Office of Utilities Regulation

Toward Universal Service/Access Obligation For Telecommunication Services in Jamaica

A Consultative Document

OUR

OFFICE OF UTILITIES REGULATION

December 2002

Abstract

Part VI of the Telecommunications Act 2000 sets out the principles governing the provisions of universal service/access. It outlines the obligations of a provider and also describes the minimum level of basic telecommunication services that are to be supplied by a designated provider. The purpose of this consultative document is to provide information to the public, promote discussion on some of the relevant issues relating to universal service/access and to gather information so as to advise the Minister, in keeping with the provisions of the Act,[1] on issues relating to universal service/access.

The document reports on a macroeconomic analysis done on the industry up to the year 2000. This analysis suggests that there may have been under investment in the domestic network to that date. The document also reports on the current developments in the basic voice telephony industry and suggested approaches that could be adopted to address affordability. The provision of payphones is also addressed.

There is extensive discussion on the issue of Internet access in public institutions. Research by the OUR revealed that the level of Internet access in some of these institutions is very low. The document also focused on two methods of choosing universal service/access providers; and suggested several funding approaches**.** In addition, the document highlighted issues relating to serving the disabled and disconnection of customers from the network.

Issues relating to the net cost of providing universal service/access have been omitted from this document; however, they will be examined in the second phase of the consultative process.

[1] Section 4(1)(g) states the Office shall: *"Advise the Minister on such matters relating to the provision of telecommunications services as it thinks fit or as may be requested by the Minister."*

Table of Contents

Comments From Interested Parties

Persons who wish to express opinions on this Consultative Document are invited to submit their comments in writing to the OUR. Comments are invited on all of the issues raised in the document.

Responses to this Consultative Document should be sent by post, fax or e-mail to: -

David Sullivan
Office of Utilities Regulation
P.O. Box 593
36 Trafalgar Road,
Kingston 10
Fax: (876) 929-3635
E-mail: dsullivan@our.org.jm

Responses are requested by February 17, 2003. Any confidential information should be submitted separately and clearly identified as such. In the interests of promoting transparent debate, respondents are requested to limit as far as possible the use of confidentiality markings. Respondents are encouraged to supply their responses in electronic form, so that they can be posted on the OUR's website (or a link included where the respondent wishes to post its response on its own website).

In order to facilitate the broadest possible participation in the consultation process, the OUR may arrange appropriate fora where the issues can be discussed.

Comments on Responses

As in all the OUR's consultations, there will be a specific period for respondents to view other (non-confidential) responses and to make comments on them. The comments may take the form of either correcting a factual error or putting forward counter-arguments. Comments on responses are requested by March 17, 2003.

Arrangements for Viewing Responses

Those who wish to view the responses that the OUR has received should make an appointment by contacting Lesia Gregory at the OUR by one of the following options:

Telephone: (876) 968 6053 (or 6057-8)
Fax: (876) 929 3635
E-mail: lgregory@our.org.jm

The appointment will be confirmed by a member of the OUR's staff. At the pre-arranged time the individual should visit the OUR's office at:

3rd Floor,
PCJ Resource Centre,
36 Trafalgar Road,
Kingston 10.

The individual may request photocopies of the responses which will be provided at a price which reflects the cost to the OUR for using its photocopying facilities.

Timetable

The timetable for the consultation is summarized in the table below. This includes an indicative timing for the Advisory to the Minister.

Summary of potential timetable for consultation

Event	*Date*
First consultation	December 18, 2002
Responses to this document	February 17, 2003
Comments on responses	March 17, 2003
Second consultation	May 30, 2003
Responses to second document	July 31, 2003
Comments on responses	August 30, 2003
Advisory	November 28, 2003

CHAPTER ONE: INTRODUCTION

Background

1.0 Prior to March 2000, Cable and Wireless Jamaica Limited (CWJ) had a monopoly on telecommunication services in Jamaica by way of an exclusive license (issued in 1988) to provide services for twenty-five years with the option of renewal after that time period. As a consequence of negotiations between the Government of Jamaica (GOJ) and CWJ, an agreement was arrived at in September 1999 to terminate CWJ's monopoly and liberalise the telecommunications industry on a phased basis. Three phases were agreed on: Phase 1, from March 1, 2000 to August 31, 2001, saw the liberalization of the mobile market, and resale of international voice minutes etc. Phase 2 is also scheduled to last for 18 months until end of February 2003. During this Phase, all licenses issued in Phase 1 (except mobile) in addition to others such as: domestic carrier licences; resale of domestic voice minutes; and the provision of internet service provider (ISP) licences to subscriber television (STV) licences holders can be issued. Phase 3, begins March 1, 2003. During this period all services, including international voice telephony services, will be subject to competition.

1.1 On March 1, 2000 the Telecommunications Act 2000 (hereafter referred to as the Act) came into effect. Part VI of the Act sets out the principles governing the provisions of universal service/access. It outlines the obligations of a provider and also describes the minimum level of basic telecommunication services that are to be supplied by a designated provider.

Universality (Universal Service/Access)

1.2 Universality is the broad term which encompasses both universal service and universal access. Universality is based on three fundamental principles: *Availability, access and affordability*. Availability occurs where service, that is, the telecommunications network, is present in the specified area. Access is where customers are able to use the network on a non-discriminatory basis, that is, every customer who desires the services of the network can access and utilise it. Affordability addresses the level of consumer spending on telecommunication services as a percentage of the individual's total consumption spending or income. The service might be available and easily accessible but the individual might not be able to purchase it at the prevailing price.

Universal Service

1.3 *"Universal service (US) policies generally focus on promoting or maintaining 'universal' availability of connections by individual households to public telecommunications networks…Universal Service is a practical*

policy objective in many industrialized countries. However it is not economically feasible in most developing countries."[2]

1.4 The Office of Telecommunications[3] (Oftel) refers to universal service as: *"affordable access to basic telecommunication services for all those reasonably requesting it regardless of where they live."*[4] According to the International Telecommunications Union (ITU): Universal service *"refers to availability, non-discriminatory access and wide-spread affordability of telephone service. The level of universal service is statistically measured as the percentage of households with a telephone."*[5]

1.5 Universal service is generally applicable in developed countries where there is relatively good network coverage and high teledensity. The focus in these countries is mainly on affordability. The idea is that since the network is already in place, the objective then is to design mechanisms that will ensure sustainable access.

Universal Access

1.6 *"Universal access (UA) generally refers to a situation where every person has reasonable means of access to a publicly available telephone [or other telecommunication services]. UA may be provided through pay phones, community telephone centers, teleboutiques, community internet access terminals and similar means."*[6] This approach is generally taken in developing countries where there is poor network development and low teledensities. In this case, governments' objective is to ensure every citizen has reasonable public access to the network at affordable rates.

Some General Objectives of Any Universality Programme

1.7 Objectives common to universality include programmes:

1) Promotion of national, political, economic and cultural cohesion;
2) Promotion of balanced distribution of income and population within the country;
3) Elimination of disparity between urban and rural areas;

---

[2] See "Telecommunications Regulation Handbook", edited by Hank Intven. Page 6-1.
[3] The Office of Telecommunications is the telecommunications regulator in the United Kingdom.
[4] Quotation from Oftel's consultative document: "Universal Telecommunications Services: A Consultative Document on Universal Service in the UK from1997 (December 1995)", page 9. http://www.oftel.gov.uk/publications/1995_98/consumer/univ_1.htm
[5] Taken from the International Telecommunications Union (ITU) and the Spanish-American Association of Research Centers and Telecommunications Companies publication: "Universal Service in the Americas", February 2000.
[6] See "Telecommunications Regulation Handbook", edited by Hank Intven. Page 6.1.

4) The full participation of society in the information and communication based economy.

The Importance of Universality

1.8 The liberalization of the telecommunications industry is intended to bring benefits to consumers. Customers will have more choices in who supplies their telecommunication services and moreover, since more operators will be competing for the consumer's dollar, they will have an incentive to increase service quality and price their products competitively in order to retain customers.

1.9 However, not all consumers will benefit to the same degree or in the same way from liberalization. There might be potential customers and areas that operators consider to be uneconomic at prevailing market conditions and therefore may choose not to serve. A typical company would tend to invest in markets where supernormal profits are being made or in markets that are not yet being served but have the potential to provide a reasonable return on investments.

1.10 Universality policies provide an opportunity for uneconomic consumers and areas to get access to basic telecommunication services. Apart from direct benefits, numerous external economic benefits can be derived from the provision of universal service/access. As the number of customers on a network increases, so does the value to all customers on that network – customers now have access to a larger number of users. Also, since telecommunication provides a means of communication; it can be used as an alternative to other services such as transportation.

Purpose of Document

1.11 The purpose of this consultative document is to provide information to the public, promote discussion on some of the relevant issues relating to universality and to gather information so as to advise the Minister, in keeping with the provisions of the Act,[7] on issues relating to universality. The OUR welcomes comments from the public at large especially interest groups who will be directly affected.

Structure of Document

1.12 The rest of the document is organized as follows: Chapter two outlines the legal framework; chapter three reports the results of a macroeconomic analysis done on the industry; chapters four to seven explore the services to be offered by designated provider(s); chapter eight outlines two options for choosing universal service/access providers; chapter nine addresses universal service/access funding; chapter ten looks at other issues related

[7] Section 4(1)(g) states the Office shall: *"Advise the Minister on such matters relating to the provision of telecommunications services as it thinks fit or as may be requested by the Minister."*

to universal service/access provision such as service to the disabled; and finally, the document concludes with four appendices.

CHAPTER TWO: LEGAL FRAMEWORK

Introduction

2.0 The development of a universality programme requires a transparent and stable legal framework. This chapter outlines the relevant sections of the GOJ's 1998 Telecommunications Policy and the Act which relate specifically to universality.

The Telecommunications Policy

Vision Statement

2.1 The Telecommunications Policy of 1998 (the Policy) embraced two fundamental principles:

1) Jamaica will utilize telecommunications as an engine of growth so as to contribute to the revitalization of the Jamaican economy and;

2) Jamaica will introduce competition in telecommunications and take advantage of convergence to ensure that Jamaicans have access to the most advanced technology at affordable prices.

WTO/ABT Commitments

2.2 As one of the signatories to the World Trade Organisation (WTO) Agreement on Basic Telecommunications (ABT), Jamaica is bound by the principles put forward by this organization. The WTO principle on universal service states that:

> *"Any Member has the right to define the kind of universal service obligation it wishes to maintain. Such obligations will not be regarded as anti-competitive per se, provided they are administered in a transparent, non-discriminatory and competitively neutral manner and are not more burdensome than necessary for the kind of universal service defined by the Member."*

2.3 Jamaica therefore has the option of designing any universal service policy/scheme it deems necessary so long as it complies with the guidelines set by the WTO.

Rate Rebalancing

2.4 The Policy recognized the disparity between the rates charged for domestic versus international calls and acknowledged that the rates for domestic telephone service were being subsidized by profits obtained from international calls by the incumbent operator. Accordingly, any growth, expansion and introduction of competition in the telecommunications sector would need to be examined against this

background. Therefore, although many customers would benefit from rate rebalancing, others could be negatively affected. The Policy foresaw appropriate transitional measures and targeted assistance being developed to address these concerns. The OUR was assigned responsibility for developing rate rebalancing strategies to deal with these issues.

