



ICTA – MAURITIUS

COUNTRY REPORT TO CRASA

April 2009

Overview

The rapid development in the realms of technology and innovation across the globe has led to a shift in focus of the ICT sector in terms of its ultimate objectives. ICTs used to be simply regarded as a means towards improving the productivity of human capital, with the associated spillover effects being felt across the rest of the economy. But today, this role of the ICT sector as a purely supportive sector has evolved towards a sector with its own socio-economic identity, and a distinct contribution to the overall GDP contribution of a given country.

The all pervasive facets of ICTs has meant that it has brought with various opportunities which policy makers have had to consider in devising a roadmap to best harness the vast potential that such a sector possesses. However, this is not without its challenges as the the ICT sector is one of the few sectors where developments occur so fast that not only policies have to be comprehensive enough, but also future-proof enough so as not to become obsolete in a short lapse of time. Especially key to this debate is the fact that access to ICTs is widely proclaimed as a key driver to reduce the digital divide, which is a fundamental foundation towards bringing equity and justice across all walks of life.

Mauritius has not been immune to all these developments in the ICT sector, but has rather anticipated the economic and social openings that this sector might generate at the outset. Consequently, policy makers have understood the need to be pro-active in order to provide the right conditions for this sector to take flight, and eventually groom it towards becoming the fifth pillar of the Mauritian economy.

This country report has been drafted with a view towards establishing the major milestones that have been reached in the various spheres as highlighted above with regards to the regulation of the ICT sector, with convergence acting as a backdrop. As much as feasible, this reports aims to establish the experience gathered from a regulatory perspective with regards to the ICT sector, so that a comparable analogy may be performed with the country reports of other CRASA members.

Historical Background

In order to realise this vision, the Government of Mauritius (GoM) has further recognised the role for targeted and effective regulation of the ICT sector, especially in the light of the not so distant liberalisation of the sector, which was eventually preponed to 01 January 2003 instead of 01 January 2004. At the same time, the ICT Act 2001 was proclaimed by Parliament in late 2001, repealing the 1998 Telecommunication Act, and establishing the Information and Communication Technologies Authority (ICTA) which started operations as regulator of the ICT sector in 2002.

It has been the case in various other countries that there is an incumbent operator which is usually present in all the major market segments, de facto due to its natural monopoly status, as such an organisation is initially a national public entity, falling under a specific

government department. This has also been the case in Mauritius, where the Department of Telecommunications was initially responsible for all the facets of telecommunications at the national level, while the Overseas Telecommunications Services (OTS) Ltd dealt with international telecommunications. In 1988, there was the corporatisation of the Department of Telecommunication into Mauritius Telecommunication Services (MTS) Ltd, which eventually took over the assets and liabilities of OTS, culminating with the creation of Mauritius Telecom (MT) Ltd in 1992.

By 1996, MT had launched 2 subsidiaries – Cellplus Mobile Communications Ltd for the mobile telephony market and Telecom Plus Ltd for the Internet Access market segment respectively. Overall, this meant that the government-owned entity known as MT had a presence in all the major market segments making up the telecommunications landscape in Mauritius. In anticipation of the need to open up the sector to the forces of competition, the GoM embarked on a partial privatization of MT in 2000, which involved a strategic equity partnership with France Telecom up to the amount of 40% entailing that while MT was envisioned to be managed as a private firm, guided by international best practices in terms of management, profitability and accountability. However, even to date, the GoM still retains a say in the affairs of MT, via its aggregated stake of 60% in the group.

The ICTA started its work as the sector regulator given the above setting. Furthermore, as is the case with several other countries, the era of digitisation allied to technological developments have had as repercussions that regulation of this sector is being done with the backdrop of convergence. The latter may be holistically described as a synergy among telecoms, IT and multimedia. While this phenomenon creates new socio-economic configurations and the associated opportunities, it also brings about regulatory uncertainty. Convergence significantly changes the ICT landscape, with the repercussion being that policy, legal and regulatory instruments must also be re-visited.

In the light of the above, the ICTA was mandated with the regulation of all the aspects pertinent to the telecommunications sector encompassing licensing, frequency management, competition, tariff, interconnection, universal access and universal service, numbering, quality of service and information technology as the main areas of interest. Additionally, a separate organisation, the Independent Broadcasting Authority, was set up to regulate the elements associated with broadcasting, especially with regards to content provision, competition and quality of delivery.

Regulation of ICT Sector: Major Milestones

As intimated in the introduction, this report is aimed at providing a breakdown of how regulation has impacted upon various critical areas, which, when taken together, make up the very fabric of the ICT sector. Consequently, this involves highlighting the main decisions and achievements in these respective spheres, taking into account the specificities that characterises the Mauritian ICT sector.

