outgoing international Internet bandwidth, EMTEL Ltd stands at some 4.34 Gbps as at Quarter 2 of 2011, having experienced more than forty-fold increase over the period 2005 to 2011, as compared to 116 Mbps in 2005.

Mauritius Telecom is a member of the South Africa Far East (SAFE) submarine fibre optic cable project linking South Africa with Malaysia and India via Mauritius and Reunion Island. Mauritius Telecom-Orange has been connected to the SAFE submarine cable since 2002. A second connection point was installed in

[27] http://www.orange.com/en/group/global-footprint/countries/Group-s-activities-at-Mauritius
[28] http://www.orange.com/en/group/global-footprint/countries/Group-s-activities-at-Mauritius
[29] http://www.orange.com/en/group/global-footprint/countries/Group-s-activities-at-Mauritius
[30] Southwood, R., The Case for "Open Access" in Africa: Mauritius case study, Association for Progressive Communications (APC), 2008, available at http://www.apc.org/en/pubs/research
[31] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

2009 via the Lower Indian Ocean Network (LION) cable, a 1,800km submarine fibre optic cable connecting Mauritius, Reunion and Madagascar with a capacity of 1.3Tb/s. Mauritius Telecom and Emtel have invested in LION in a joint venture with France Telecom and Orange Madagascar. Mauritius Telecom is also a partner in the ACE submarine cable which runs from France to South Africa along the continent's west coast

With the LION and EASSy cables becoming operational as of 2010, connectivity has opened up with East Africa and voice and data traffic benefiting from the security of an alternative route. The commissioning of the LION 2 cable in April 2012 has provided even more international bandwidth, redundancy and resilience for the MT Group and Emtel as well as their users and has brought bring prices further down.[32]

Table 5: International Long Distance Market

MARKET FOR INTERNATIONAL LONG DISTANCE SERVICES						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON OPERATORS						
Number of International Long Distance (ILD) Service Providers in operation	7	7	7	9	9	9
DATA ON CALL USAGE						
Volume of ILD Calls originated from Fixed Access Networks (million mins)	41	49	50	56	41	41
Volume of ILD Calls originated from Mobile Access Networks (million mins)	19	22	57	67	92	93
Total Outgoing ILD Voice Calls (million mins)	**60**	**71**	**107**	**123**	**133**	**134**
Volume of ILD Calls terminated to Fixed Access Networks (million mins)	94	114	76	78	90	87
Volume of ILD Calls terminated to Mobile Access Networks (million mins)	48	57	89	83	93	75
Total Incoming ILD Voice Calls (million mins)	**142**	**171**	**165**	**162**	**183**	**162**

Notes:
1. Figures for volume of International Long Distance (ILD calls), in million minutes, have been rounded to the nearest digit
2. The statistics provided are based on the best available estimates for the period ending 2011 at the time of disclosure.

Source: ICTA

3.5. Internet

NOMAD was created after a local ISP called Network Plus was taken over by the current owners, African Digital Bridges Networks Ltd, which is in turn owned by Galana. DCL specialised in international Internet telephony (with its VoIP Easicall product) and on providing services to the BPO and call centre sector. Hotlink also offers international Internet telephony under the brand name of Yello International Call Carrier and has a partnership with an international wholesaler. City Call is owned by Outremer Telecom, a company in France that built its reputation on offering cheap international calls and is doing the same in Mauritius.[33]

Licences have been awarded to 15 ISPs with MT's Orange, Network Plus and Data Communications Ltd (DCL Internet) as the major players. Telecom Plus Ltd, a fully owned subsidiary of Mauritius Telecom, started commercial operations in 1996, and provides Internet services in the country now under the Orange Brand. Telecom Plus launched its Application Service Provider (ASP) service in 2007. Orange

[32] http://www.orange.com/en/group/global-footprint/countries/Group-s-activities-at-Mauritius.

[33] Southwood, R., The Case for "Open Access" in Africa: Mauritius case study, Association for Progressive Communications (APC), 2008, available at http://www.apc.org/en/pubs/research.

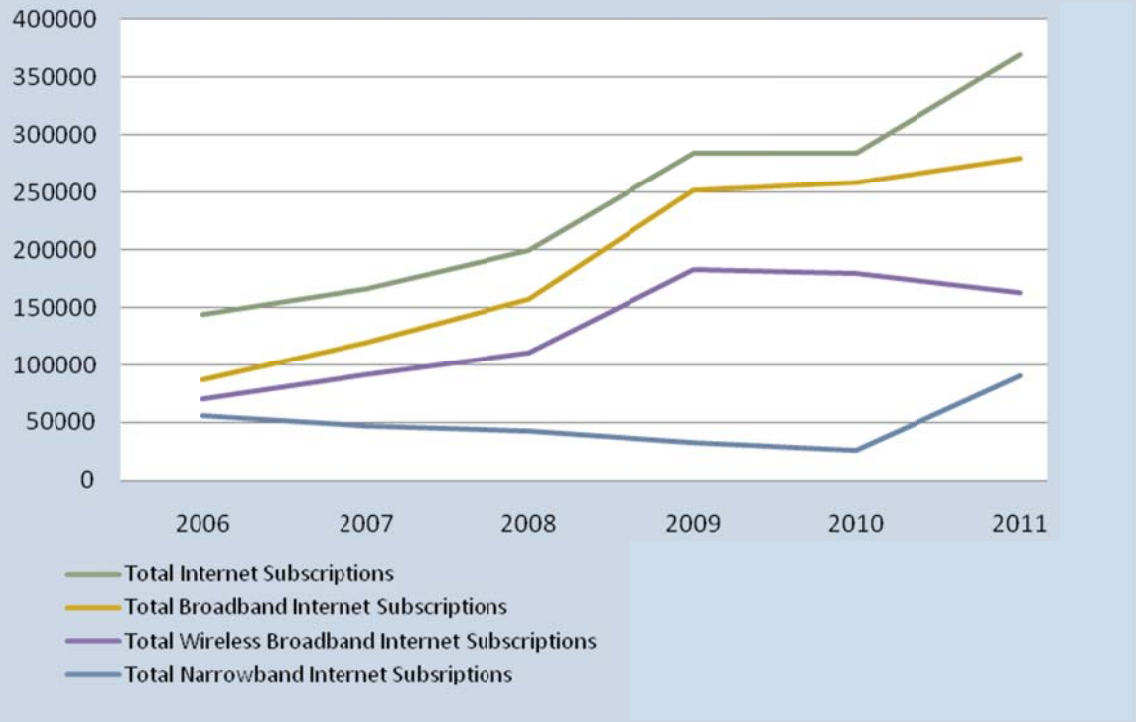
offers both dial-up and broadband Internet services and a wide variety of IP services to both individuals and business users.