Universal Service/Access

2.5 The GOJ's objective is to ensure that every household, including rural and the urban poor, has access to basic telecommunication services. In addition, the Government intended to use telecommunications technology (or Information and Communication Technologies) to enhance education, health and national security. Therefore schools, hospitals and the disabled should all benefit from these provisions.

2.6 The Policy acknowledged that a significant level of investment would be needed to achieve universal service and as such proposed universal access, (if necessary), in the short to medium term as a transitional phase to universal service.

2.7 The Policy also indicated that no private monopoly would be encouraged and the provision of universal service/access would not be limited to the incumbent. The OUR is expected to have responsibility for developing and/or approving any net costs incurred by operators designated to provide universal service/access. In addition, the Office would be required to recommend the most appropriate funding mechanism.

The Telecommunications Act 2000

2.8 Part VI of the Act deals specifically with universal service/access. It gives the Minister the responsibility for the development and implementation of any universal service/access programme in Jamaica. The role of the OUR is limited to modification of an existing scheme, as requested by the Minister. This is outlined in Section 39(1)(a) and (b):

> (1) *Subject to this section the obligation to provide universal service shall be determined -*
>
> *(a) by an agreement between the Minister and a licensee and;*
>
> (b) *on the recommendation of the Office, in accordance with Section 42.*[8]

[8] Section 42 of the Act deals with modification of an existing scheme.

2.9 Section 39(2) outlines the principles under which a universal service/access obligation should be provided:

(a) to the extent technically feasible and economically reasonable, to promote access to single line voice telephone services throughout the Island to persons regardless of place of residence or work;

(b) to ensure that payphone services are reasonably accessible to customers on an equitable basis;

(c) to permit access to free calls to emergency services; and

(d) to the extent technically feasible and in so far as the necessary resources are available, to promote internet access throughout the Island in schools, public libraries and post offices.

2.10 These are broad principles that encompass both universal service and universal access and will impact both economic and uneconomic customers and areas.

2.11 An economic customer is a person, household or institution who can afford to pay the full economic cost of telecommunication services provided while an uneconomic customer is one who cannot afford to pay the full economic cost of the service provided. Uneconomic customers may be found in both economic and uneconomic areas.

2.12 An economic area is an area that is considered by the operator to be commercially viable to offer service. An uneconomic area on the other hand, is one that is not considered commercially viable. An area can become uneconomic[9] as a result of several factors. One such factor, for example, would be the closure/pull out of the main employer(s) in the area. This would leave many people in the area unemployed and unable to pay their bills. Another factor is migration. People tend to move to areas where they have easy access to social and economic opportunities. This is common in rural areas where some residents migrate to urban areas with the hope of 'making a better life.'

Obligation of New Mobile Operators

2.13 Schedule 2 of the Domestic Mobile Provider Licences 2000 states that "*the licensee shall provide 90% geographic coverage of Jamaica within five (5) years of the grant of this licence.*" The licences were granted on 2000 March 14. This would suggest that by March 2005, mobile service should be reasonably accessible across the Island.

[9] It is worth noting that not all areas are originally economic; some areas are inherently uneconomic because of factors such as low population density and difficult terrain.

CHAPTER THREE: MACROECONOMIC ANALYSIS, MARKET EFFICIENCY AND ACCESS GAPS

Introduction

3.0 This chapter reports the results from the macroeconomic analyses of the telecommunication industry up to the year 2000. In addition, the chapter also seeks to address the concepts of market efficiency and access gaps in view of the macroeconomic analyses.

Macroeconomic Analysis of the Industry

3.1 Teledensity is probably one of the most widely used indicators for measuring the performance of telecommunication industries across the world. It is expressed as the number of fixed telephone lines per 100 inhabitants in a country.[10] In an effort to assess the performance of the telecommunications industry in Jamaica, statistical analyses were carried out. The findings showed that the predicted teledensity, (what teledensity should have been given its main determinants), was approximately 22.9% rather than the actual figure of 19.9%.

The Data

3.2 The Office gathered data[11] from both the International Telecommunications Union (ITU) and the Federal Communication Commission (FCC). The data from the ITU is for the year 2000 and included approximately 209 countries. The FCC data, net settlement payments, ranges from 1985 – 2000 and included 13 countries.

The Analysis

3.3 The statistical analyses were based on a selected sample. This sample comprised countries with gross domestic products (GDP) per capita ranging from half to double that of Jamaica. In addition, countries with population less than 500,000; geographic area less than 5000 square km and population density greater than 500 inhabitants per square km, were omitted. After the filtering process, only 36 countries including Jamaica remained.

3.4 Simple bivariate ordinary least squares (OLS) regressions[12] were performed using teledensity and public density, (referred to as the number of payphones per 1000 inhabitants), as dependent variables. The independent variables used in the analyses included:

---

[10] However, some may argue that an even better measure is the number of fixed lines per 100 households in the country.

[11] The data gathered from the ITU were as follow: Gross domestic products, exchange rates, population, number of fixed lines and payphones, size of country (expressed in kilometer squared), total telecommunications revenue.

[12] The results from these regressions are more for illustrative purposes. Further analyses would have to be done to arrive at more robust figures.

(1) gross domestic product per capita (GDP/Capita);

(2) population density;

(3) telecommunications revenue per capita and;

(4) telecommunications revenue as a percentage of gross domestic product.

The Results

3.5 The predicted teledensity for Jamaica is approximately 22.9%, about 3% above the actual value. Similar results were obtained for public density where the predicted value of approximately 2.9% is higher than the actual figure of 1.5%. The data also showed that while the average country spends approximately 3.4% of its GDP on telecommunication services, Jamaica spends about 6.5%.

3.6 The data from the FCC indicated that a very significant portion of Jamaica's telecommunications revenue is from international settlement payments. In fact, for 2000, Jamaica was by far the highest per capita recipient of net settlement payments from among the thirteen countries that have traditionally been the highest net recipients from the U.S.A. The average per capita net settlement for these countries in 2000 was US$4.37. Jamaica was the highest at US$35.10. The second and third highest countries were Mexico and Dominican Republic at US$7.72 and US$5.36, respectively. On a per line basis, the group average was US$32.86. Jamaica was again highest, at US$176.70. The second and third highest countries among the group were Mexico and Pakistan, at US61.93 and US$60.83, respectively.

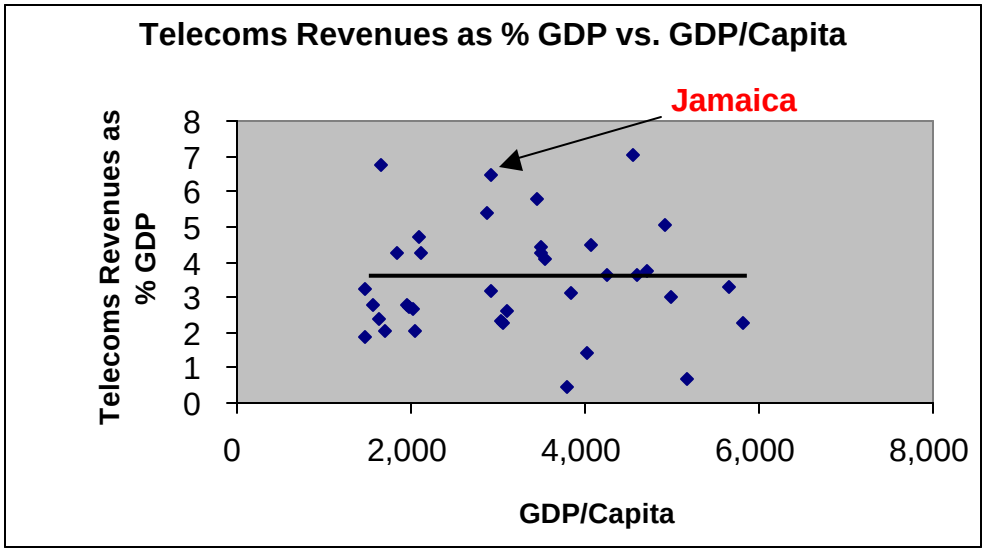
Conclusion

3.7 Despite receiving a significant amount of revenues from international net payments, Jamaica has lagged, at least in relative terms, in teledensity and public density. In other words, the telecommunications industry in Jamaica has under-invested in the domestic network (fixed line and public payphone) relative to other countries in the sample. This finding is consistent with other analytical work on the subject. Wallsten (2001)[13] recently carried out an econometric study with a data set of 179 countries from 1985 to 1998 to study this and other related issues. In that study he confirmed that there is a "statistically significant positive correlation between settlement payments and telecom revenues". More interestingly, he found that there is "no correlation between settlement payments and network growth" (defined as mainline growth) in developing countries. Hence, Wallsten argues "settlement payments appear to have no effect on

[13] Wallsten, S. 2001. "Telecoms Traffic and Investment in Developing Countries: The effect of international settlement rate reductions". World Bank Research Paper. Washington, D.C. – U.S.A.

growth in the number of telephone mainlines" and "the data do not support the contention that [international] settlement payments have been invested in the domestic network."

Figure 3.1: Graph Showing the Plot of Telecommunications Revenues as a Percentage of GDP vs. GDP Per Capita for the Selected Sample.



Market Efficiency and Access Gaps[14]

3.8 Market Efficiency Gap refers to the difference between the level of telephone penetration under monopoly conditions and the level under optimal or competitive conditions**.** Access Gap refers to a state where the market is competitive and fully developed but some consumers are still unable to access the network because of affordability constraints or operators have decided not to rollout in certain areas because of economic reasons. In other words, Access Gap is a state where the market has reached its "affordability frontier". Beyond this frontier, regulatory intervention is necessary. Intervention may include regulatory provisions and/or public financial subsidies to motivate operators to maintain or expand beyond the affordability frontier.

3.9 Jamaica's below-trend teledensity and public density performances may be explained as a "Market Efficiency Gap". This gap of about 3.0% teledensity (i.e. approximately 77238 fixed lines which should have been in place since the year 2000) and 1.4% public density (i.e. approximately 3607 payphones) may be closed, *without* any public financial subsidies, through market-oriented reform policies such as the introduction of

[14] Navas–Savater, J., A. Dymond and N. Juntunen. 2002. Telecommunications and Information Services for the Poor: Toward a Strategy for Universal Access, The World Bank Group. World Bank Discussion Paper No. 432. Washington, D.C. – USA.

competition. The "Access Gap" may only be closed by additional regulatory intervention and/or public financial subsidies.

3.10 Currently, approximately 52% of the over 722000[15] households across the Island are being served by fixed line.[16] Competition may satisfy the market efficiency gap thus ensuring the connection of more households to the network without funding. In addition, the number of households being served may increase significantly given the current trend in the mobile market.[17]

The Office finds the concepts of Market Efficiency Gap and Access Gap to be useful tools for defining the nature of universal service/access objectives and obligations. The Office hereby invites comments on these concepts and their application in the Jamaican environment.