1) Licensing

One of the building blocks for the transition towards free and open competition in the post-liberalised multi-operator ICT sector was the requirement for a new licensing structure, which was put forward as from July 2003. Underlying this change was a shift from a vertically integrated regime in the pre-liberalised state towards horizontal integration in the newly liberalised context.

The granting of licenses was constructed on an evaluation protocol based on the foundations of simplicity, openness and non discrimination, in order to encourage the entry of operators, while minimising associated regulatory and business risks. In addition, the licensing regime was devised to be technology neutral to encourage licensed service providers to foray into constantly innovative solutions, networks and services to meet the needs of competition and the demands of end users.

The licensing structure made provision for two types of authorisation. Firstly, Class Licences were earmarked for networks and services which do not require access to scarce resources, and carry a limited number of rights and obligations. Secondly, Individual Licences were earmarked for networks and services which require access to scarce resources and where a high degree of regulatory control is required. The latest listing of licensed operators is placed at **Annex 1**.

2) Frequency Management

In terms of the Frequency Management policy, the ICT Authority has embarked on four main projects, which represent the key developments for 2007/08 in this sphere, as laid down below.

Spectrum Management Reform

A current state assessment report has been prepared in view of a spectrum management reform in Mauritius. The aim of this reform is to move towards a flexible, technology and service neutral, regulatory framework for spectrum management.

Consultation on the opening of the 1785 – 1805 MHz band for BWA

A public consultation on the opening of Broadband Wireless Access (BWA) in the 1785 - 1805 MHz band has been released and the Authority is currently working towards a determination based upon the responses obtained following the consultation process.

Reorganisation of the GSM 900 MHz frequency band

Presently, spectrum in the Primary-GSM 900 MHz frequency band is equally shared between two mobile (PLMN) operators. A study on the reorganization of the said frequency band and the possible opening of the E-GSM band so as to accommodate additional GSM mobile operator is currently being conducted.

Human Exposure to RF Electromagnetic Fields (EMF)

The Authority has started to conduct evaluations of base stations in accordance with the ITU-T Rec. K.52 to determine, prior to being put into service, their compliance to the ICNIRP safety limits for human exposure to EMF. Further the Authority has trained its staff in order to carry out in-situ measurements with a view to determining compliance to the said safety limits.

3) Competition

In line with the policy of liberalisation of the ICT sector, as announced by the GoM for implementation as from 01 January 2003, the reviewing and streamlining of the licensing regime for the telecommunications sector has seen, as anticipated, an increase in the number of telcos establishing themselves in the sector. The table below summarizes the situation pre-2003 and post liberalisation, in terms of the number of licensed operators by given market segments, *offering service to the public*:

Table 1: The advent of Competition in the Telecoms sector

Main Licence Holders	Pre- Liberalisation, before January 2003	Post-Liberalisation, as at June 2008
PSTN (Fixed)	1	2
PLMN (Mobile)	2	3
ILD & ITSP	1	8
ISP	2	5

Source: ICTA

The first sign of the influx of competition in a given sector is initially measured by the number of entrants into that sector. It is inferred from Table 1 that for all the major market segments, there have been several operators that had entered the race for the obtainment of a share in the respective markets.

A few pioneering firms initially attempted to take advantage of the early signs of change in the sector, notably Emtel Ltd which was at the time the first private based company to offer mobile telephony services in 1989, and benefiting from an exclusivity period of 7 years. There were also several private and public bodies which applied for the ISP licence in 2001, but with notably only one of them, Data Communications Ltd, offering internet services to the public. Nevertheless, it was only with the implementation of liberalisation in 2003 and the review of the applicable laws and provisions via the ICT Act of 2001, that genuine competition was fostered, as shown in Table 1 above.

The second aspect that captures the workings of competition in the telecommunications sector may be gathered from the growth in the demand for telecoms based services. This may be performed by analysing the situation pre and post liberalisation in terms of the evolution in the subscriber base for the various market segments.

Table 2: Subscriber Demand Estimates for various Telecommunications Services

ICT Access	2001	2002	2003	2004	2005	2006	2007	2008
Fixed line Subscribers	307,000	327,000	348,000	354,000	358,000	357,000	361,000	364,500
Fixed line Penetration	25.5%	26.9%	28.4%	28.6%	28.6%	28.4%	28.6%	28.7%
Mobile Subscribers	279,000	348,000	466,000	548,000	657,000	772,000	929,000	1,033,300
Mobile Penetration	23.1%	28.6%	38.0%	44.3%	52.6%	61.5%	73.4%	81.2%
Internet Subscribers	43,000	50,000	61,000	78,000	129,000	138,000	166,000	185,000*
Internet Penetration	3.6%	4.1%	5.0%	6.3%	10.3%	10.9%	13.1%	14.5%*