The mobile operator Mahanagar now also offers Internet access through its wireless CDMA network which provides up to 144kb/s (Internet Express) with the standard 1x technology island-wide and up to 2.4Mb/s with the EV-DO upgrade installed in parts of Mauritius.[34]

Telecom Plus launched its NetTV service in 2001, which provides Internet access through a conventional television set, which comes bundled with a keyboard, remote control, 56kb/s modem and a three-month Internet access subscription.[35]

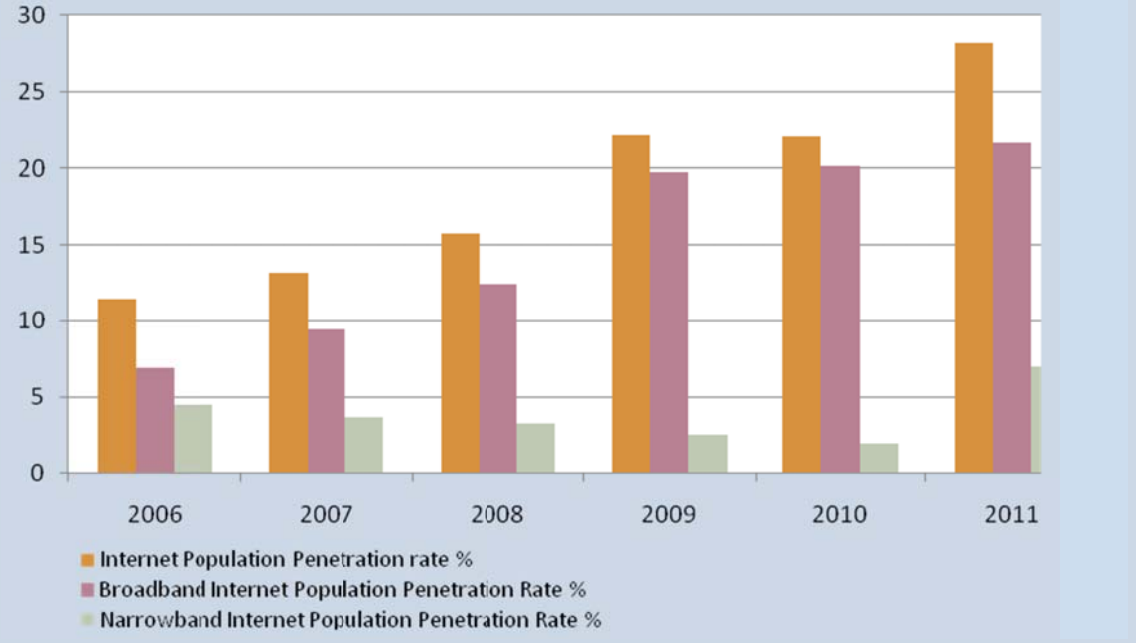
[34] Mauritius - Telecoms, Mobile, Broadband and Forecasts, Buddecomm report, April 2012.
[35] Mauritius - Telecoms, Mobile, Broadband and Forecasts, Buddecomm report, April 2012.

Table 6: Internet, Narrowband and Broadband Subscriptions (2006-2011)



Source: ICTA

Table 7: Internet, Narrowband and Broadband Penetration Rate (2006-2011)



Source: ICTA

3.6. Broadband

Presently, the Information and Communication Technologies Authority (ICTA) treats broadband transmission as a telecommunication service subject to the statutory requirements set forth under section 24 of the ICT Act 2001, as subsequently amended. ISPs licensed by the ICTA are able to provide enhanced or information services classified in most cases as broadband Internet access services.[36] Broadband Internet, defined as Internet connectivity at speed of at least 256 Kbps, was launched in 2002. In September 2011, the number of broadband Internet subscribers amounted to 232,611. The said subscribers had access to the service through Digital Subscriber Line (DSL) connection, mobile cellular telephone, using General Packet Radio Service (GPRS) including the Wireless Application Protocol (WAP), and third-Generation Mobile telephony (3G).[37]

4. Establishment and Implementation of the Broadband Strategy/Policy

4.1. Background

Box 2: A Clear Vision by Government

"The vision of the Government of Mauritius is to make of the ICT sector the fifth pillar of the economy and transform Mauritius into a regional ICT hub. Government wishes to position Mauritius as a major destination in the region for investments in this sector.

In order to achieve the above vision, Mauritius will have to leverage its investments in ICT in order to move towards becoming both an Information-based Economy and an Information Society."

Ministry of Information Technology and Telecommunications, Republic of Mauritius, National ICT Policy 2007-11, available at: http://www.ist-africa.org/home/files/Mauritius_ICTPolicy_2007-11.pdf

Since 1989, Mauritius has been a front-runner in an overall comprehensive national ICT policy and liberalized telecommunications framework, more recently in line with the Millennium Development Goal (MDG)[38] 8 – *Target: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications.*

Not only has Government through the Ministry and the NRA defined a clear institutional framework, but it has also followed up with the necessary policy measures as well as legal and regulatory decisions, which it has revised regularly to adapt to the changing ICT landscape and to make the ICT market appealing and

[36] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

[37] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

[38] Southwood, R., The Case for "Open Access" in Africa: Mauritius case study, Association for Progressive Communications (APC), 2008, available at http://www.apc.org/en/pubs/research

attractive to flagship companies and foreign investment, thereby creating economic opportunities for citizens.

The Government has also been at the forefront in driving ICT access and use at all levels of society and has implemented a number of ICT projects with ambitious targets, both in terms of supply of infrastructure and take-up of services. Such initiatives have been defined since 1989 within the context of a long-term strategy of promoting ICTs and their use within the country. Recently, broadband has also developed in light of the key elements of the various policy initiatives issued by the Ministry and the NRA.

Box 3: Holistic Approach to ICT Development

"Development should not be confined to mere economic growth. In its wider sense, development is about the re-distribution of wealth and growth, ensuring sustainable livelihoods, integrating people who have been left at the margins of society and bridging the digital divide. This is why ICTs are often associated with the term 'enabler' because, if properly harnessed, ICTs offer prospects that traditional policy instruments have failed to deliver and can also dramatically improve the chances of any given country towards meeting its commitments under the Millennium Development Goals. Therefore, in recognising the scope for development of the ICT sector, it is fundamental that the regulatory framework that has been designed to develop the ICT industry of Mauritius is constantly adapted to maximise the gains and opportunities afforded by ICTs."

ICTA Annual Report on the Development of the Information and Communication Industry in Mauritius: 2009, available at: http://www.icta.mu/documents/publications/ict_report09.pdf

Since 1989, the Government of Mauritius took early and consistent measures to create an enabling environment and robust infrastructure for ICTS and to position Mauritius as a key player in ICTs, including through the definition of policy measures and legal and regulatory instruments to support the liberalization of the telecommunication sector, create an ICT literate workforce, address the issues of affordability and accessibility of communications services, and to improve the capacity of public institutions to use ICTs.