[15] Based on information supplied to the OUR by CWJ and the Statistical Institute of Jamaica.

[16] Based on information supplied to the OUR by CWJ and the Statistical Institute of Jamaica. The estimate of the number of of households being served by fixed lines is also based on the assumption that only one phone line is installed in each home.

[17] More will be developed on this issue in the chapter on basic voice telephony service.

CHAPTER FOUR: BASIC VOICE TELEPHONY SERVICES

Introduction

4.0 This chapter examines issues relating to basic voice telephony services whether provided by fixed wireline, fixed wireless and/or mobile. Specifically, it looks at current and future trends in the fixed and mobile markets; affordability issues; as well as four possible voice telephony options to address the affordability problems of users.

Basic Voice Service

4.1 Section 39 (2)(a) of the Act provides the guidelines for the provision of basic voice telephony services across the Island. It reads: "To the extent technically and economically reasonable, *(the objective is)*[18] to promote access to single line voice telephone services throughout the Island to persons regardless of residence or work." In other words, the intended objective is that every household across Jamaica should have access to basic voice telephony services subject to technical and economic constraints.

4.2 Given the fact that the designated universal service/access provider (USP) could be compensated for costs incurred in providing the service, the issue of economic feasibility is mitigated. Notwithstanding, some may argue that providing basic voice service to every household would be too costly and therefore should not be a policy priority. For example, in sparsely populated areas the net cost of providing basic voice service might be too high thus rendering it infeasible. However, it should be borne in mind that the main concern should be whether the benefits derived from the provision of universal service/access exceeds the resource costs since consumers will be paying this cost whether as customers to telecommunications operators or as general taxpayers.

4.3 The Act does not specify the means by which voice telephony should be provided – whether by fixed (line or wireless) and/or mobile operations. Generally, existing fixed line operators have been designated universal service/access providers. However, the Office is of the view that the provision of universal service/access should be technology neutral and therefore should not be limited to any specific technology. The real concern should be the use of technology or technologies that will provide the required services at the least possible costs.

Analysis of Basic Voice Telephony Access

4.4 The proliferation of mobile phones on the Jamaican landscape is remarkable. The number of subscribers has increased over 440% in two years (end of December 1999 to end of December 2001). The average

[18] Words in parenthesis added.

yearly growth rate has been approximately 134% over the period. These unprecedented changes in the sector have propelled the country's penetration rate[19] to over 40%. The growth rate for fixed line service remained constant at approximately 4% each year over the two-year period. Jamaica has now joined a growing list of countries that have been reporting more mobile than fixed line phones. The ratio of mobile phones to landline in Jamaica, as at December 2001, is approximately 1.26:1. This ratio is expected to increase given the trends in the mobile market.[20]

4.5 An explanation for the significant increase in the mobile market is the change in the pricing policy of operators. A "calling party pays" (CPP) principle was introduced to replace the "receiving party pays" principle. The CPP scheme facilitates a prepaid calling plan of which over 90%[21] of mobile customers are on. The introduction of competition in the market has also stimulated growth. Competition has brought about more choices and an increased opportunity for people to access telecommunication services.

4.6 As competition in the mobile market intensifies, consumers can expect improved service at lower prices. Mobile could eventually become a substitute for fixed phones. Substitution occurs where an increase in the price of a product results in an increase in demand for another product. In other words, an increase in the price of fixed line service would probably increase the demand for mobile services (assuming all other things remain equal).

4.7 However, price may not be the only factor that could drive the increase in demand for mobile. The fact that mobile provides flexibility is in itself an added advantage.

4.8 Jamaica has a population of just fewer than 2.6M with an average household size of approximately 3.6 persons;[22] this equates to over 722000 households. The estimated number of phone lines (fixed and mobile) in use to date is over 1.8M.[23] The OUR estimates that approximately 52% of households across the Island are currently being served by fixed lines;[24] however, the Office has no information on the number being served by mobile. To arrive at more robust estimates, the

[19] Penetration rate here means the total number of telephone lines (fixed and mobile) per 100 inhabitants
[20] Up to the end of October 2002, the ratio stood at approximately 2.68:1, that is, over 1.8m telephone lines have been reported.
[21] This figure is based on information provided to the OUR by the industry up to October 2002.
[22] Estimates are obtained from the Statistical Institute of Jamaica's (STATIN) website (www.statinja.com) and are based on the 2001 preliminary Census Report.
[23] Based on information supplied to the OUR by the industry as at 31 October 2002.
[24] See Table 4.1 below. The information in this Table was compiled from data obtained from CWJ and the Statistical Institute of Jamaica. This estimate is based on the assumption that only one fixed line phone is installed in each household.

OUR has embarked on a more extensive data gathering process. This will be discussed in paragraphs 4.9 to 4.11 below.

Table 4.1: Estimated Number of Households Currently Being Served by Fixed Line, by County.

County[25]	Estimated Number of Households	Estimated Number of Households With Fixed Line Service
Surrey	228290	72.33%
Middlesex	324015	45.34%
Cornwall	169750	38.67%
TOTAL	**722055**	**52.31%**

4.9 Two models are put forward below – see Figures 4.1 and 4.2. Model 1 indicates that telephone lines are distributed relatively evenly across the population. It suggests that households with fixed line phones have a relatively small proportion of mobile phones and vice-versa. This model also shows that overlapping is relatively small in the mobile market. For example, very few customers would own one or more mobile phones. If this model depicts the current situation in Jamaica, then most if not all, households would have access to at least one telephone. However, the situation might be similar to the one presented in Model 2. This model illustrates that most of the customers with fixed line phones are also the ones with the mobile phones. This would be suggesting that many households have multiple phones while many others may possess one or none at all.[26] The OUR's preliminary view is that the current situation in Jamaica may be more like the latter model.

4.10 However, to obtain more information on the current situation in Jamaica, the OUR has reached an understanding with the Statistical Institute of Jamaica (STATIN) where STATIN will include the following questions in its current survey:

1) What type of telephone service do you have (specify whether fixed or mobile)?

2) If mobile and/or fixed, how many of each is in the household?

4.11 The data collected from this survey will be published in STATIN's annual publication: "Jamaica Survey of Living Conditions" (JSLC). The organization plans to interview approximately 9000 households[27]. The

[25] Jamaica is divided into three counties and fourteen parish.
[26] Affordability could be the driving force behind this model. Even though service might be readily available, the poor might not be able to pay.
[27] This represents just over 1% of the number of households across the Island.

survey will be very extensive and should encompass both urban and rural areas as well as households from different income groups.

Figure 4.1: Single Line Voice Telephony Access: Model 1

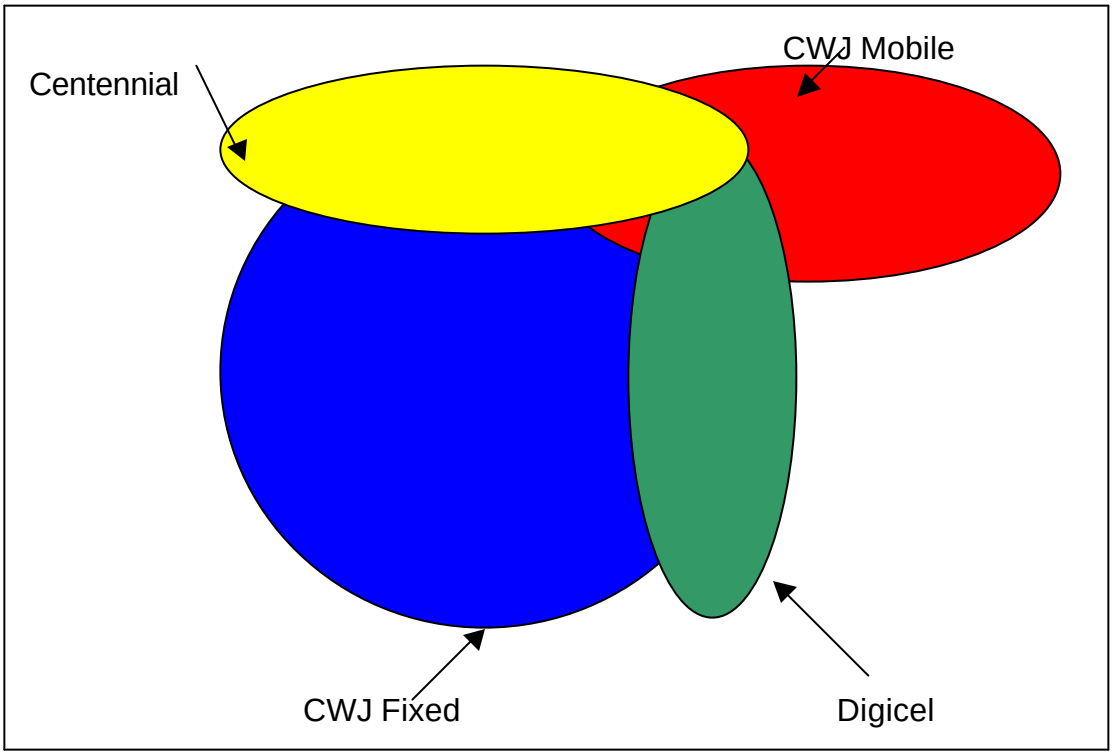
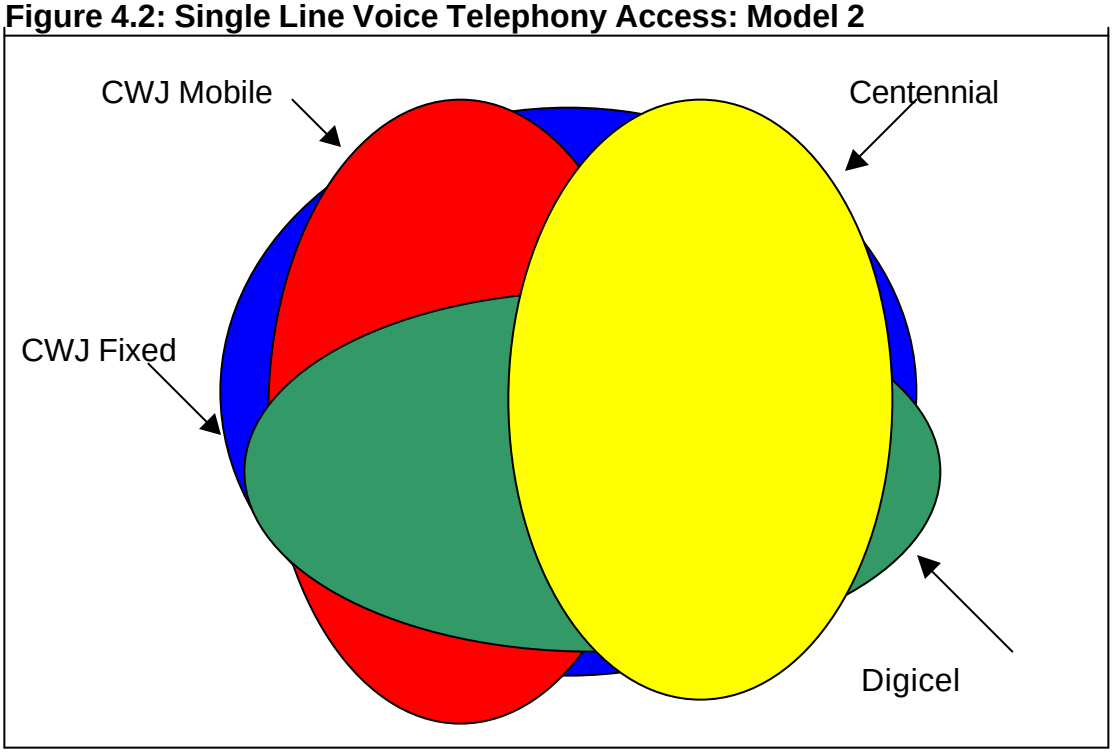


Figure 4.2: Single Line Voice Telephony Access: Model 2



Affordability

4.12 Affordability is a function of both the price and the ability of households to pay for the services being provided. This section will examine affordability in some detail from four perspectives: (1) Current consumer spending, (2) overall expenditure on utilities, (3) cross subsidies and rate rebalancing and (4) competition.