Source: CSO & ICTA; Note: * refers to provisional estimate

Several observations may be drawn from Table 2 when a comparative is performed between the year 2001/2 and the year 2008, that is, five years onwards since liberalisation of the sector. Firstly, the number of subscribers for all the listed types of ICT access has risen. The extent of this increase is most spectacular especially for mobile subscribers, while for fixed line and Internet subscribers, the relevant growth was not so significant in contrast. This is explained by the fact that firstly, the vast majority of households was already equipped with a fixed line, implying that this segment was close to its mature stage. In comparison, with the significant and continued fall in the price of mobile handsets and the latest innovations available, the demand for mobile connectivity simply outmatched the corresponding demand for fixed line access. As for Internet access, it is only from 2005 onwards that double digit figures for penetration were reached, implying that there is a heavy inter-dependency on the affordability of the service, combined with PC penetration across household. For instance, latest estimates for the Central Statistical Office reveal that in 2006, only 24% of all households were equipped with a PC, while only around 17% had internet access at home.

In terms of the demand for international voice communications, an analysis of the traffic distribution again reveals a similar picture.

Table 3: International Voice Traffic Estimates – Million Minutes

ICT Access	2001	2002	2003	2004	2005	2006	2007
Outgoing International minutes	36	38	45	60	59	60	72
Incoming International minutes	56	62	68	93	118	142	169

Source: CSO & ICTA

The empirical data presented so far confirms that the working of competitive forces has been felt much more strongly since the sector has been opened up. Nevertheless, there is a need to factor in that the increase in demand for such services is not only driven by the number of new entrants offering these services, but more importantly, these developments have as a common linchpin the underlying changes in tariffs, together with the supply of quality-based services, as will be elaborated upon below.

4) Tariffs

One of the objects of the ICTA, as established under the ICT Act of 2001, Section 16(d), is to “ensure that information and communication services including 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.”

When read in conjunction with Section 31 of the ICT Act of 2001, on matters pertaining to tariffs, this establishes the boundaries within which the regulator may operate in making determinations on tariffs for various telecommunications services. With this framework in mind, it becomes possible to ascertain the various tariff developments that have characterised the telecommunications sector, and again to enrich the analysis further, the situation pre and post liberalisation is provided.

One of the most immediate tasks that faced the ICTA upon its inception was to instil the appropriate conditions for the implementation of the liberalisation of sector, with a minimal degree of administrative hassle, while ensuring that competition would flourish under optimal conditions. This transition undoubtedly had to go through a stage of tariff rebalancing, which effectively related to the operations of the incumbent fixed line operator, Mauritius Telecom Ltd. The Authority oversaw the implementation of 2 such exercises in October 2002 and September 2003 respectively. The culminating effect was that the tariffs practised by the incumbent operator for international voice communications were brought down from excessively high rates, while the monthly rental for being connected to a fixed line and the associated local call charges were re-adjusted upwards. The need for such an exercise was imperative because the then practice of the incumbent was deemed inconsistent with the onset of liberalisation, as it only resulted in skewing the various markets towards being sub-competitive. In other words, had such an exercise not been performed, the new licensees would have been placed at a disadvantage vis a vis the historical operator in the sector, and the gains from competition would have been short lived.

Table 4A: Stages of Tariff Rebalancing & Local Fixed Line Tariffs, in Rs

Fixed Line Service	2001	2002	2003	2004	2005	2006	2007	2008
Monthly Line Rental - Residential	60	75	90	90	90	90	90	90
Monthly Line Rental - Business	100	210	225	225	225	225	225	225
3 min off-peak Fixed to Fixed call	1.00	1.30	2.05	2.05	2.05	1.80	1.80	1.80

Source: CSO & ICTA

Table 4B: Stages of Tariff Rebalancing & Off-peak IDD Tariffs from Fixed Lines, in Rs

IDD tariffs – 3 min call	2001	2002	2003	2004	2005	2006	2007	2008
Reunion Island	45.00	30.00	21.60	21.60	21.60	21.60	21.60	20.70
London / Johannesburg	75.00	54.00	36.00	36.00	36.00	28.80	28.80	27.90
New York	90.00	54.00	36.00	36.00	36.00	28.80	28.80	27.90
China	105.00	54.00	36.00	36.00	36.00	28.80	28.80	27.90

Source: CSO & ICTA

Tables 4A & 4B depicts the tariff evolution that took place pre and post liberalisation, while highlighting the impact of the tariff rebalancing exercises of 2002 and 2003. It is noted that local tariffs underwent a relative increase in the period 2002 and 2003 and these tariffs were maintained, based on the latest June 2008 figures. The only difference pertained to the re-introduction of off-peak local tariffs in 2006 onwards by the incumbent fixed line operator, thereby accounting for the Rs1.80 charge for 3 minutes of conversation on a fixed to fixed call. In contrast, the tariffs for International Direct Dialling (IDD) experienced a major fall ranging between 54 – 73% for the major destinations described above, from 2001 to 2008. However, this observation is based on the IDD tariffs of the incumbent operator only.