4.2. Institutional Framework

As an initial step, *key institutional decisions* were made in 1989 with the creation of the National Computer Board, the Central Informatics Bureau, the State Informatics Limited, and the State Informatics Training Centre Limited. Regulation and operation were also separated, with the *Ministry of Information Technology and Communication Technology* dealing with the formulation and implementation of government policies in the ICT sector, and Mauritius Telecom being created in 1992.

Recently, the Ministry of Information and Communication Technology has also been mandated with the responsibility for the elaboration of policies to circumvent challenges facing ICT businesses as a whole, and has taken the lead in elaborating the National Broadband Policy of January 2012. This is in line with the Government's recognition of the importance of continuously monitoring policies and the value of the national ICT assets in linking to the sector reform programmes as clearly enshrined in the Government Programme 2010-2015 and emphasized in the National Information and Communication Technology Strategic Plan 2011-2014.

Recognizing the need to bring regulation up-to-date in light of the convergence of ICTs and to promote affordable and adequate access to quality ICT services through functional market-driven competition and regulatory principles in a trouble-free Networked Information and Knowledge Society, Parliament passed the *Information and Communication Technologies Authority* (ICTA) Act in late 2001, effectively creating the ICTA which has the status of a body corporate.

Since its creation, ICTA has embarked on the process of consolidating regulation across convergent sectors (such as telecommunications, broadcasting and IT) and has created a forward-looking and more flexible regulatory framework to enable ICTA to transform and remain a resilient organisation in response to constant technological change and convergence.[39]

In accordance with sections 16 (b) and 16 (d) of the ICT Act 2001 (as amended), ICTA has actively pursued key objectives, including "to create a level playing-field for all operators in the interest of consumers" and "to ensure that telecommunication services are reasonably accessible at affordable cost nationwide and are supplied as efficiently and economically as practicable and at performance standards that reasonably meet the social, educational, industrial, commercial and other needs of Mauritius."[40]

ICTA is managed and administered by the ICT Board consisting of a Chairperson and 6 other members appointed by virtue of their qualifications, expertise, and experience in the subject matter. The executive arm of ICTA is headed by an Executive Director who has a staff of around 75 employees under his administrative control. The Executive Director oversees the running of five departments: namely, the Department of Engineering, the Department of Information Technology, the Department of Finance and Administration, the Department of Marketing & Communications, the Department of Service Regulation and Legal Affairs.[41]

The Competition Act 2007 also established the Competition Commission of Mauritius to promote competition and to deter anti-competitive or restrictive business practices. The ICTA is tasked with the promotion of the interests of the ICT sector, including the fostering of competition and the maintenance of a level playing field.

There is presently a statutory MOU which recognizes that in certain aspects of information and communication technologies regulation, the Competition Commission of Mauritius (CCM) and the Information and Communication Technologies Authority (ICTA) have overlapping powers, and in which the scope of intervention of both institutions is clearly described. In addition, there is the general agreement that ICTA acts ex-ante while CCM acts ex-post. Amendments made to sections 30 and 31 of the ICT Act in December 2011 established a statutory joint Working Group established between the ICTA and CCM in relation to market definition and SMP regulation.

[39] http://www.icta.mu/it/itoverview.htm
[40] http://www.icta.mu/telecommunications/teleoverview.htm
[41] http://www.icta.mu/home/organigram.htm

4.3. Policy Measures

Box 4: A Clear Statement of Commitment

"ICT and ICT enabled development in Mauritius should be policy-led, ensuring a better synergy between the public and private sectors and alignment with national goals."

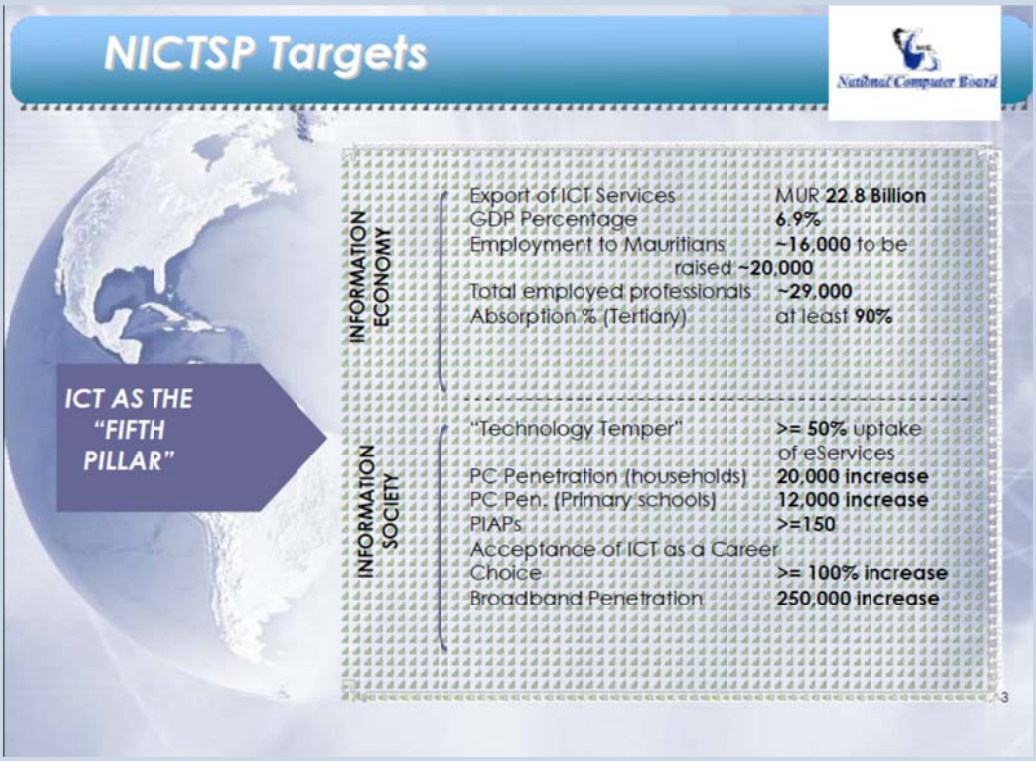
Ministry of Information Technology and Telecommunications, Republic of Mauritius, National ICT Policy 2007-11, available at: http://www.ist-africa.org/home/files/Mauritius_ICTPolicy_2007-11.pdf

In 1997, Mauritius made clear commitments under the World Trade Organization (WTO) to open its telecommunication sector to competition and end all monopolies and exclusive rights to domestic and international services by 2004. Within this context, Government agreed to sell 40% of Mauritius Telecom shares to France Telecom. Emtel entered the market in 1989 offering mobile telephony services from 1989.

These policy measures were followed in 1998 with the adoption of the *first National Information and Communication Technology Strategic Plan (NICTSP),* which formulated a number of key ICT policy elements, and defined projects in terms of ICT awareness, human resource development, government computerisation, and standard setting. The first five years of the NICTSP between 1998 and 2005 were reviewed in 2006.