Current Consumer Spending

4.13 The analysis presented in this section is based on the information provided in Table 4.2 below.[28] The information is broken down by income quintile[29] – quintile one consists of households who are considered the poorest among the society meanwhile quintile five contains the most affluent. The data shows that, while absolute telecommunication expenditure increases with household income, relative telecommunications expenditures decrease with household income. Hence, households in the poorest quintile spend approximately $1112 or 7.7% of their monthly expenditure on telecommunication services while those in the richest quintile spend approximately $2090 or 5.3%.

[28] Information obtained from the Jamaica Survey of Living Conditions (2001) published jointly by the Statistical Institute of Jamaica and the Planning Institute of Jamaica. To derive total disposable income, the per capita savings rate for 2001 was calculated from information provided in the Statistical Digest (Published by the Bank of Jamaica, May 2002). This was then combined with the consumption information provided by the JSLC. A savings rate of 12.4% was used for all quintiles.

[29] The definition of a quintile can be found in Appendix II, page 11 of the Jamaica Survey of living Conditions 2001.

4.14 The JSLC 2001 data also reveals that approximately 84.9% of individuals living in households in quintile 1 are living below the poverty line while only a mere 3% in quintile 2 falls below this level.

Table 4.2: Household Monthly Expenditure on Telecommunication (JA$)

Quintile	Mean Household Size	Monthly Household Expenditure	Monthly Household Expenditure on Telecom Services	Telecom Expenditure as a % of Total Household Monthly Expenditure	Telecom Expenditure as a % of Total Household Monthly Disposable Income
1	5.23	$14442	$1112	7.7	6.7
2	4.34	$19190	$1209	6.3	5.5
3	3.58	$22400	$1344	6	5.3
4	3.15	$25797	$1522	5.9	5.2
5	2.26	$39434	$2090	5.3	4.6

Source: Jamaica Survey of Living Conditions 2001. Published jointly by the Planning Institute of Jamaica and the Statistical Institute of Jamaica.

Overall Expenditure on Utilities

4.15 The average Jamaican household spends over 12.5% of its disposable income buying utility services. Households in quintile one pay up to 14.9% of their disposable income on utility services. This is significantly higher than what households in the other quintiles are paying. For example, households in quintile 2 spend up to 12.5% while households in quintile 5 spend 10.1%. Telecommunication services account for the highest percentage of household spending on utility services (about 5.5%) while water reports the lowest, approximately 2.6%.

Table 4.3: Percentage of Household Expenditure On Utilities

Quintile	Monthly Household Telecom Expenditure as a % of Total Monthly Disposable Income	Monthly Household Electricity Expenditure as a % of Total Monthly Disposable Income	Monthly Household Water Expenditure as a % of Total Monthly Disposable Income	Total Monthly Spending on Utilities in %
1	6.7	5	3.2	14.9
2	5.5	4.5	2.5	12.5
3	5.3	5.1	2.7	13.1
4	5.2	4.5	2.7	12.4
5	4.6	3.5	2	10.1

Cross Subsidies and Rate Rebalancing

4.16 Cross subsidy occurs where revenues from one service of a company is used to subsidize another service provided by the same company. Traditionally, the telecommunications industry in Jamaica relied on this mechanism where international call tariffs were set higher than economic costs and the extra revenues used to subsidise the provision of domestic services at prices below their economic costs. However, this situation is now changing as internal cross subsidies are difficult to sustain in competitive markets.

4.17 The Office is currently proposing a rate rebalancing programme for CWJ domestic fixed line rates that will run for seven years – from September 1, 2002 to August 31, 2009.[30] Rate rebalancing may have serious implications for some households especially those who fall within the poorest quintile. Generally, these households have a higher domestic call rate than those in the richest quintile. Households in quintile 5 (the ones with the highest international call rate) would benefit most from rate rebalancing. However, it is presumed that rate rebalancing will motivate CWJ to expand its fixed line network to serve more people since it will now be able to charge customers the full economic cost of providing the service. Overall, Jamaica's telephone penetration rate is expected to increase. This would be consistent with results from research conducted for both developed and developing countries. These studies indicate that rate rebalancing has brought about increased penetration and overall reduction in price for most customers.[31] Also, the studies have shown that the price elasticity of access services is very low. This would suggest that increasing the access charge would have little effect on the demand for access services. [32]

Competition

4.18 The current liberalisation process has brought about tremendous growth in the mobile market to date. The number of lines increased from just over 330,000 in March 2001 to over 1.3M at the end of October this year. This growth is expected to increase as the new mobile operators extend their networks to meet their licence requirements.[33] The fixed line market is also expected to expand despite the absence of specific obligations. Up to

[30] More detail can be obtained from the OUR Consultative Document: "Modification to C&WJ'sPrice Cap Plan and Proposed Rules for International Telecommunication Services." This time period for rebalancing could change depending on responses from the consultation process.

[31] One such study is: "Telecommunications Privatization and Tariff Rebalancing: Evidence from Latin America" by Agustin J. Ros and Aniruddha Banerjee (April 2000).

[32] See "Telecommunications Regulation Handbook". Edited by Hank Intven. Page 6-17.

[33] Schedule 2 of the Domestic Mobile Provider Licences 2000 states that "*the licensee shall provide 90% geographic coverage of Jamaica within five (5) years of the grant of this licence.*" The licences were granted on 2000 March 14. This would suggest that by March 2005, mobile service should be reasonably accessible across the Island.

June this year, the waiting list stood at approximately 200,000. One of the new licensees is now capitalising on this demand by opting to serve only communities without fixed line service in its initial phase of operation. Increase competition may result in more affordable packages for the consumer.

Options to Address Affordability Problems

4.19 Affordability is one of the main rationales for establishing universal service/access plans. The objective is to develop and implement programmes/schemes that will facilitate more affordable access. The following are some schemes that could be implemented to address affordability problems:

a) Call Barring;

b) Limited Minutes

c) Prepaid Scheme

d) Low User Package

Call Barring

4.20 Restrictions can be imposed on the customer's calling patterns. Calls that attract a high charge can be barred so as to control the customer's bill. In order to dial these numbers, the customer would require the use of a calling card. Also, there could be a total barring of direct dialling except for calls to emergency services. The customer would then have to use a phone card to make outgoing calls. This scheme would allow unlimited incoming calls and have a fixed monthly access charge.

Limited Minutes[34]

4.21 A system could be implemented where the number of minutes allocated to a customer per month is restricted. An advantage of this option is that it might be easy to estimate the consumer's monthly bill providing the average price of calls can be determined and the consumer is allocated a fixed number of minutes per month.

Prepaid Scheme

4.22 A prepaid scheme, similar to the one used in the mobile market, could be introduced in the fixed line market. The scheme would employ the calling party pays principles and provide consumers with free access to emergency services such as fire and police. In addition, there would be no monthly fixed charge and outgoing calls, whether local, national or international, could be facilitated by the use of prepaid calling cards. Rates

[34] Appendix A develops a model illustrating this option.

could be set higher than normal to account for the absence of a fixed monthly charge.

4.23 One of the advantages of this scheme is that there is no monthly bill and the customer has total control over the amount spent on telephone services each month.

Low User Package

4.24 This scheme is currently being used by CWJ in its fixed line division. It is designed for customers who need access but make fewer calls than the average user. The objective is to encourage the customer to make fewer calls in return for a lower line rental charge. The customer has access to all services such as emergency, local, national and international. Local and national minutes[35] are priced relatively higher than normal but the customer is compensated with a lower monthly access charge. However, international rates are the same as that of the average customer.

4.25 One of the disadvantages of this scheme is that the customer would be required to constantly keep check of the time spent on the phone since beyond a specified number of minutes[36] his monthly charges would increase at a faster rate relative to the standard user. The plan assumes that the customer is well informed and disciplined, and the scheme will work to his advantage.[37]

Universal service/access has traditionally been thought of as related to fixed line technologies. If the objective of providing Jamaicans with access to telecommunications services is to be met under a Universal Service/Access Plan, is the basic level of service a "voice" connection regardless of whether it is provided by a fixed line or mobile or some other service or service provider? The Office seeks comments on the functional level of service that should be provided and the implications this may have for the type of service provider and nature of the universal service/access obligation.

[35] Intra and inter-parish calls on CWJ fixed line network.

[36] Under the current low user pricing scheme for fixed line customers, the breakeven of minutes, providing the customer makes only intra parish calls, is approximately 1433 and if the customer makes only inter parish calls, it's 496.

[37] More information on the Low User Scheme can be found in the OUR consultative document entitled: "Rebalancing Telephone Prices."

The Office's review indicates that "affordability" may be an increasing problem as rates for basic residential voice services are "rebalanced", i.e. as these rates rise to their economic cost. The Office seeks comments on how concepts of affordability can and should be defined and applied to the circumstances in Jamaica.

CHAPTER FIVE: PAYPHONES

Background

5.0 The Act provides for reasonable access to payphones as one of the requirements for universality. As with other services, operators will assess the commercial viability of installing calls boxes. In areas where the scope for profitability is low or non-existent, operators have little or no incentive to provide service.

5.1 The provision of public payphones is a critical component of any universality programme especially in sparsely populated rural areas where household income is low and affordability maybe a concern. Public payphones are also of importance to the urban poor - Network coverage might make service readily available but access to the network may be limited due to income constraints. The provision of public payphones can be used as the starting point for ensuring that access to telecommunication services are universally available with access to single line made available to households overtime.

Current Provision

5.2 The macroeconomic analysis discussed in Chapter 3 suggests that Jamaica's public density should have been approximately 2.9%, that is, an additional 3607 payphones should have been installed up to the year 2000. Currently, there has been only a marginal increase in the number of payphones.

Experiences

5.3 Several developing countries have used public payphones as the starting point toward building universal service. For example, Bhutan, Comoros, Ethiopia and Madagascar opted for payphones in every village. Others such as Costa Rico, Kenya and Lesotho require that public phones should be within walking distance from homes – 1 km for example. Still others use a different method. Service is provided based on the number of persons living in an area. The Cuban Government, for example has mandated that all villages and communities with more than 500 persons should have access to telephone services. The Iranian authority requires that all villages with a population of over 100 individuals should have access to telecommunication facilities. [38]

Proposal for Jamaica

5.4 The data on fixed line telephones and public payphones indicate that there is a higher percentage of households in urban areas with access than those in rural areas.