If the lowest IDD tariffs practised by other licensed ILD operators are factored in, this decrease in tariffs is even more pronounced, as captured in Table 5 next:

Table 5: Comparison of cheapest Off-peak IDD Tariffs for the years 2001 & 2008

IDD tariffs (Rs) – 3 min call	2001	2008	% decrease
Reunion Island	45.00	15.00	67%
London	75.00	12.00	84%
Johannesburg	75.00	16.20	78%
New York	90.00	12.00	87%
China	105.00	12.00	89%

Source: CSO & ICTA

Table 5 reveals that other International operators are offering tariffs that are significantly below those of Mauritius Telecom Ltd, when compared with the 2008 tariffs in Table 4B above. In fact, the ILD market is precisely the one market segment where the forces of price competition have been most productive and effective, post liberalisation.

The mobile telephony market on the hand has proven to be the segment which ended up being the most insular to the onset of liberalisation, initially reflected by its duopolistic market structure. It is a fact that most of the price changes brought about by the mobile operators have come as a result of regulatory intervention in this segment, notably through the prescription of new interconnection charges on various occasions, and the introduction of the Calling Party Pays regime in October 2004. Only with the entry of the third licensed mobile operator, Mahanagar Telephone Mauritius Ltd (MTML) has there been a sense of genuine attempt at price competition as the latter launched its services at prices below those of its established rivals, which were aligned for the most part. Table 6 below captures the essence of this argument:

Table 6: Tariffs for local mobile calls – Prepaid package

Mobile tariffs (Rs) – 3 min	2001	2002	2003	2004	2005	2006	2007	2008
To same mobile network	3.60	3.60	3.60	3.60	3.60	2.48	2.40	2.40
To other mobile network	14.40	14.40	9.00	11.70	11.70	10.80	10.80	5.40
To a fixed network	14.40	14.40	12.75	12.75	12.75	11.00	10.80	8.10

Source: CSO & ICTA

The tariffs mentioned above in Table 6 over the period 2001 up to 2005 represent the aligned tariffs for Cellplus and Emtel Ltd. However, the lowest tariffs practised in the market came into effect when MTML launched its prepaid services in 2006, with same being presented from this period onwards in Table 6. The tariffs of the other two established operators are generally still above those of MTML for the respective call category.

Last but not least, the intervention of the regulator in the Internet Service market may be considered, especially in the context of the GoM aiming to turn Mauritius into a true cyber-island. The figures in terms of Internet penetration, as displayed earlier, suggest that some progress has taken place, but the other fact to take into account is that this has been accompanied by a gradual decline in prices of internet services, especially for broadband Internet. For instance, the tariff of the entry level ADSL 128 Kbps home offer is now almost 50% cheaper as at the end of 2008, compared to its 2001 price level. The other main reductions may be observed from Table 7 next.

Table 7: Tariffs for Internet Services

Internet Services	2001	2002	2003	2004	2005	2006	2007	2008
Dial up – Peak (Rs/min)	0.80	0.80	0.57	0.57	0.57	0.57	0.57	0.57
Dial up – Off-peak (Rs/min)	0.50	0.50	0.27	0.27	0.27	0.27	0.27	0.27
ADSL 128 Kbps - Home	na	na	1,499	1,316	990	750	750	750
ADSL 128 Kbps - Business	na	na	2,500	2,500	1,900	1,860	1,860	1,860
ADSL 512 Kbps - Home	na	2,490	2,500	2,178	1,590	1,360	1,360	1,360
ADSL 512 Kbps - Business	na	na	5,500	5,500	3,600	3,190	3,190	3,190

Source: CSO & ICTA

One of the measures taken by the ICTA to promote affordability of the internet was the prescription of below cost interconnection charges for dial-up internet, in tandem with the prescription of maximum retail tariffs as from 2003, to compensate for the fact that DSL service was generally not within the reach of the wider public. However, there is now a substitution effect towards the use of broadband packages, this being notably associated with the consistent decrease in prices coupled with the rising GDP per capita of the population over the past decade.

To round up the discussion on tariffs, it is imperative to point out that the regulator does make sure that retail tariffs are monitored and generally screened meticulously to ensure that as far as possible they do not create distortions in the market for various services. Nevertheless, the major workload of the ICTA exists at the wholesale end in terms of the

determination of wholesale access charges, on which virtually all the retail business models of all the major players in the telecommunications sector are based upon. Therefore, by giving due recognition to the direct causal relationship between wholesale charges and retail tariffs, it is key to understand the role of the regulator in determining the appropriate access charges for various services, which become crucial to the overall economic well being of the sector. This issue will be developed next.