A revised strategy adopted was adopted after this first review for the period 2007-2001 – *NICTSP 2007-2011*. This Policy revolved around focusing on niche markets in the ICT industry, developing strategic partnerships with ICT leaders, investing in world-class infrastructure, emphasizing the development of ICT culture, providing for an adequate supply of human resources, and establishing a favourable business environment. The 2007-2011 Plan contained 15 programmes across 124 projects, representing one of the most ambitious e-strategies of any developing economy.

Figure 3: NICTSP 2007-2001 Targets



Source: National Computer Board, Mauritius, The Cyber Island: Using ICT Indices for Policymaking, 7th World Telecommunication/ICT indicators meeting, Cairo, Egypt, 3-5 March 2009

A further review to the plan led to the elaboration of the *The National ICT Strategic Plan 2011-2014: towards i-Mauritius*, which gives significant policy guidance to successfully embrace the knowledge economy journey and to respond to the dynamic changes linked to such journey. It is also in line with the Government's aspirations of transforming the nation into a high-value economy whilst at the same aiming for inclusiveness of the population. The country expects to continue to implement more initiatives as its 2014 Plan gathers speed.

Figure 4: Key projects realized in terms of ICT accessibility and availability since 2005

- **2005:** Free Broadband Internet Access in secondary schools and a National Internet Exchange Point established
- **2006**: Setting up of ICTA-funded Public Internet Access Points in Post Offices across the island
- **2006**: Universal ICT Education Programme : Trained 400,000 people over 4 years in ICT Literacy
- **2006**: Interactive E-government services made available, introduction of full cost-based Interconnection Usage Charges (IUC) with zero Access Deficit Compensation
- **2007**: Reduction of Internet access charges and adoption of cost-based IPLC international connectivity tariffs
- **2008:** Setting up of Universal Service Fund (USF), Introduction of Digital E-inclusion Project (PCs for low income households and NGOs), Community Empowerment Programme: setting up of computer clubs in youth and women centres across the island.
- **2009:** Citizens can access e-government via mobile channels and setting up of community web portals across the island.
- **2010** onwards: National ID Card based on smart card technology and PKI : online transactions and payments: reduction on Mobile Termination Rates

Source: National Computer Board, Mauritius, The Cyber Island: Using ICT Indices for Policymaking, 7th World Telecommunication/ICT indicators meeting, Cairo, Egypt, 3-5 March 2009

The Broadband Policy released on 20 January 2012 is another key policy measure aimed at creating a comprehensive framework to create digital online technologies and associated services which are accessible and affordable to the citizens. *The National Broadband Policy 2012 – 2020 (NBP2012)* sets out a strategic vision for a Broadband Intelligent Mauritius, branded as "Towards i-Mauritius", and establishes national goals regarding broadband, while elaborating specific policies to achieve those goals within the overarching National ICT Strategic Plan (NICTSP) 2011-2014 context.[42]

As such, the NBP 2012 aims to facilitate the provision of affordable, accessible, universal access to broadband infrastructure and services to promote the social and economic opportunities made available by broadband in order to ensure the best possible conditions under which Mauritius can grow further as a knowledge-based society.

The major pillars of the NBP2012 include implementing and fostering a broadband ecosystem in the ICT services market, within the required regulatory framework, and paving the way for the adoption of the said concept within the overall economic activities of the country.

[42] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

Funding for Broadband will be a mix of private and public financing. In terms of the Broadband ecosystem which was defined, Government is investing significantly in the adoption and promotion phases. Furthermore, Government is investing in building e-Government applications which are citizen-centric; priority areas are e-Health, G2G and G2B as well as G2C applications. On the other hand, private operators are investing in infrastructure deployment. A licence was granted to Bharat Telecom, for example, to establish a FTTH and FTTB infrastructure, which it is building using its own private financing. Privately owned telecoms operator Bharat Telecom Ltd (BTL) announced in March 2012 that it is launching a fibre-to-the-home (FTTH) service in Mauritius. The telco, which was incorporated in August 2010, hopes to deliver a range of services to Mauritian households over the new platform, including broadband internet and IPTV. Further, the operator says it intends to use digital infrastructure based on Gigabit Ethernet Passive Optical Network (GEPON) technology, to act as a carrier backbone for other service providers in the country operating in the gaming and WebTV business spheres.[43]

Mobile operators have been assigned LTE 4G spectrum to deploy mobile broadband infrastructure. The USF on the other hand is being used to create free WiFi hotspots across the country with a view to allowing citizens to experience broadband ubiquitously. The USF will also be used to address connectivity issues in the outer islands (Rodrigues and Agalega) where there are clear sign of market failures and real-access gap.

Key policy objectives of the 2012 NBP include:

- To achieve robust competition and, as a result, maximize consumer welfare, innovation and investment;
- To ensure efficient allocation and management of scarce resources, such as spectrum, facilities (e.g. poles), and rights-of-way, to encourage network upgrades and competitive entry;
- To reform current universal service mechanisms to support universal deployment of broadband in even high-cost areas and ensure that low-income Mauritians can afford broadband;
- To support efforts to boost the adoption and utilisation of broadband;
  To facilitate reform to laws, policies, standards and incentives to maximize the benefits of broadband in sectors where government influences significantly, such as public education, health care and government operations.[44]

Within the context of the Policy Objectives, a number of targets have been identified, as shown in the Figure 5 below.

[43] Bharat Telecom Mauritius launches FTTH service, Telegeography, March 2012. Available at: http://www.telegeography.com/products/commsupdate/articles/2012/03/20/bharat-telecom-mauritius-launches-ftth-service/

[44] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

Figure 5: National Broadband Plan 2012 Targets

- By 2014, at least 60% of homes should have affordable access to actual download speeds of at least 10 Mbps and actual upload speeds of at least 5 Mbps; and by 2020, almost 100% of home should have affordable access to actual download of 100 Mbps;
- Mauritius should become a leader in the region in mobile innovation, with the fastest and most extensive wireless networks by 2020.
- By 2020, every Mauritian should have affordable access to robust broadband service and the means and skills to subscribe thereto if they so choose.
- By 2020, every public institution should have affordable access to at least 100 Mbps broadband service to anchor institutions such as schools, hospitals and government buildings.
- To ensure safety of the public at large, every alarm monitoring and security response service provider should, by 2020, have access to a nationwide, wireless, interoperable broadband public safety network.
- To ensure that Mauritius leads in the clean energy economy in line with the Maurice ile Durable (MID) programme, every Mauritian should, by 2020, be able to use broadband to track and manage their real-time energy consumption.

Source: Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

The NBP 2012 also addresses the availability and financing of broadband in Mauritius. As such, the NBP 2012 provides that everyone in Mauritius should have access to broadband services supporting a basic set of applications (including sending and receiving e-mail, downloading Web pages, photos and video, and using simple video conferencing. Ensuring that all people have access to broadband requires the ICTA to set a national broadband availability target to guide public funding.