[38] See "Telecommunications Regulation Handbook", edited by Hank Intven. Table 6.3, page 6-11.

5.5 According to the 2001 JSCL, 10.9% of the number of households across the Island are below the poverty line. The incidence of poverty is highest in rural areas with approximately 16.4% of the total number of households living below the poverty line. The figures are lower in the Kingston Metropolitan Area (KMA) and Other Towns with 4.6% and 8.7%, respectively. This data seems to support one of the reasons for the lower penetration rate in rural areas – households in urban areas are more "economic" than those in rural. In addition, the lower penetration rate could also be explained by the higher cost of providing service in rural areas than in urban areas.

5.6 In order to fulfil the requirement of the Act with respect reasonable access to payphones across the Island, it might be necessary to install payphones at schools, post offices, shops and public libraries as well as along main roads. Installation could be based on, but not limited to the following minimum criteria:

(1) One payphone for every community or town with at least 25 households or 90 persons;

(2) Payphones should be within reasonable walking distance from homes. A maximum of two kilometres (2km) would be considered a reasonable walking distance to a payphone.

Technologies Currently Being Used to Provide Payphones

5.7 Several technologies are currently being used in many countries around the world to provide payphone service to customers. The traditional cable is still being widely used in densely populated areas. However, the industry has seen the emergence of cellular and other wireless technologies, such as VSAT[39], being used to provide service especially in rural areas where population density is lower. The Office believes that the provision of payphones should be technology neutral and the technology that can provide the required service at the least possible costs should be the one that is employed.

The Office invites comments on the use of payphones as a means of extending and facilitating access to telecommunications services. Specifically:

a) What criteria should be used to establish a sufficient number of payphones?

[39] This is currently being used in Chile to provide service to rural communities.

b) What are the factors that have inhibited the necessary or needed number of payphones from being provided?

c) What can be done to promote the use of payphones as a means of public access?

CHAPTER SIX: INTERNET ACCESS IN PUBLIC INSTITUTIONS

Introduction

6.0 *"The use of the internet has grown rapidly over the past few years with computer use and access to the internet becoming part of people's daily lives. It is believed that the Internet will become increasingly similar to the use of general home appliances and that consumers will eventually access the Internet at least once a day."*[40]

Internet Access in Schools

Benefits of Internet in Schools

6.1 Enormous benefits can be achieved from the provision of Internet service in schools. Students can benefit from online research, distance learning, and access to virtual libraries, just to name a few.[41]

Background to the Education System

6.2 Jamaica's education system is comprised of four levels: Early Childhood, Primary, Secondary and Tertiary. Early Childhood accommodates students between the ages of 0 – 5; primary education is provided to children between the ages of 6 – 11; students age 12 – 18 are enrolled in secondary level institutions and tertiary institutions accommodate students from age 16 and over. During the 2000/2001 school year, 108872 students were registered in early childhood educational facilities; 312369 in primary schools; 227540 in secondary; and 24474 in tertiary institutions.

Table 6.1: Information on the Education System in Jamaica for 2000/2001

	Early Childhood	Primary[42]	Secondary	Tertiary[43]
Number of Schools	1085	-	-	12
Number of Students	108872	312369	227540	24474
Age Group	0 – 5	6 – 11	12 -18	16 & over

Source: Economic and Social Survey Jamaica 2001. Published by the Planning Institute of Jamaica.

6.3 Analyses conducted by the OUR reveal that most schools at the tertiary level are providing internet access to students, however, only 9.6%[44] of the institutions at the primary and secondary levels are connected to date.

---

[40] Adapted from: http://adcentre.fairfax.com.au/research/whyonline.htm

[41] More information can be obtained from the following websites: http://www.stran-ni.ac.uk/pages/catacombs/CIT/Stu_pages/00-01/Yr3/SubjApps/l.platt/Html/INTRO.HTML; http://www.princeton.edu/~eszter/edu/issue.html

[42] The primary and secondary levels consist of schools that are providing both primary and secondary level education. For example, primary and junior highs or all-age schools accommodate both primary and secondary level students.

[43] The tertiary level consists of public institutions such as University of the West Indies, University of Technology, and nine teachers' colleges across the Island.

[44] This information is provided in Table 6.2 below.

For this reason, the GOJ might want to concentrate more on the connection of schools at the primary and secondary levels. This is critical since:

1) *It is mandatory that students attend school up to the age of 15. This means that education for students might end at this age therefore it is important that a good foundation is provided.*

2) *Tertiary education is not compulsory therefore students are not bound to attain education at this level. Moreover, classroom space at tertiary level institutions is limited compared to that at other levels. This explains one of the reasons for the lower attendance rate at tertiary institutions than at the primary and secondary levels. For example, analysis of the figures in Table 6.1 shows that only 72.8% of the students from the primary level move on to the secondary level. The figure worsens for the movement from the secondary to the tertiary level. Only 10.8% of the students at the secondary level move on to the tertiary level.*

3) *A third point is social and economic constraints. Generally, students who live in affluent households are more likely to have Internet access at home than those who are at the lower end of the socio-economic strata of the society. Therefore, access at school might be the only opportunity for these students.*

Current Situation in Schools at the Primary and Secondary Levels

6.4 The analysis presented in this section is based on the information provided in Table 6.2[45] below. Over half a million students (532,526) are enrolled in 944 schools at the primary and secondary levels[46] across the Island. Of the total number of schools, 74.4% are primary (37.4%) and all-age (37.0%), high[47] accounts for 16.2%, 9.3% are primary and junior high while a mere 0.1% are exclusively junior high. The largest number of students are in primary schools (37%), followed by high schools (35.3%). The additional 27.7% are distributed as follow: 11.2% attend primary and junior high, all-age accounts for 16.4% while junior high enrolls only 0.1%.

[45] Appendix B provides a breakdown of the information provided in Table 6.2, by parish. Information in this table was compiled from data supplied by the Ministry of Education, Youth and Culture and CWJ.
[46] Schools at these levels are: Primary, Primary and Junior High, Junior High, All-Age, Traditional High, Comprehensive High and Technical High.
[47] High represent all high schools: Traditional, Comprehensive and Technical.

6.5 With regard to basic utilities, 96.6% of all schools have access to electricity. However, the situation is not as encouraging for telephone service coverage. Just over one half (57.1%) of these schools have access to telephone service. With regard to telephone service by school type: 100%, 96.7%, 64% and 62.5% of all junior high, high, primary and primary and junior high schools, respectively, have telephone service. However, the figure for all-age schools falls way below those of the other schools; only 31.7% currently have access the telephone network.

6.6 The number of schools with access to the Internet is significantly low, only 9.6%. With respect to Internet access by school type: 37.3% of all high schools are providing Internet service to their students. However, the figures for other school types are very low: 5.7% of the primary schools provide internet access, 3.7% of the all-age and 1.1% of the primary and junior high. Internet service is not yet available at the Island's only junior high school.

6.7 Just over thirty six percent (36.3%) of schools are located in urban areas meanwhile the remaining (63.7%) are located in rural Jamaica[48]. With respect to school type in urban areas: 100%, 75.2%, 47.7% and 41.4% of all junior high, high, primary and junior high and primary schools, respectively, are located in urban areas. However, only 11.1% of all all-age schools are located in urban areas. With respect to school type in rural areas: 88.9% of all-age schools are located in the rural areas followed by primary with 58.6%, primary and junior high with 52.3% and high schools account for 24.3%.

[48] Urban and rural areas are defined in the same way as the definitions used by the Ministry of Education, Youth and Culture.

Table 6.2: Statistics for Schools at the Primary and Secondary Levels in Jamaica.

	Primary	Primary and Junior High	Junior High	All-Age	High	Total	% of Schools
Number of Schools	353	88	1	350	153	945	
Population	197128	59736	464	87387	187811	532526	
Number With Electricity Service	340	86	1	334	152	913	96.6%
Number With Telephone Service	226	55	1	111	147	540	57.1%
Number With Internet Service	20	1	0	13	57	91	9.6%
Number in Urban Areas	146	42	1	39	115	343	36.3%
Number in Rural Areas	207	46	0	311	38	602	63.7%

Estimated Number of Computers Required

6.8 The number of computers available to students should be reasonable enough such that the intended objective of the GOJ of providing Internet access can be met. One approach to facilitating this objective is to apply the student/teacher ratio. This approach assumes that at least one teacher is assigned to a classroom therefore, every class would have access to at least one computer. The average student/teacher ratio and the number of computers that would be required at the primary and secondary levels are shown in the Table 6:3 below.

6.9 After determining the number of computers that will be required to provide a basic form of Internet access in schools, the next step is to decide how to fund the provision of these computers. It does not appear reasonable to assume that schools would be able to purchase computers without financial assistance. Therefore to meet this objective, one means is to obtain funding from the universal service/access fund; another would be to fund the provision of computers through government programmes.

Table 6.3: The Average Student/Teacher Ratio and the Number Computers Required at the Primary and Secondary Levels.

School Type	Student/Teacher Ratio[49]	Population	Number of Computers Required	Cost of Providing Computers (US$)[50]
Primary	42:1	197,128	4,694	4,694,000
Primary and Junior High	38:1	59,736	1,572	1,572,000
Junior High	30:1	464	15	15,000
All-Age	42:1	87,387	2,081	2,081,000
High	23:1	187,811	8,166	8,166,000
TOTAL		**532526**	**16528**	**16,528,000**

Tariff Packages for Schools

6.10 Currently, Internet service providers bill their customers using two methods: (1) either on a dial-up usage basis, measured in hours or (2) a monthly fixed fee (flat rate) for dial-up or broadband (high-speed).[51]

6.11 Dial-up connection is considered a basic form of access and based on usage, may be a cheaper alternative. However, high-speed services are considerably more costly but depending on usage patterns may be more economical.

6.12 Billing based on usage might not be appropriate for schools if the level of usage is high.[52] With flat rate, the level of usage would not be a critical issue since students would be able to use the service as long as required without regard to the charges. Another important issue is that with flat rate, the school will know its monthly charges whereas with hourly charges, it would be difficult to determine this amount. The Office is of the view that a fixed or flat monthly rate would be more appropriate for schools. This rate structure would also be suitable for broadband connection.

Contributions to Monthly Bill Payment

6.13 The following are some approaches that could be considered with respect to contribution to schools' monthly Internet bill:

(1) Full payment of bills from the universal service/access fund;

[49] The student/teacher ratios and population figures were obtained from the Ministry of Education, Youth and Culture

[50] These costs are based on the assumption that each computer would cost US$1000.00 for purchase and installation.

[51] Note that this fee is just for Internet access. If the customer is on a dial up plan he would be required to pay the telephone company dial up charges; however, if the customer has broadband connection all charges would be paid to the internet service provider because there would be no dial up charges.

[52] See Appendix D; paragraph D.11, for an explanation.

(2) Part payment of bills from the universal service/access fund.