5) Interconnection

Interconnection of new entrants with existing operators on terms that are fair and cost based is of the utmost importance for establishing and nourishing competition. The incumbent operators are never happy at having to deal with additional competition as it threatens its monopoly position (by decreasing overall market share) and reduces the existing profit margin.

The institutional framework for interconnection in Mauritius caters for the following:

- (a) Direct interconnection is mandatory when requested
- (b) Indirect routing of calls is also permitted to sustain the case of small operators
- (c) The interconnection agreement is required to be filed with the authority
- (d) Any aggrieved operator may approach the Authority for arbitration
- (e) Any appeals to the decisions of the Authority may be brought up to the independent ICT Appeals Tribunal

The ICTA has taken a number of measures to ensure fair interconnection terms to the late entrants, which inter-alia includes direct peering of calls of mobile operators (2003), 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 cost based interconnection charges to fixed line operators & no provision for Access Deficit Charges (2008). The Authority is also working towards implementing LRIC based interconnection charges by 2009.

Being an island state, the new ILD and ITSP operators are dependent upon the incumbents SAFE Cable for their international connectivity needs. The charges for access to SAFE Cable have been regularly reduced at the initiative and practical policy of the Authority. The table below provides the 5 year view of the IPLC charges from Mauritius to Telehouse, Paris.

Table 8: Evolution of tariffs for IPLC full circuit on SAFE

IPLC Tariffs (in USD) from Mauritius to MT Point of Presence at Telehouse Paris, France					
		Sep-03	Feb-06	Jul-06	Sep-07
Speed	Installation Charges	Monthly Rental			
64	2000	1900	1400	1100	900
128	2000	2600	1800	1500	1200
192	2000	3100	2400	1900	1600
256	3000	3400	2700	2200	1800
384	3000	4400	3500	2900	2300
512	3000	5100	4200	3400	2800
768	3000	6500	5400	4400	3500
1024	3800	8800	6800	5600	4500
2048 (E1)	3800	12600	10500	7900	6300
Volume Discount allowed for IPLC shall be as follows, based on E1 (i.e 2Mbps) capacity utilisation					
Capacity Purchased (B)	Allowable discount based on E1 capacity	Average Discounted price per E1 (USD/month)			
2E1 ≤ B < 4E1	5%	7,505			
4E1 ≤ B < 6E1	10%	7,110			
6E1 ≤ B < 8E1	15%	6,715			
8E1 ≤ B < 10E1	20%	6,320			
B ≥ 10E1	25%	5,925			
Discount scheme effective as from 01 July 2006					

It has to be highlighted that the determination made by the Authority in July 2006 on the tariffs for full circuit IPLCs was accompanied by the introduction of a bulk discount scheme, in terms of the E1 capacities purchased. The tariffs as per the September 2007 determination remained in force till the end of 2008, and it is apparent that, the price of an E1 has fallen by as much as 50% over the period 2003 to 2008.

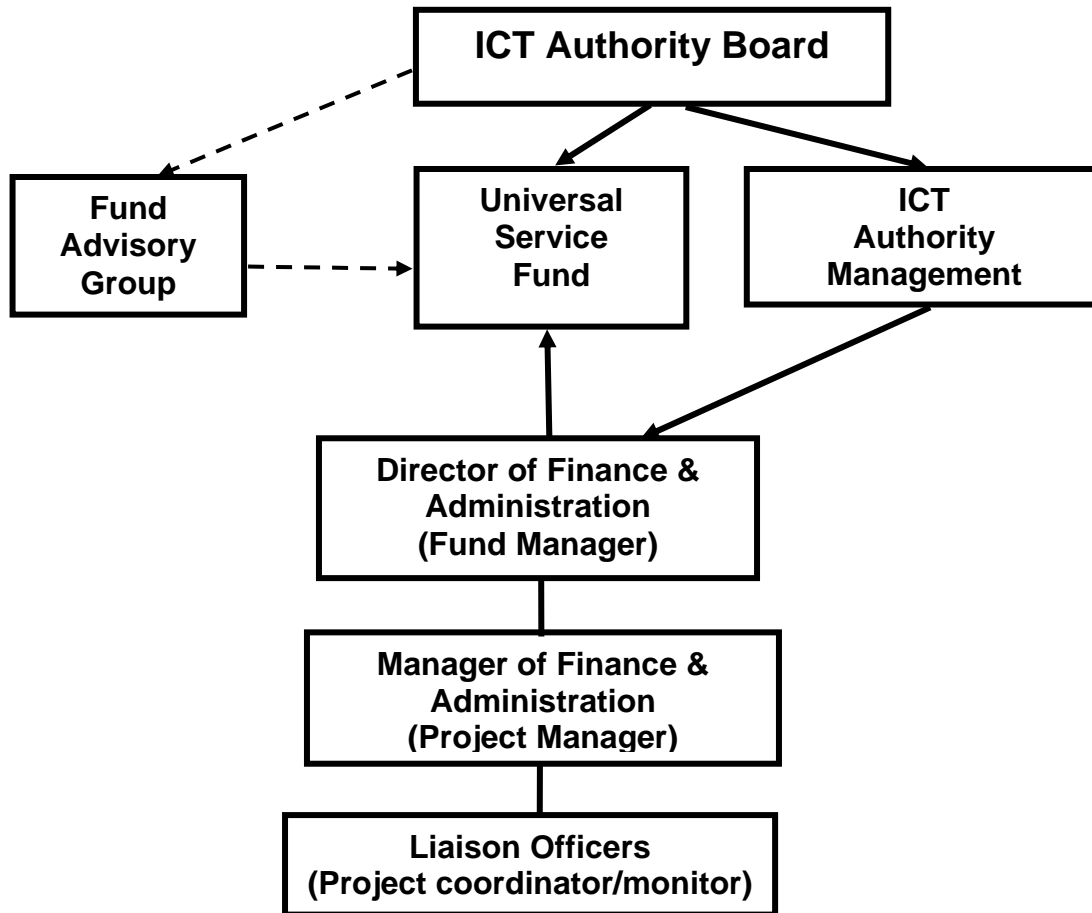
6) Universal Access & Universal Service Fund