The NBP2012 also provides an initial universalization target of 1 Mbps for actual download speed and 256 kbps for actual upload speed, with an acceptable quality of service (QoS) for interactive applications, would ensure universal access. It also recognizes however that while the Government is aiming for higher speeds, operators will be forced to direct more investment toward meeting this initial target. [45]

In terms of financing, the NBP 2012 requires ICTA to improve the performance of the USF and provides that the Ministry will also draft Regulations to broaden USF contributions so as to provide for long-term sustainability of USF.[46]

[45] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

[46] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

These are critical drivers central for major ICT uptakes and economic multipliers in the making of the Intelligent Mauritius branded as i-Mauritius.

4.4. Legal and Regulatory Framework

Box 5: Comprehensive and Effective Policy and Regulatory Framework

Acknowledging the capacity of ICT to become an even more powerful tool to accelerate both social cohesion and economic development, while increasing efficiency productivity across all sectors and enable a high standard of living, both the Ministry and the regulator have pursued measures aimed at bridging the digital divide, lowering the cost of telecommunications, establishing the right eco-system to permeate the use of ICT throughout the country and make access to the internet a basic citizen's right, and positioning the country as a safe and reliable ICT destination capitalising on the existing bilingual workforce, modern ICT infrastructure and good governance within the country.

Policy formulation has been accompanied by the definition and adoption of clear legal and regulatory measures aimed at implementing policy and creating the environment necessary to promote investment and use of ICTS. The Institutional Framework was defined in 2001, with the creation of ICTA through the Information and Communication Technologies Act.

A new licensing framework was introduced in July 2003, and applications from prospective operators were invited by ICTA for the following three categories. The ICT (Amendment of Schedule) Regulations 2003 structures the licensing framework in three categories, namely: (1) Commercial, (2) Private Network, and (3) Engineering. The Commercial licence category defines three types of licences, namely (1) Infrastructure provider, (2) Networking Services Provider and (3) Network Application Provider. The infrastructure provider is only authorized to set up the physical infrastructure for operators and service providers, the networking services provider on its part is allowed to offer networking services which includes the provision of network capacity (e.g. leased circuits) to service providers. The network application provider is allowed to offer services to the general public.[47]

ICTA approved licence applications from 14 companies to enter the domestic telecom market, ten for international long distance (ILD) and one each for fixed-line, payphone, internet and mobile services.[48] ICTA was also one of the first NRAs to license VoIP service providers with the aims of having such service providers offer cheaper international calling rates to users.[49] Annual license fees ranged between USD170,400 for an ILD license to USD 34,000 for an Internet telephony licence USD 265,000 for a Fixed-

[47] ICTA Annual Report on the Development of the Information and Communication Industry in Mauritius: 2009, available at: http://www.icta.mu/documents/publications/ict_report09.pdf

[48] Mauritius - Telecoms, Mobile, Broadband and Forecasts, Buddecomm report, April 2012.

[49] Southwood, R., The Case for "Open Access" in Africa: Mauritius case study, Association for Progressive Communications (APC), 2008, available at http://www.apc.org/en/pubs/research

line and cellular licences and USD 1,600 for Internet and payphone licences.[50] The licensing regime adopted in 2003 has been a major driver for development of the sector.[51]

Since its creation in July 2002, ICTA has achieved several significant milestones pertaining to spectrum management which have greatly helped the development of the ICT sector by enabling new technologies to be deployed in Mauritius and novel services to be offered:

- ICTA has established a National Spectrum Allocation Plan, introduced spectrum refarming of the 1800 MHz band for the purpose of deploying DCS1800 mobile networks, as well as spectrum refarming of the 2.1 GHz band and allocation of the said band to IMT-2000 services,

- ICTA has reviewed the licensing procedure for Private Mobile Radio (PMR) and proposed a review of the licensing regime with a view to including individual licensing, class licensing and licence exempt, introduced spectrum planning and allocation for Broadband Wireless Access (BWA) Services to enable the deployment of BWA technologies such as WiMAX,

- ICTA has introduced spectrum planning and international coordination for Digital Terrestrial Television Broadcasting, and reorganized the 900 MHz band and opened the EGSM band in order to cater for Mahanagar Telephone (Mauritius) Ltd.[52]

Recognizing the potential of 4G to offer a solution to operators to deliver a range of data services, at much higher speeds with the added advantages of mobility and flexibility, ICTA adopted a Decision on 5 June 2012 on Additional Spectrum for the Terrestrial Component of the International Mobile Telecommunications (IMT) in the 1800 MHz Band to release additional spectrum for operators in Mauritius to provide high-speed mobile Broadband services such as 4G and beyond (LTE). This Decision is in line with the Government's National Broadband Policy to gear Mauritius towards greater broadband uptake and penetration so Mauritian citizens can benefit from the full range that Broadband connectivity can provide in terms of innovative services.

Additional spectrum is already being made available for the deployment of the Frequency Division Duplex (FDD) for the terrestrial Component of International Mobile Telecommunications (IMT) in the 1800 MHz band. The Decision also sets out provisions for the technical, regulatory and operational provisions for the co-existence between IMT and DCS1800.[53]

In terms of major decisions taken in terms of interconnection, a number of key decisions have affected both the wholesale and retail level, including:

- carrier pre-selection for international calls (2004),

- Calling Part Pays (CPP) regime & cost based interconnection charges to mobile operators (2004),

- minimum termination charges for international calls terminated in Mauritius (2006), and

[50] Mauritius - Telecoms, Mobile, Broadband and Forecasts, Buddecomm report, April 2012.
[51] ICTA Annual Report on the Development of the Information and Communication Industry in Mauritius: 2009, available at: http://www.icta.mu/documents/publications/ict_report09.pdf
[52] ICTA Annual Report on the Development of the Information and Communication Industry in Mauritius: 2009, available at: http://www.icta.mu/documents/publications/ict_report09.pdf
[53] http://www.icta.mu/mediaoffice/2012/spectrum.htm

- cost-based interconnection charges to fixed line operators & no provision for Access Deficit Charges (2006 and 2008).