(3) No contribution from the universal service/access fund

Full Payment of Bills From the Universal Service/Access Fund

6.14 With this approach, the universal service/access fund would pay the monthly Internet bill of all schools across the Island. This proposal is based on the premise that schools are constrained by income limitations and therefore would not be able to pay their monthly Internet bills.

Part Payment of Bills From the Universal Service/Access Fund

6.15 This approach assumes that schools can pay a portion of their monthly bill therefore full subsidy should not be given. Essentially, the fund would contribute a fixed proportion while the schools would pay the difference.

6.16 A similar approach is adopted by the United States Government to address Internet access in public schools. A special fund, referred to as E-rate, was created in 1996. Under this provision, schools can get funding ranging from 20 – 90% of the cost of providing the service. Generally, schools in low-income areas receive more discount than those in high-income areas.

6.17 A similar discount scheme could be introduced in Jamaica where schools in low-income areas would receive a higher discount than those in high-income areas.

No Contribution from the Universal Service/Access Fund

6.18 This approach assumes that Internet access is similar to the provision of electricity, telephone and water and therefore it should be paid for from the recurrent budget of schools and not the universal service/access fund.

Level of Service[53]

6.19 Two different levels of Internet service are currently being offered in Jamaica - Conventional Dial Up and Broadband. Broadband connection offers clear advantages over dial up with respect to speed, economic efficiency and continuous connection. Given the purpose and the level of usage at schools, it may be appropriate to install broadband connections in schools.

In order to provide Internet access to schools, at least three components must be met: the hardware, ie, the computer itself; the software used on the computer and the access line to the Internet. The Office seeks comments on how best to meet this objective. What a reasonable level of Internet access

[53] See Appendix D for further discussion on this topic.

to schools should be; and how the funding to provide these components should be sourced.

Internet Access at Public Libraries and Post Offices

Current Situation at Public Libraries and Post Offices[54]

6.20 The analysis presented in this section is based on the information provided in Table 6.4[55] below. There are 132 libraries and 310 post offices throughout the Island. Ninety-seven percent (97%) of the libraries have access to electricity, that is, only 4 libraries across the Island are currently without electricity service. Data on the number of post offices with electricity was not available at the time of publication. Currently, only 58% of all public libraries across the country have access to telephone service; of post offices, approximately 22% have access to telephone service. Access to Internet service is the lowest of all three services; 33% of libraries have access to the Internet, while a mere 9% of all post offices is currently providing the service to the public.

6.21 In addition, it is worth noting that all parish libraries and post offices in parish capitals, except Spanish Town and Black River, are providing Internet access to the public. However, more work is needed to get the service into other areas. As part of an agreement with the GOJ, CWJ is expected to provide 60 post offices across the country with Internet service by March 2003. To date, as can be seen in the Table 6.4 below, only 28 post offices are delivering Internet service to the public.

Table 6.4: Statistics for Libraries and Post Offices in Jamaica.

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	132	310		
Number With Electricity Service	128	N/A	97.0	N/A
Number With Telephones Service	76	67	57.6	21.6
Number With Internet Service	44	28	33.3	9.0

Number of Internet Terminals Per Post Office

6.22 CWJ has been installing Internet terminals or kiosks in post offices across Jamaica. As mentioned above, they have already installed terminals in 28 and an additional 32 are to be installed by March 2003. This obligation will not cover all post offices and therefore other measures will have to be

[54] The information provided in this section is based on data provided to the OUR up to August 2002, by CWJ, Jamaica Library Service and The Postal Corporation of Jamaica.

[55] Appendix C provides a breakdown of the information provided in Table 6.4, by parish.

implemented to ensure full coverage across the Island. Other measures could include direct funding from the universal service/access fund and/or funding directly from government.

6.23 The number of terminals installed at post offices will depend on the demand for the service. There are numerous approaches that can be used to assess the demand for internet services at post offices, however, this section will discuss two of these: (1) Location and (2) Income.

Location

6.24 Location plays a critical role in the demand for Internet service at post offices. Urban areas are more densely populated than rural areas therefore the demand for service in these areas is expected to be greater. This would suggest that post offices located in urban areas would require more terminals than those in rural.

Income

6.25 Income is another factor that may influence the demand for Internet services at post offices. In affluent neighbourhoods the demand for public access might be lower than in communities where the majority of the citizens are considered to be "working class." In other words, wealthy households are better able to pay for individual access than the poor.

Number of Terminals Per Library

6.26 The number of terminals to be installed in libraries would also be influenced by the demand for Internet service. A number of factors may influence the demand for Internet service at libraries: The number and population of schools served by the library, location and income level of citizens living the service areas.

6.27 Funding for terminals at libraries could also be financed directly from the universal service/access fund and/or the government.

Tariff Packages for Libraries and Post Offices

6.28 A similar tariff package, as the one proposed for schools, could also be made available to public libraries and post offices. However, since libraries and post offices may or may not re-sell the service being offered, it would not be appropriate to provide full funding to cover their monthly charges. Instead, two options could be considered: (1) part funding and (2) no funding.

Level of Service

6.29 The level of service to public libraries and post offices could be similar to those discussed for schools in paragraph 6.19 above.

In order to provide public access to Internet terminals in libraries and post offices, elements may need to be defined within the universal service/access plan. The Office seeks comments on how best to meet this objective in terms of provisioning and funding within a universal service/access plan. The Office also seeks comments on whether Internet kiosks in public libraries and post offices should be able to re-sell the service in order to recoup the cost of providing public access.

CHAPTER SEVEN: EMERGENCY SERVICES

Introduction

7.0 Emergency services form part of universal service/access provision. All telephones whether fixed line, fixed wireless, mobile or payphone should have the capability of providing access to emergency services. These include the police (119) and fire and ambulance (110). In addition, the Act specifically states that this service should be offered without charge to all customers.

7.1 This is a vital part of the telecommunication service that everyone should have access to. It could save lives, time and money. It is important that all operators are adhering to the requirements of the Act to provide free emergency services.

CHAPTER EIGHT: THE UNIVERSAL SERVICE/ACCESS PROVIDER

Introduction

8.0 This chapter assesses the different options that can be used in choosing universal service/access providers. Two approaches are discussed: Competitive Bidding and Pay or Play.

8.1 According to Sections 40(1)(a) and (b) the Minister, on his own, may designate the existing telecommunications carrier as a USP or any other licensee on the recommendation of the Office. However before any designation, Section 40(2)(a) and (b) state that the Minister shall:

(a) consult with members of the public;

(b) issue a written determination that the public interest requires the taking of such action.

8.2 With respect to the recommendation of the Office on the designation of other licensees, the Office is proposing two approaches that could be used in selecting/choosing these licensees:

1) Competitive Bidding and;

2) Pay or Play;

Competitive Bidding

8.3 The competitive bidding approach is a process in which operators would bid against each other to serve potential customers. Licensees could be invited to bid for the opportunity to serve potential customers after the number of customers to be served and the amount of subsidy have been determined. The objective would be to award the contract to the company with the lowest bid, that is the one requiring the least amount of subsidy. The agency responsible for the bidding process would be required to set the terms and conditions of the contract. Some of the terms and conditions of the contract could include, but not limited to the following:

a) Area(s) or institutions to be served;

b) the minimum quality of service;

c) the applicable tariff structure;

d) roll out period for service to be provided;

e) maximum subsidy;

f) penalty for non-fulfilment of terms of contract.

8.4 The two most successful instances of competitive bidding to date are to be found in Chile and Peru. The Chilean program focused on providing public phones in every community. In 1995, the country targeted approximately 6000 communities and by 1999 it was successful in installing public phones in 5916 of these districts. The records[56] indicate that during this period the level of subsidy paid out by the authorities to operators amounted to 50% less than budgeted. Over two million people benefited from the project!

Table 8.1: Summary of the Results of the Bidding Process in Chile

Year	Projects	Localities	Inhabitants in Localities (000)	Maximum Subsidy (USD m)	Subsidy Granted (USD m)	Subsidy Per Person (USD)
1995	34	726	240	3.1	2.1	8.75
1996	18	1632	762	4.2	0.9	1.18
1997	70	2146	772	20.4	8.1	10.49
1998	27	858	229	8.9	5.5	24.02
1999	34	554	154	5.5	4.4	28.57
Total	**183**	**5916**	**2157**	**42.1**	**21.0**	**9.74**

Source: "Telecommunications Regulation Handbook". Edited by Hank Intven. Page 6-31.

8.5 The Peruvian program started out in 1998 with a pilot project to provide 213 localities/communities with access to payphones. With a budgeted maximum subsidy of US$4M, the successful bidder was able to provide the service for about 59% less. The project was completed in just over a year. After the completion of the pilot project, service was extended to include public Internet telecentres. In late 1999 three projects were tendered with the intention to install 1937 public payphones and 236 public Internet telecentres.

8.6 Something noticeable happened during the process. The regulator modified the bidding arrangements. In an effort to arrive at the lowest cost for the three projects combined, the regulator allowed simultaneous bidding. Operators were allowed to bid for any combination of the projects offered. The results were very encouraging. Of the maximum amount of US$50M allocated, the bidders requested only US$10.99. Bidder A won the bid for project 3 meanwhile projects 1 and 2 were awarded to Bidder B. Tables 8.2 and 8.3 below give a summary of the bidding process and the results.

[56] See "Telecommunications Regulation Handbook". Edited by Hank Intven. Page 6-31.

Table 8.2: Example of Multiple Projects Bidding Procedure in Peru.

	Project 1	Project 2	Project 3	Project 1 & 2	Project 1 & 3	Project 2 & 3	Project 1,2 &3
Bidder A's Bids:	100		50		130		
Bidder B's Bid:	80	50	60	120	130	100	180
Bidder C's Bid:	90	45		130			

Source: "Telecommunications Regulation Handbook". Edited by Hank Intven. Page 6-35.

Table 8.3: Summary of the Results of the Bidding Process in Peru

Project	Localities	Inhabitants in Localities (k)	Maximum Subsidy (USD m)	Subsidy Granted (USD m)	Subsidy Per Person (USD)
South	534	136	14.0		
Central South	1029	303	27.0		
Jungle North	374	141	9.0		
Total	**1937**	**580**	**50.0**	**10.99**	**18.95**

Source: "Telecommunications Regulation Handbook". Edited by Hank Intven. Page 6-36.

8.7 The two examples of competitive bidding outlined above could be considered for the effective delivery of service to potential customers in Jamaica. However, it is worth noting that the bidding process is driven mainly by the subsidy and not necessarily by price and quality of service to customers even though these might be explicitly outlined during the process. Also, even though a company might produce the lowest bid and be awarded the contract to provide service, it might not be able to fulfil its commitments. Therefore careful consideration should be given to the bidding process before enactment.

Pay or Play Approach

8.8 This approach was put forward by Oftel. Essentially, the pay or play approach is a process whereby an operator can choose to serve an uneconomic customer, area or institution, voluntarily. The idea is that if an operator serves potential customers voluntarily, that is "play", then the efficient cost of providing this service is deducted from the amount that otherwise would have been payable into the universal service fund. In other words, a subsidy[57] would be made available to the company providing the amount it is required to contribute to funding of universal service is less than the net costs it incurs in providing the service to these customers.