Under section 21 (1) of the ICT Act 2001 it is provided that the Authority shall establish a Universal Service Fund (USF). Pursuant to the recommendations made in January 2006 by the Authority to the Minister in accordance with section 21 (3) of the Act, and further to various consultative meetings that the Ministry had held with the stakeholders on the subject since June 2008, the Minister has, in accordance with sections 21(3) and 48 of the Act prescribed the manner and basis of contribution into the USF. The said prescription has been made by way of Regulation which is gazetted as GN 206 of 2008. The said Regulations have come into effect since the 3rd October 2008.

With the coming into effect of the aforesaid Regulations, an administrative structure and established procedures has been set up for the management of the USF. In that regard, based on the early consultations conducted by the Authority and in line with best international practices as upheld by the ITU, the following arrangements have been put in place:-

a. Management and Administration of funds

It is established under the Act that the Authority shall be the body designated to manage the USF. It is thus important to draw the management and organisational structure that fits within the Authority to handle the USF, while at the same time ensuring transparency, accountability and preserving autonomy. The following structure has been set up:-



- **The ICT Authority Board** which is the board created under the Act.
- **The USF advisory group** which provides input, suggestions and ideas to the USF management concerning project priorities, operational plans, objectives and key issues. The group shall consist of appointed representatives from the industry, the government, public institutions with an emphasis on those most involved with fund activities, public operators, and consumer representatives.
- **The USF fund administrator** who oversees all fund activities.
- **The project manager** who is responsible for analysing market conditions, developing proposed project plans and acting as liaison with USF funding recipients in the implementation and evaluation of approved projects.

- **Liaison officers:** within the Authority (Engineers, attorneys, accountant, economist, etc...) will be responsible to extend professional support and resources in their fields of responsibility to the management.

b. Review and revisions of Fund activities

The operations and objectives of the USF programmes shall be subject to periodic review and revisions, both within the Authority and through public comment and consultation process. The Fund administrator will issue an annual report containing at least the following information:

- Financial reports (collections, expenditures, reserves, etc...)
- Description of projects that were funded.
- Goals and budgets of the USF for the coming years
- Review of previously funded projects.
- Revisions to target objectives and estimates of progress.

c. Evaluation procedure for determining funding allocations

In practice it is expected that the amount of fund available will be limited and will have to be allocated among a number of competing worthy investments. As such a proper method of rationing should be devised. According to ITU guidelines quantitative methods may be used to analyse the various choices, by comparing the long-term net present value of alternative projects, incorporating social benefits. Competitive bidding is a methodology that can be used to determine funding allocation. Under this the licensees are asked to bid for implementing each of the Universal Service. The licensee who bids for the lowest charges for implementing a Universal Service is asked to provide the Universal Service with the bid amount given from the USF. This model has proven successful in Chile.

Project proposal shall be evaluated according to the viability and completeness of their implementation plans which in many cases may be a vital factor in determining the success or failure of the project. The evaluation criteria that will be adopted will include basically the following seven elements:

- 1) Location of proposed service,
- 2) Quality of service,
- 3) Quantity of service,
- 4) Community benefits,
- 5) Implementation plan,
- 6) Cost, and
- 7) Bidder qualifications.

Points 1 to 4 may be easily analysed in terms of the submitted data and information. The implementation plan requires both a short-term process for installing facilities and services and a long-term plan for operating and maintaining the services. This will set a foundation to

ensure that the networks and services will be sustainable after the USF subsidy has been exhausted.