These decisions have not only assisted interconnected operators in terms of their business case, but have also ensured competitive voice call tariffs to end users within various markets.[54]

Another example of effective regulation concerns the regulatory interventions regarding the pricing of international access. Much has been accomplished in terms of falling prices for international connectivity, especially from 2002 to 2012, when various determinations were made by the ICTA pursuant to applications made by Mauritius Telecom Ltd (MT) in accordance with section 31 of the ICT Act. One of the price determinations, for example, addressed the issue of the high costs of monopoly international bandwidth on the SAT3/SAFE Cable, spurring the incumbent to lower prices.[55] A similar picture is applicable in terms of bilateral half circuits also between 2002 and 2012, with an average reduction of up to 77% over the selected routes.[56]

Such measures and the effective reduction in international bandwidth prices have effectively spurred the development of economic opportunities, including in the ICT sector, with call centres and Business Process Outsourcing (BPO) gaining significant growth in the years following such price reductions.[57] Between 2002 and 2012, the price of a full circuit E1s (a 2Mbps capacity), from Mauritius to Paris, on SAFE fell by as much as 84%. Tariffs for half circuit E1s on selected routes were also affected, with on average a 65% decrease over the period 2005 to 2009. [58]

[54] ICTA Annual Report on the Development of the Information and Communication Industry in Mauritius: 2009, available at: http://www.icta.mu/documents/publications/ict_report09.pdf

[55] Southwood, R., The Case for "Open Access" in Africa: Mauritius case study, Association for Progressive Communications (APC), 2008, available at http://www.apc.org/en/pubs/research

[56] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

[57] Southwood, R., The Case for "Open Access" in Africa: Mauritius case study, Association for Progressive Communications (APC), 2008, available at http://www.apc.org/en/pubs/research

[58] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

Table 8: Reduction in the price of full circuit International Private Leased Circuits

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Jan-12	2002 to Jan 2012 % change
Mauritius to France (MT POP Telehouse Paris)												
IPLC Full Circuit on SAFE (2Mbps E1) in USD:	22,339	12,600	12,600	12,600	7,900	6,300	6,300	4,900	4,900	4,100	3,500	84

Source: ICTA 2012

In terms of half circuit International Private Leased Circuits on SAFE, prices have also decreased significantly.

Table 9: Reduction in the price of half circuit International Private Leased Circuits

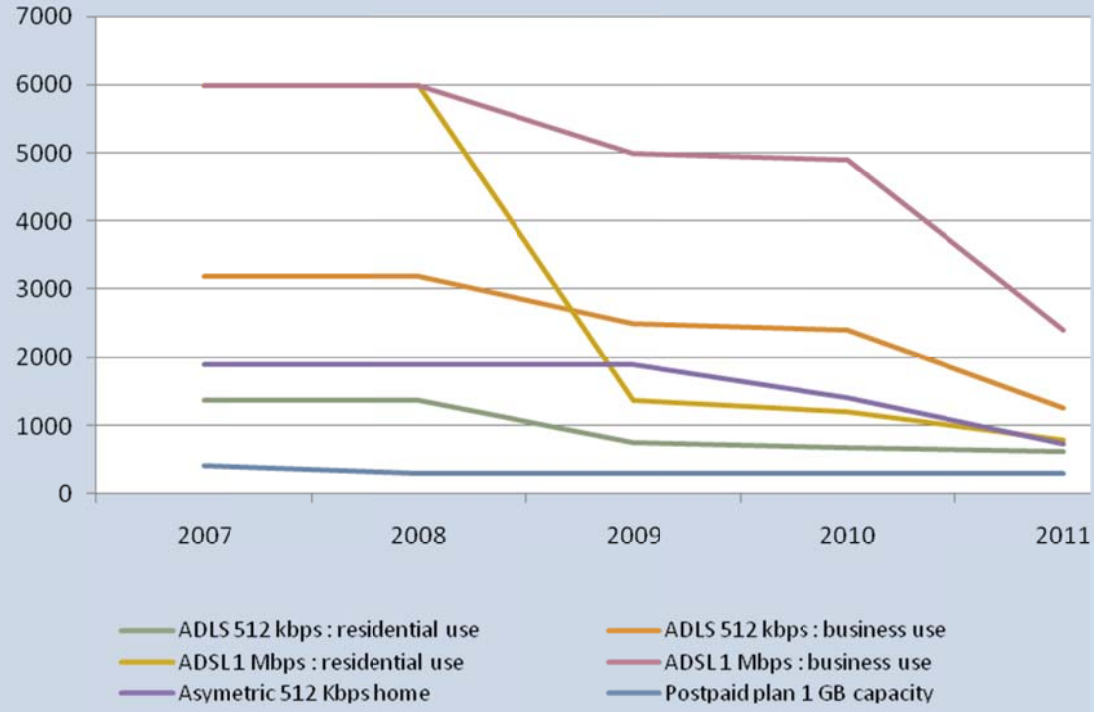
Tariffs for Bilateral Half Circuits on SAFE	2005	2006	2007	2008	2009	2010	2011	Jan-12	2005 to Jan 2012 % change
IPLC Half Circuit on SAFE (2Mbps) in USD:									
South Africa	7,112	4,753	3,802	3,802	2,484	2,484	2,156	1,954	73
Portugal	9,169	6,128	4,902	4,902	3,031	3,031	2,479	2,110	77
India	6,836	4,568	3,654	3,654	2,378	2,378	2,168	1,960	71
Malaysia	7,726	5,163	4,130	4,130	2,522	2,522	2,237	1,993	74
Reunion	5,741	3,836	3,836	3,836	2,200	2,200	2,000	1,828	68
								Avg	73

Source: ICTA 2012

The level of International Internet bandwidth available to Mauritius increased by more than 6 times, from 71 Mbps in 2004 to 462 Mbps by the end of 2008. The combination of falling connectivity costs, coupled with rising capacity levels, has led to significant changes within the relevant retail markets.[59]

[59] ICTA Annual Report on the Development of the Information and Communication Industry in Mauritius: 2009, available at: http://www.icta.mu/documents/publications/ict_report09.pdf

Table 10: Evolution of broadband Tariffs 2007-2011



Notes:
1. The tariffs provided for the relevant service markets refer to the cheapest approved tariffs being commercialised across licensed operators for a given year
2. The tariffs provided refer to selected service categories in order to allow for indicative and consistent comparisons
3. The tariffs provided for the year 2011 is as at November 2011
4. The ADSL Home Offers tariffs are to be commercialised as at 01 December 2011
5. The ADSL Business Offers tariffs are to be commercialised as at 01 January 2012

Source: ICTA 2012

The Government also established a USF at the end of 2008 to support the roll-out of telecommunications and broadband infrastructure in poor and rural areas. However, rather than just imposing a flat-rate levy, operators holding a telephony licence have a choice of either contributing a percentage of their revenues or a percentage of the price of every incoming call to the Fund.[60] Following the setting up of the operational framework of the USF in October 2008, ICTA was tasked with the management of this fund, ranging from the collection of monies from licensed operators to the disbursement of funds to selected recipients which have been earmarked for the concretisation of universal services, as decided upon by the ICTA Board, under the guidance of the USF Advisory Group.[61]

[60] Mauritius - Telecoms, Mobile, Broadband and Forecasts, Buddecomm report, April 2012.
[61] http://www.icta.mu/market/usf.htm