[57] That is the difference between the net costs incurred in providing service and its contribution to the fund.

8.9 This approach has the potential of introducing competition in the provision of universal service/access and even innovation in the products and services provided. The packages offered by operators would have to comply with guidelines specified by the Ministry or the Office. For example, the company's pricing policies would need to be approved by the Office before any funding is granted.

The Office seeks comments on how and who may be designated as a universal service/access provider bearing in mind that the current legislation limits the role of the OUR to merely recommending "other licensees". The current legislation permits the Minister to designate, by agreement with the potential provider, who shall be the universal service/access provider.

The Office also seeks comments on potential options for choosing providers for single line voice telephony, public payphones and Internet services.

CHAPTER NINE: FUNDING UNIVERSAL SERVICE/ACCESS

Introduction

9.0 This chapter discusses different ways in which universal service/access may be funded.

Mechanisms Used to Fund Universal Service/Access

9.1 Several mechanisms are used to fund universal service/access. Different countries use different options or a combination of options. The following are a list of some of the options used:

a) **General taxation:** the government may levy a tax on the society and use the proceeds to fund universal service/access;

b) **Interconnect charges:** the universal service provider (USP) is allowed to inflate its interconnect charges and use the extra revenues to finance universal service/access;

c) **Cross subsidies:** the incumbent is allowed to price one or more service(s) above cost and use the difference to subsidize other services and expand its local network;

d) **Universal service fund (USF):** operators in the industry contribute to a fund which is used to cover the net cost of universal service/access. Two types: (1) A physical fund that is administered either by the regulator or some other independent body and (2) a virtual fund where operators make their contributions directly to the USP instead of pooling the money in a physical fund.

General Taxation

9.2 The funding of universal service/access can be accommodated by a general tax on the society by the government. This method of funding is probably the most efficient since it is spread across the entire society thus reducing the level of distortions that might have occurred in the market. In addition, since telecommunication services benefit everyone in the society, whether directly or indirectly, the general consensus is that everyone should contribute. This is the approach currently being used in South Africa and Finland.

9.3 However, a drawback of this method of funding is that it can be highly political and changes in government policies could severely affect its collection and distribution.

Interconnect Charges

9.4 Interconnect charges are also used to fund universal service/access. The universal service provider (USP) is allowed to inflate its interconnect charges to other operates and use the extra revenues to finance universal service/access. This approach might not be ideal in a competitive maket since it increases interconnection charges to other operators. This is inefficient pricing and may result in the reduction of competition in the market.

Cross Subsidies

9.5 Cross subsidies is another approach that is used to fund universal service/access. Cross subsidy occurs where revenues from one service of a company is used to subsidize another service provided by the same company. Traditionally, the telecommunications industry in Jamaica relied on this mechanism where international call tariffs were set higher than economic costs and the extra revenues used to subsidise the provision of domestic services at prices below their economic costs. However, this situation is now changing as internal cross subsidies are difficult to sustain in competitive markets.

Universal Service/Access Fund (USF)

9.6 A universal service/access fund is generally viewed as the best option in financing and promoting universality objectives. Revenues are collected from operators in the industry in a fair and transparent manner and then distributed to the USP in a similar fashion. This option, unlike others that might not pass on the desired benefits to consumers, is specifically used to fund service to uneconomic customers and areas. Chile and Peru are probably the best two examples of successful universal service/access funds to date.

Physical Universal Service/Access Fund (PUSF)

9.7 Operators in the telecommunications industry are required to contribute to a fund which is used to offset the net cost of universal service/access. The fund is usually controlled by an administrative body which is responsible for its collection and distribution. The administration of the fund varies from country to country. In some countries the government, the regulator, or an independent body assumes responsibility. In Colombia, the Ministry of Communications is responsible for administration; independent bodies are used in France, South Africa, Peru and the USA.

9.8 A physical fund tends to portray transparency, fairness and proportionality. It also tends to be flexible in that it is capable of meeting the future requirements of the industry. The PUSF can easily facilitate payments to new USPs or contributions from new operators. Contribution from each operator can be clearly demonstrated and since it is proportional to some measure of market share, no undue burden is placed on any operator.

9.9 One of the drawbacks of a physical fund is that it may require the establishment of an institution or agency to monitor and control the funds collected. Since the cost of operating this institution is expected to come from the fund itself, the overall net costs of universal service/access would be higher. Another disadvantage of this option is the administration of the fund itself. If the fund is administered by the government for example, there will be a higher potential for political interference than if it were administered by the regulator.

Virtual Universal Service/Access Fund (VUSF)

9.10 Virtual funding is similar to physical in that operators contribute to the funding of universal service/access; however, instead of making payments to a physical fund, contributions are made directly to the universal service provider(s). Therefore, there is no need for the establishment of an agency; however, this approach does not totally forego the administrative costs of a physical fund. These costs would be passed on to individual operators. The VUSF would still however, require the regulator (or other independent body) to calculate or at least verify the net cost of universal service/access and the payments by each operator. An example of VUSF is found in Australia. Telstra, the universal service/access provider, is paid directly by other operators in the industry.

Physical vs. Virtual Fund

9.11 The selection of one option over the other depends on the telecommunications environment. If there were only one USP then it would prove more efficient to use the virtual rather than the physical fund. However, as the number of USPs increases, direct payments become more complicated thus shifting the preference to the physical fund.

Contributions to the Fund – By What Means?

9.12 After establishing what the net cost of universal service/access is, the next step is to determine how to share this cost among operators and by what means. It is generally suggested that costs should be shared in proportion to the size or market share of companies. This can be done by the following means:[58]

a) profits;

b) minutes;

c) revenues.

[58] These options are taken from the study: "The Cost, Benefits and Funding of Universal Service in the UK", prepared by Analysys for OFTEL in 1995.

9.13 Revenues, as a measure of contribution, are more advantageous than profits and minutes as shown below:[59]

a) revenues are more difficult to manipulate than profits;

b) not all telecommunication services (access and leased lines, for example) are sold in minutes;

c) verification of revenue information might be less complicated.

Who Should Contribute to the Fund?

9.14 Since everyone in the industry will benefit from expanded networks, everyone should contribute. Voice telephony operators benefit from an increased customer base which will result in increased revenues and brand recognition. Their customers benefit from the expanded networks in that they now have the opportunity to communicate with more people thereby increasing the utility obtained from the service being provided.

9.15 Providers of non-voice services such as data may argue that they do not benefit because their users have no need for direct access to uneconomic customers and areas. However, their arguments miss a very fundamental factor – all operators have to use the telecommunication network to provide service. Therefore, the expansion of the network would benefit everyone. For example, even though an area may be considered uneconomic to serve, there might be people in the area who can afford to pay for the services offered. Expansion of service in that community may result in increased demand for Internet service or other non-voice related services in that area.

9.16 To ensure the efficient collection of contributions from the industry, it might be more appropriate to levy charges only on operators with service provider licences. Therefore all revenues, net of any interconnection and/or leased line payments to other operators, generated from the provision of services prescribed under the Telecommunications Act 2000 using a service provider licence, should form the basis for contribution to the fund.

9.17 Since consumers will be the ultimate contributors, it is more justifiable for the tax to be levied on the revenues of service providers (they interface directly with customers). If carriers[60] are required to contribute then services sold to service providers will be inflated because the carrier will

[59] Note that the advantages of revenues over profits and minutes are not limited to those listed above.
[60] Note that a company could hold both carrier and service provider licences. In this case, only revenues generated from selling services applicable under the service provider licence would be considered for contribution to the fund.

try to recover its costs by passing on the increase to purchasers of its services. The service provider, whose services are already inflated, will further increase its price to the end consumer to accommodate the tax. This is not a reasonable and efficient tax option. The focus therefore is on operators who interface directly with the customers. This form of taxation is similar to a general consumption tax – a tax is levied on finished products and services. An example is the General Consumption Tax (GCT) used in Jamaica.

How Much Should Each Operator Contribute to the Fund?

9.18 The Act provides guidelines as to how much contribution a company should be required to make. It emphases that no undue burden should be placed on any contributor or the USP. The net cost of universal service/access for a given year should not exceed five (5) percent of the total eligible revenues of the industry. Therefore to ensure transparency and fairness, contributions could be made in proportion to a company's revenues. That is, if net costs represent five percent of industry revenues, each operator would be required to contribute five percent of its eligible revenue to the fund. It therefore follows that operators with large revenues will contribute more in dollar terms than those with low revenue base.

Mechanisms for Recovery of Universal Service/Access Charges

9.19 Two approaches could be considered: (1) the charges could be built into the tariffs consumers pay to the operator or (2) charges could be shown as a line item on customers' bills expressed as a percentage of the bill.

The Office seeks comments on the type of approach and funding options that would best served the needs for funding universal service/access plan.

Specific comments are requested on the methods of contributing to a fund, who should contribute and how funds should be sourced and administered.

CHAPTER TEN: OTHER ISSUES

Introduction

10.0 The chapter focuses on some other issues that might impact on the provision of universal service/access. It examines the possibility of introducing special services to the disabled community; the issue of disconnection and some benefits of keeping customers connected; and outlines some of the issues that may involve proper monitoring and review.

Service to the Disabled

10.1 The Planning Institute of Jamaica (PIOJ) reports that an estimated five (5) percent[61], (over 100,000 persons), of the population have some form of disability. Of this figure, 29.1 % are physically disabled and 14.1% have multiple disabilities. The National Policy on Disability provides guidelines on how disabled people should be treated. One such guideline is equal opportunities for people with disabilities.

10.2 Oftel has put forward a number of services that British Telecom (BT), the universal service provider in the United Kingdom, is expected to meet in its provision of service to the disabled[62]. They include, but are not limited to the following:

a) provision of free directory information service to customers who are unable to use a telephone directory;

b) priority fault repair services;

c) reasonable access to payphones by wheelchair users;

d) delivery of bills in Braille, large print or even on computer disk for customers who are visually impaired;

e) cheaper calls for text phone users; ability to call other customers who do not have text phones. (Text phones are designed for the hearing-impaired).

10.3 The OUR is proposing that special consideration be given to the disabled population. Service should be such that no undue burden is imposed on this customer group in using the services provided. Some of the issues put forward by Oftel could probably be used as the starting point for the level

[61] According to the 2000 Edition of the of the PIOJ's "Economic and Social Survey Jamaica 2000."
[62] See "Telecommunication Services for People with Disabilities - Statement" published by OFTEL. www.oftel.gov.uk/publications/1995_98/index.htm

of service to the disabled community. Comments are especially welcome from the disabled community on more of the issues that could be considered in the delivery of service to them.

Telecommunication Services at Health Facilities

10.4 The OUR is in the process of gathering data on the availability of telecommunication facilities at hospitals and health centres across the Island. Unfortunately, the data were not available for publication up to the time of release of this version of the consultation document; however, the OUR intends to include them in subsequent versions when they become available.