Implementation plans to be included with project proposals should incorporate the following information:

- **Business plans** – three to five year budget projections, break-even analysis and market demand analysis should be provided.
- **Tariff and other pricing proposals** – these should include interconnection agreements with other carriers.
- **Management plan** – these should detail the organisation of the project, the responsibility of personnel.
- **Implementation schedule** – specific dates and sequence of events, the timing of equipment installation and operation startup dates should be included.
- **Publicity and community inclusion programmes** – these should describe plans for inviting participation in the project from affected communities as well as gender awareness considerations and publicity and outreach plans to promote use and benefits of service.
- **Monitoring and reporting plans** – there should be provisions for informing USF managers about progress in implementation, the public response to the services, lessons learnt, identified obstacles and possible improvements.

The cost of a project is defined in terms of the proposed subsidy amount requested from the USF to support its implementation. Additional costs beyond the subsidy amount should not be considered but should be a factor in the evaluation of community benefits and the above-referred implementation plan. For projects that are otherwise considered to be equivalent according to the other evaluation criteria, the proposal requesting the smallest amount of USF is usually awarded the concession. In case it is difficult to compare projects according to exactly equivalent characteristics, though the amount of subsidy requested remains the selection criterion, other factors may be included to ensure that the winning proposal is the one that provides the greatest net social and economic value.

7) Numbering

On 31st December 2008, the ICT Authority issued its Decision on the migration of non-geographic (mobile) E.164 telephone numbers from seven to eight digits, following a public consultation exercise carried out with respect to same in September 2008. The migration of mobile numbers to 8-digits will thus take place on 1st November 2009. A Numbering Change Monitoring Committee and a technical sub-committee have been set up in order to oversee the implementation of the new numbering plan.

Numbering Guidelines

The ICT Authority has drafted the *National Numbering Guidelines* which contains a set of detailed rules governing the administration, management and use of the national numbering resources.

The document clearly defines the responsibility of the ICT Authority in managing the numbering resource and sets out the rights and obligations of other stakeholders (operators/service providers/ end-users) in respect of numbers. The document has been reviewed in order to include the forthcoming 8-digit numbering plan, and the document will be released as consultation paper prior to the implementation of the new numbering plan.

ENUM

The ICT Authority is looking into the operational and administrative aspects of ENUM as an initial phase prior to the request of the domain **0.3.2.e164.arpa** at tier 1 level. This matter is being handled by taking into account the **.mu** administration model which is currently under review.

Annual Numbering Audit

With a view to monitoring the use of the numbering capacity, the ICT Authority conducts on an annual basis a numbering audit. Access providers are requested to provide numbering information (e.g. current use of allocated numbers; free capacity; reserved capacity; quarantined numbers, forecast of expected utilisation etc.) over a period of one year ending generally 30 June or 31st July.

This exercise allows the Authority to:-

- i. identify the use of existing numbering capacity;
- ii. update the numbering database and identify any anomalies;
- iii. identify future requirements of numbers and make a forecast of demands;
- iv. assess whether the numbering resources are being used efficiently; and
- v. improve the numbering scheme where necessary.

The ICT Authority has been carrying out numbering audits since July 2004 and the last of such exercise has been carried out in July 2008.

H) Quality of Service

The Authority is in the process of establishing a framework for regulating Quality of Service in the ICT sector. Based on international best practices, the Authority has defined QoS parameters for the Fixed, Mobile, Internet, International Telephony and Leased Line services respectively. At this stage, target values for the proposed QoS parameters have not been specified, but the Authority has taken note of international benchmarks.

The Authority has participated in the ITU-T Study Group 12 meeting on Quality of Service and Quality of Experience, held in Geneva from 10-19 March 2009. In that context, the Authority also attended and contributed to the informal meetings of the Study Group 12 Regional Group for Africa (SG12 RGA). The Regional Group is working on some QoS/QoE monitoring and measurement guidelines for the countries of the region, and the ICT Authority will be contributing towards this work.

9) Information Technology Regulations

Under the ICT Act 2001, the ICTA has one of its functions to act as the Controller of Certifying Authorities (CCA). With a view to implementing same the ICTA has entered into a Memorandum of Understanding (MoU) with the CCA of India. The purpose of the MoU is to foster cooperation between the two parties with the aim of the setting up the Mauritian Public Key Infrastructure (PKI), which will be based on the Indian PKI model.

The CCA of India and ICTA has indeed confirm their intention to promote closer cooperation and the exchange of information pertaining to implementation of Public Key Infrastructure in Mauritius in accordance with the Electronic Transaction Act, 2000 and the relevant laws and regulations of each country and this MoU.