The Government also recognizes that in addition to the need for available and affordable international internet bandwidth, wholesale ADSL lines must also be available and affordable to promote the effective supply of retail internet services in Mauritius. Mauritius Telecom provides wholesale ADSL as part of its domestic copper-based fixed-line network. Determinations by ICTA have led to several tariff reductions by Mauritius Telecom over the past five years, resulting in a substantial decrease ranging from 30% to 50% from the prevailing price levels, depending on the selected speed and committed number of lines.[62]

The Government is also addressing the availability of ICTs through the availability of PCs. Within this context, the Government wants to bring the price of PCs below the MUR10,000 (USD350) mark and has been negotiating with Advanced Micro-Devices (AMD) for the provision of low-cost PCs. There is also an initiative to have at least one PC connected to the Internet at every state school in the country.[63]

The Mauritius Parliament also passed an Electronic Transaction Act in July 2000 to provide an appropriate legal environment for electronic transactions covering electronic contracts, the establishment of certification authorities and standards to combat forgery and fraud in electronic business. Amendments to the said Act and additional Regulations were made in 2008 and 2010 respectively to allow for the first Certification Authority to be licensed in May 2012

5. Lessons learned

The National Broadband Policy 2012 – 2020 (NBP2012) sets out a strategic vision and establishes national goals regarding broadband, while elaborating specific policies to achieve those goals within the overarching National ICT Strategic Plan (NICTSP) 2011-2014 context.

It builds on years of clear and comprehensive ICT policy and regulatory development, as well as on the effective implementation of various initiatives to support the growth of the ICT sector, including the creation of infrastructure parks, initiatives to increase capacity within ICT, and developing policies to build an investor-friendly environment. The Government is also seeking to enable an ICT-ready environment through the promotion of the usage and adoption of ICT by its citizens.

The ICT sector has effectively become the third pillar of the Mauritian economy, with a GDP contribution of 6.7%, a turnover of USD1 billion and directly employing some 15,000 people with flow-on benefits for many more. The ICT Development Index (IDI) for Mauritius has improved from 3.43 in 2008 to 4.00 in 2010, and is estimated by the Statistics Mauritius at 4.37 for the year 2011, as a direct effect resulting from improvements of ICT infrastructure and access.

IT Services, together with the Business Process Outsourcing (IT/BPO), have become a key factor for the economic growth of Mauritius. The Government is aiming to increase the contribution of the sector to GDP by increasing the number of jobs to be created in the ICT sector, increasing employment of those graduated in ICT and by increasing the number of foreign investors in the ICT sector in Mauritius.

[62] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

[63] Mauritius - Telecoms, Mobile, Broadband and Forecasts, Buddecomm report, April 2012.

The Government of Mauritius recognizes that broadband worldwide has to become a key driver of economic growth and national competitiveness. As such the NBP2012 is aimed at taking advantage of the new opportunities and overcoming the challenges facing the electronic communications sector, so the ICT sector can continue to be an important vector for economic growth.

Within this context, a number of good practices were identified which can also provide guidance to other countries defining their Broadband Policy. They are:

- Defining the broadband ecosystem for Mauritius.
- Creating a conducive environment to attract new investments and players in the new ecosystem.
- Establishing and promoting the National Broadband Infrastructure.
- Consolidating the regulatory and legislative frameworks to allow the emergence of Broadband I-Mauritius.
- Ensuring the quality of service of broadband services from "best effort" to "minimum guaranteed' levels.
- Linking the commercialising of broadband services to cost oriented elements.
- Developing a broadband handling culture for adequate usage.
- Developing a content production culture to stimulate sufficient supply and demand mixes.
- Developing efficient management strategies in the use of scarce resources for broadband deployment and monitoring thereof.
- Providing adequate broadband services within accessibility, availability and affordability ranges.
- Promoting research, innovation and competition for sustaining the broadband ecosystem.
- Introducing adequate regulatory safety-nets to ensure broadband universalisation.
- Defining institutional framework and responsibilities to achieve objectives set. [64]

[64] Ministry of Information and Communication Technology, National Broadband Policy (NBP2012), January 2012, available at: http://www.gov.mu/portal/goc/telecomit/file/NationalBroadband.pdf

ANNEX:

ICT Industry

ICT INDUSTRY STATISTICS						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON VALUE ADDED						
Value Added in the ICT Sector (Rs million) by activity:	9,858	11,714	12,994	14,851	17,036	19,004
Telecommunications (% of Value Added in ICT Sector)	66	66	61	56	46	43
Wholesale & Retail Trade (% of Value Added in ICT Sector)	10	13	12	12	11	10.9
Other (% of Value Added in ICT Sector)	24	21	27	32	43	46.1
Value Added in the ICT Sector as a % of GDP	5.2	5.4	5.3	5.9	6.4	6.7
Growth Rate in the ICT Sector (%)	13	15.1	13.2	13.1	13.3	10.5
DATA ON ESTABLISHMENTS & EMPLOYMENT					.	
Number of Establishments in the ICT Sector	108	116	129	134	139	137
Number of Employed persons in the ICT Sector	7,970	10,170	11,250	12,360	12,826	13,116
Employment in the ICT Sector as a % of Total Employment	2.8	3.5	3.7	4.1	4.2	4.3
DATA ON ICT TRADE						
Imports of ICT Goods & Services (Rs million)	15,000	9,005	8,511	7,687	8,737	8,899
Exports of ICT Goods & Services (Rs million)	11,435	4,764	5,115	3,046	3,803	4,988
Imports of ICT Goods & Services as a % of Total Imports	10	5.5	4.7	4.7	4.6	4.1
Exports of ICT Goods & Services as a % of Total Exports	9	3.4	3.5	2.2	2.4	2.9

Source: ICTA Website

ICT Market

Fixed Line Market

MARKET FOR FIXED TELEPHONY SERVICES						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON OPERATORS						
Number of Fixed Network Access Providers in operation	2	2	2	2	2	2
DATA ON SUBSCRIPTION						
Total Residential Lines	293,000	296,700	275,300	284,700	294,700	281,700
Total Business Lines	64,300	64,500	88,300	90,400	93,000	92,900
Total Fixed Lines	**357,300**	**361,200**	**363,600**	**375,100**	**387,700**	**374,600**
Fixed Line Population Penetration Rate (%)	28.43	28.56	28.58	29.35	30.21	29.07
Fixed Line Household Penetration Rate (%)	87.59	87.26	79.70	81.25	83.04	81.35
DATA ON CALL USAGE						
Volume of Fixed to Fixed On-Net Calls (million mins)	1,032	918	827	715	671	617
Volume of Fixed to Fixed Off-Net Calls (million mins)	23	54	47	47	43	32
Volume of Fixed to Mobile Calls (million mins)	327	330	325	332	328	331
National Voice Traffic Originating from Fixed Access Network (million mins)	**1,382**	**1,302**	**1,199**	**1,094**	**1,042**	**981**
Number of Fixed to Fixed Calls (million)	374	345	316	276	252	244
Number of Fixed to Mobile Calls (million)	164	169	133	177	175	179
Average Call Duration of a Fixed to Fixed Call (min)	2.82	2.82	2.77	2.76	2.83	2.67
Average Call Duration of a Fixed to Mobile Call (min)	2.00	1.96	2.44	1.88	1.87	1.85

Notes:

1. Figures for subscriptions have been rounded to the nearest hundred where applicable
2. Figures for penetration rates and average call duration have been rounded to 2 decimal places where applicable
3. Total Fixed Lines refers to lines which have dedicated ports in the telephone exchange, connecting the subscribers to the PSTN by access technology (Analogue Fixed, ISDN and WLL)
4. Fixed Line population penetration rate refers to the total number of fixed line subscribers divided by the estimated mid-year population for Rep of Mauritius, as released by the CSO.
5. Fixed Line household penetration rate refers to the total number of residential fixed line subscribers divided by the estimated total number of households for the Rep of Mauritius, as released by the CSO.
6. Fixed to Fixed Calls are inclusive of Inter-Island Calls.
7. The statistics provided are based on the best available estimates for the period ending 2011 at the time of disclosure.

Source: ICTA Website

Mobile Market

MARKET FOR MOBILE TELEPHONY SERVICES						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON OPERATORS						
Number of Mobile Network Access Providers in operation	3	3	3	3	3	3
DATA ON SUBSCRIPTION						
Total Prepaid Mobile Subscriptions	723,600	871,400	969,800	1,013,000	1,099,200	1,191,900
Total Postpaid Mobile Subscriptions	48,800	57,300	63,500	73,800	91,700	102,200
Total Mobile Subscriptions	**772,400**	**928,700**	**1,033,300**	**1,086,800**	**1,190,900**	**1,294,100**
Mobile Penetration Rate (%)	61.46	73.42	81.23	85.05	92.79	100.42
DATA ON CALL USAGE						
Volume of Mobile to Mobile On-Net Calls (million mins)	683	898	1,100	1,294	1,416	1,745
Volume of Mobile to Mobile Off-Net Calls (million mins)	103	135	160	180	192	208
Volume of Mobile to Fixed Calls (million mins)	67	71	90	89	95	89
National Voice Traffic Originating from Mobile Access Network (million mins)	**853**	**1,105**	**1,350**	**1,563**	**1,703**	**2,042**
Number of Mobile to Mobile Calls (million)	**294**	**563**	**607**	**993**	**1,152**	**1,341**
Number of Mobile to Fixed Calls (million)	**41**	**60**	**53**	**82**	**90**	**82**
Average Call Duration of a Mobile to Mobile Call (min)	2.67	1.84	2.08	1.48	1.40	1.46
Average Call Duration of a Mobile to Fixed Call (min)	1.63	1.18	1.69	1.09	1.06	1.09
Total number of SMS exchanged (million)	738	881	855	1,123	1,204	1,279

Notes:

1. Figures for subscriptions have been rounded to the nearest hundred where applicable
2. Figures for penetration rates and average call duration have been rounded to 2 decimal places where applicable
3. Mobile penetration rate refers to the total number of mobile subscribers divided by the estimated mid-year population for Rep of Mauritius, as released by the CSO.
4. The statistics provided are based on the best available estimates for the period ending 2011 at the time of disclosure.

Source: ICTA Website

International Long Distance Services Market

MARKET FOR INTERNATIONAL LONG DISTANCE SERVICES						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON OPERATORS						
Number of International Long Distance (ILD) Service Providers in operation	7	7	7	9	9	9
DATA ON CALL USAGE						
Volume of ILD Calls originated from Fixed Access Networks (million mins)	41	49	50	56	41	41
Volume of ILD Calls originated from Mobile Access Networks (million mins)	19	22	57	67	92	93
Total Outgoing ILD Voice Calls (million mins)	**60**	**71**	**107**	**123**	**133**	**134**
Volume of ILD Calls terminated to Fixed Access Networks (million mins)	94	114	76	78	90	87
Volume of ILD Calls terminated to Mobile Access Networks (million mins)	48	57	89	83	93	75
Total Incoming ILD Voice Calls (million mins)	**142**	**171**	**165**	**162**	**183**	**162**

Notes:

1. Figures for volume of International Long Distance (ILD calls), in million minutes, have been rounded to the nearest digit
2. The statistics provided are based on the best available estimates for the period ending 2011 at the time of disclosure.

Source: ICTA Website

Internet Market

MARKET FOR INTERNET ACCESS SERVICES						
INDICATORS FOR YEAR ENDED:	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
DATA ON OPERATORS						
Number of Internet Service Providers in operation	7	6	6	7	7	7
DATA ON SUBSCRIPTION						
Total Internet Subscriptions based on Fixed Access Network	82,300	87,600	94,700	105,000	106,700	133,200
Total Internet Subscriptions based on Mobile Access Network	61,100	78,400	104,800	179,000	177,500	236,800
Total Internet Subscriptions	**143,400**	**166,000**	**199,500**	**284,000**	**284,200**	**370,000**
Internet Population Penetration Rate (%)	11.41	13.12	15.68	22.22	22.14	28.71
Broadband Internet Subscriptions based on Fixed Access Network:	25,900	40,600	52,500	72,800	81,000	118,200
Broadband Internet Subscriptions based on Mobile Access Network:	61,100	78,400	104,800	179,000	177,500	161,600
Total Broadband Internet Subscriptions	**87,000**	**119,000**	**157,300**	**251,800**	**258,500**	**279,800**
Broadband Internet Population Penetration Rate (%)	6.92	9.41	12.37	19.70	20.14	21.71
Total Wireless Broadband Internet Subscriptions	70,200	91,200	110,600	183,000	179,300	163,000
Total Narrowband Internet Subscriptions	**56,400**	**47,000**	**42,200**	**32,200**	**25,700**	**90,200**
Narrowband Internet Population Penetration Rate (%)	4.49	3.72	3.32	2.52	2.00	7.00
DATA ON INTERNET TRAFFIC USAGE						
Total Dial-up Internet Traffic (million mins)	**297**	**257**	**206**	**179**	**124**	**50**
International INCOMING Internet Bandwidth Capacity (Mbps)	192	285	462	1,864	3,390	5,806
International OUTGOING Internet Bandwidth Capacity (Mbps)	153	285	462	1,864	3,390	5,806

Notes:

1. Figures for subscriptions have been rounded to the nearest hundred where applicable
2. Figures for penetration rates have been rounded to 2 decimal places where applicable
3. Broadband Internet refers to connection to the Internet at a speed equal to or greater than 256 Kbps, as the sum of capacity in both directions.
4. Narrowband Internet refers to connection to the Internet at a speed less than 256 Kbps, as the sum of capacity in both directions.
5. The statistics provided are based on the best available estimates for the period ending 2011 at the time of disclosure.

Source: ICTA Website

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