The following areas of cooperation between the parties and their respective countries have been proposed:

1. Setting up of the Mauritian PKI bearing the following characteristics:
2. Capacity building for the staff who will be involved in the Mauritian PKI with respect to the activities falling under the purview of the Controller of Certification Authorities (CCA);
3. Technical facilitation by the Indian CCA for:
 - Developing Certification Policies, Certification Practice statements, identification documents, subscriber agreements as well as other agreements and statements for the Mauritian PKI,
 - Facilitating the choice of the Indian Certification Authority recognised by the Indian CCA for extension of its services to the Mauritian PKI,
 - Ensuring dispute resolution settlement (within the Electronic Transaction Act, 2000) arising from the use of the Mauritian PKI as implemented under the selected Indian CA, and
 - Developing training programmes and workshops for PKI related matters.
4. Setting up communication channels for exchange of information; and
5. Collaborating on best practices in the field of PKI.

The Way Forward: Opportunities & Challenges

The prominent feature of the ICT sector is all about innovation and technological progress. As such, it is quasi impossible for regulation to evolve fast enough to keep up the pace with such developments. Nevertheless, it is the duty of the policy makers and regulators alike to anticipate such new developments, and develop a framework that is both proactive and reactive enough to draw and sustain the potential earmarked in this particular sector.

Consequently, it is not surprising that the same key spheres that have been examined in this report will be the same spheres where regulation will require a shift of focus or even a shift in paradigm to face the new challenges posed by the collapse of the barriers of the new digital world. For instance, one of the key issues to be addressed soon by the GoM and the ICTA is which service should now be categorised under Universal Service, given that fixed line and mobile phones are virtually ubiquitous across the island. Should broadband internet be placed into this particular basket? How to address the modalities of such an implementation in terms of legal, financial and social considerations?

Similarly, should the monitoring of competition in the telecommunications sector be left to the regulator, or should the impending creation of the Competition Commission for the country be left with the task of overseeing the market practices of this sector, as for the rest of the economy. Is there a need for the licensing regime to be completely reworked to feature the foundations of complete neutrality, whether technological, service, application or infrastructure based? Should the ICTA transit directly to the use of LRIC in its determinations on interconnection, or should a phased approach still be preserved for the interests of the sector at large.

These are but a few of the challenges that the regulator is tasked with, but at the same time, one must also recognise the opportunities that lie therein. If dealt with in the appropriate framework, and under the propitious conditions, these challenges will ultimately assist in re-dynamizing the whole sector, while at the same time easing the transition towards light regulation. In such a scenario, the various markets would have gravitated towards maturity, with pure competition forces working as a self-regulating entity, entailing that the role of the regulator will be re-designed with a view towards dealing with issues like quality of service, customer complaints and dispute resolution among others.

Furthermore, the convergence of the conventional media, IT and telecom is really a challenge that we are equipping ourselves to face in the very near future, especially in terms *a priori* regulatory safety-nets and *a posteriori* competitive safeguards. While we know very well that the 'one size fits all' concept does not really work in the ICT regulatory field, we can only hope that we learn the best practices from our fellow regulators on the region and chart out our own regulatory reform roadmap while keeping a significant flavour of local culture in the said plan.

ANNEX 1: Licensed Operators as at March 2009

NETWORK INFRASTRUCTURE PROVIDERS

1. MultiCarrier Mauritius Ltd

2. SERVICE OPERATORS

2.1 Landline Operators (PSTN) - 2

1. Mauritius Telecom Ltd
2. Mahanagar Telephone Mauritius Ltd (MTML)

2.2 Mobile Operators (PLMN) - 3

1. Cellplus Mobile Communications Ltd
2. Emtel Ltd
3. Mahanagar Telephone Mauritius Ltd (MTML)

2.3 International Long Distance Operators (ILD) – 8

1. Mauritius Telecom
2. Emtel Ltd
3. Data Communications Ltd (DCL)
4. City Call Ltd
5. Hotlink Ltd
6. Mahanagar Telephone Mauritius Ltd (MTML)
7. TLC
8. T @ Media. Com Ltd
9. Equant (Mauritius) Services Ltd

2.4 Internet Service Providers: (ISPs) - 13

1. Telecom Plus Ltd
2. SITA
3. Enterprise Information Systems Ltd.
4. Data Communications Ltd
5. Mauritius Freeport Development Co Ltd
6. Paging Services Co Ltd
7. Mauritius Computing Services Ltd
8. City Call Ltd
9. Africa Digital Bridges Networks Ltd
10. I-Telecom
11. Emtel Ltd
12. Mahanagar Telephone Mauritius Ltd

2.5 Internet Telephony Service Provider (ITSP) – 1

1. Paging Services Ltd

2.6 Audiotex Services -1

1. Telecom Plus Ltd

2.7 Payphone Service -1

1. Mauritius Telecom Ltd

2.8 Unified Messaging Service (UMS) - 1

1. Africa Digital Bridges Networks Ltd

2.9 Value Added Services – 4

1. Mauritius Telecom
2. Telecom Plus Ltd
3. SITA
4. Mauritel Services Ltd