Disconnection

10.5 The provision of universal service/access to a customer should not be viewed as a luxury item but instead a necessity. The objective should be to satisfy the individual's basic telecommunications need. With this view in mind, programmes could be implemented to keep the customer on the network. [63]

10.6 The OUR believes that disconnection should be minimal. Everyone benefits when the customer remains on the network. As the company's customer base increases, so does the value of the network. Subscribers would now be able to communicate with more people thus increasing the utility obtain from the network. The company benefits in terms of increase revenue and brand image. If the customer is disconnected, the company would not only forego revenues from outgoing calls and access charges but also revenues from incoming calls. The other side of this argument is that the company could earn more revenue if the service was transferred to another customer!

Monitoring and Review

10.7 For the universal service/access programme to be successful, there must be effective and efficient administration, collection monitoring and review. The Office would have to ensure that the guidelines and standards laid down for the provision of service are adhered to by the USP(s).

10.8 Review is just as important as monitoring. Given the rapid changes in technology and the industry, it follows that the definition of universal service/access will have to be constantly reviewed to ensure that services provided to customers remain current. Presently Internet service is not a requirement for households; however, in the not too distant future this idea might have to be revised to accommodate service in every household across the Island.

[63] Chapter four discusses some voice telephony options that could be implemented.

Comment on the issue of whether the disabled community should be given special treatment and what should be the starting point for services.

The Office seeks comments on how best to minimize disconnection of customers from the network. Also, what provisions should can be implemented to ensure an effective monitoring and review programme.

APPENDIX A: ANALYSIS OF THE PRICE OF FIXED LINE VS. PREPAID MOBILE SERVICES

A.0 The following model gives an analysis of the cost of owning a fixed line phone vs. a prepaid mobile. The objective of this analysis is to determine which method is more economical in the provision of universal service to the customer. The assumptions used in this analysis are as follow:

1) the prices shown in the tables below, (Tables A1 and A2), are based on average prices in the sector up to November 30, 2002. These rates are assumed to be at economic cost or close to economic cost;

2) the consumer is allocated a fixed number of minutes for the month;

3) the consumer can distribute minutes equally or based on price of a call;

4) the fixed line access charge is fully rebalanced.[64] CWJ estimates that the average economic cost of providing access is approximately $1200.[65] The analyses will therefore use J$1200 as the cost of access.

5) to account for the per second billing on Digicel and CWJ's mobile networks, the model assumes that each call made is terminated at one minute intervals.

A.1 The model is expressed in the following form:

$$MC = W_1*M_1 + W_2*M_2 + W_3*M_3$$

$$FC = W_1*F_1 + W_2*F_2 + W_3*F_3 + AC$$

Where:

MC = the total monthly charge to a customer with a prepaid mobile phone;

FC = the total monthly charge to a customer with a fixed line phone;

[64] The model considers only the standard fixed line package. The low user package is ignored to facilitate easier computations.

[65] See Cable and Wireless' Response to Digicel's Preliminary Response on: "Modifications to C&WJ's Price Cap Plan and Proposed Rules for International Telecommunications Services", October 23, 2002. A copy can be obtained at the OUR.

M_1 = the average per minute charge for a call from a prepaid mobile to another mobile phone on the same network;

M_2 = the average per minute charge for a call from a prepaid mobile to another mobile phone on a different network;

M_3 = the average per minute charge for a call from a prepaid mobile to a fixed line phone;

F_1 = the average per minute charge for a call from a fixed line to another fixed line (intra parish calls);

F_2 = the average per minute charge for a call from a fixed line to another fixed line (inter parish calls);

F_3 = the average per minute charge for a call from a fixed line phone to a mobile;

AC = monthly access charge on the fixed network;

W_i = weight assigned to each call/minute. Note i = 1,2,3.

Table A1: Average Price of Calls From a Prepaid Mobile Phone (J$)

	Mobile-to-Mobile (Same Network)	To Other Mobile	Mobile-to-Fixed
Average Price	8.17	17.5	8.83

Table A2: Average Price of Calls From a Fixed Line Phone (J$)

	Fixed-to-Fixed (Intra)	Fixed-to-Fixed (Inter)	Fixed-to-Mobile
Average Price	0.35	0.88	9.0

Equal Distribution of Minutes

A.2 If we assume that the consumer distributes minutes equally, then the average per minute price of a call from a prepaid mobile phone would be approximately J$11.50 meanwhile from a fixed line phone the charge would be J$3.41. If we also assume that a customer is allocated thirty minutes (30) per month, that is, an average of one minute call per day, then the average bill for the customer with a prepaid mobile phone will be J$345.00 while that of a customer with a fixed line phone will be J$1302.33 (including access charge of J$1200.00).

A.3 However, as the number of allocated minutes increase, fixed line service become more economical. The break-even point is between one hundred and forty-eight (148) and one hundred and forty-nine (149) minutes. Any minutes allocated above this point would be more costly for a prepaid

mobile user compared to a landline customer. For example, if two hundred minutes were allocated, the mobile customer would be billed J$2300.00 and the fixed line customer would be required to pay J$1882.22.

Minutes Based on Price

A.4 With equal weights, the consumer values all calls equally; however, if we assume the consumer's decision to make a call is based on the price of that call compared to another, then the weights will change. An analysis of the prices in Tables A1 and A2 indicate that the customer with the mobile phone will value his calls according to the following weights: 0.418 for mobile to mobile; 0.195 for calls to other mobile; and approximately 0.387 for calls to fixed line phones. The customer with fixed service will value calls as follow: 0.697 for fixed to fixed (intra parish) calls; 0.276 for fixed to fixed (inter parish) calls; and 0.027 for fixed to mobile calls.

A.5 If the analysis in paragraph A.4 above holds, then the average per minute charge from a prepaid mobile would be approximately J$10.25. The charge from a fixed line would be J$0.73. If we further assume that the customer is allocated thirty (30) minutes per month, then the average bill for a prepaid mobile user would be J$307.38; the fixed line customer would be required to pay J$1221.95. As the number of allocated minutes increase, the cost of owning a mobile phone become more expensive relative to a fixed line. The break-even point is between one hundred and twenty-six (126) and one hundred and twenty-seven (127) minutes). For example, if two hundred minutes were allocated, the mobile customer would be billed J$2049.18 and the fixed line customer would be required to pay J$13846.33.

A.6 It is obvious that this method of valuing minutes produces better results for the consumer than the one that assumes equality. For example, if a prepaid mobile customer is allocated two hundred minutes per month, he would save approximately J$250.00 monthly if he applies the "minutes based on price" approach where as the fixed line customer would save over J$500.00 per month.

APPENDIX B: STATISTICS FOR SCHOOLS BY PARISH

Kingston and Saint Andrew

	Primary	Primary and Junior High	All-Age	High	Total	% of Schools
Number of Schools	54	19	29	43	145	
Population	49045	4221	7039	52884	113189	
Number With Electricity Service	53	19	28	43	143	98.6
Number With Telephone Service	50	15	18	43	126	86.9
Number With Internet Service	5	0	3	11	19	13.1
Number in Urban Areas	48	15	6	41	110	75.9
Number in Rural areas	6	4	23	2	35	24.1

Saint Thomas

	Primary	Primary and Junior High	Junior High	All-Age	High	Total	% of Schools
Number of Schools	30	3	1	9	5	48	
Population	9835	2045	464	1408	6058	19810	
Number With Electricity Service	29	3	1	7	5	45	93.8
Number With Telephone Service	22	3	1	3	5	34	70.8

Number With Internet Service	1	0	0	0	2	3	6.3
Number Urban Areas	5	2	1	0	2	10	20.8
Number in Rural Areas	25	1	0	9	3	38	79.2

Portland

	Primary	Primary and Junior High	All-Age	High	Total	% of Schools
Number of Schools	19	6	20	5	50	
Population	10809	1506	3857	5589	21761	
Number With Electricity Service	17	6	19	5	47	94.0
Number With Telephone Service	12	1	10	5	28	56.0
Number With Internet Service	0	0	0	2	2	4.0
Number in Urban Areas	5	0	0	3	8	16.0
Number in Rural Areas	14	6	20	2	42	84.0

Saint Mary

	Primary	Primary and Junior High	All-Age	High	Total	% of Schools
Number of Schools	28	7	24	9	68	
Population	8285	4338	4366	7200	24189	
Number With Electricity Service	28	7	23	9	67	98.5
Number With Telephone Service	16	4	4	8	32	47.1
Number With Internet Service	1	0	1	7	9	13.2
Number in Urban Areas	3	1	4	5	13	19.1
Number in Rural Areas	25	6	20	4	55	80.9

Saint Ann

	Primary	Primary and Junior High	All-Age	High	Total	% of Schools
Number of Schools	17	6	45	8	76	
Population	10117	3638	11167	9117	34039	
Number With Electricity Service	15	6	43	8	72	94.7
Number With Telephone Service	10	1	12	8	31	40.8

Number With Internet Service	1	1	0	5	7	9.2
Number in Urban Areas	6	0	6	7	19	25.0
Number in Rural Areas	11	6	39	1	57	75.0

Trelawny

	Primary	Primary and Junior High	All-Age	High	Total	% of Schools
Number of Schools	13	2	16	5	36	
Population	4288	1352	6113	6056	17809	
Number With Electricity Service	12	2	16	5	35	97.2
Number With Telephone Service	9	0	6	5	20	55.6
Number With Internet Service	0	0	1	2	3	8.0
Number in Urban Areas	2	0	2	3	7	19.4
Number in Rural Areas	11	2	14	2	29	80.6

Saint James

	Primary	Primary and Junior High	All-Age	High	Total	% of Schools
Number of Schools	13	7	21	8	49	
Population	11069	8313	6911	13778	40071	
Number With Electricity Service	13	7	19	8	47	95.6
Number With Telephone Service	9	6	10	8	33	67.3
Number With Internet Service	3	0	1	2	6	12.2
Number in Urban Areas	5	5	4	5	19	38.8
Number in Rural Areas	8	2	17	3	30	61.2

Hanover

	Primary	Primary and Junior High	All-Age	High	Total	% of Schools
Number of Schools	12	3	19	4	38	
Population	4505	2311	3650	5152	15618	
Number With Electricity Service	12	3	19	4	38	100
Number With Telephone Service	9	2	4	4	19	50.0

Number With Internet Service	1	0	0	1	2	5.3
Number in Urban Areas	4	2	1	2	9	23.7
Number in Rural Areas	8	1	18	2	29	76.3

Westmoreland

	Primary	Primary and Junior High	All-Age	High	Total	% of School
Number of Schools	23	5	29	7	64	
Population	11988	2524	6694	8768	29974	
Number With Electricity Service	22	4	26	6	58	90.6
Number With Telephone Service	12	2	8	7	29	45.3
Number With Internet Service	1	0	1	0	2	3.1
Number in Urban Areas	9	1	3	4	17	26.6
Number in Rural Areas	14	4	26	3	47	73.4

Saint Elizabeth

	Primary	Primary and Junior High	All-Age	High	Total	% of School
Number of Schools	35	5	35	10	85	
Population	9863	3408	8307	11974	33552	
Number With Electricity Service	33	5	33	10	81	95.3
Number With Telephone Service	14	3	8	9	34	40.0
Number With Internet Service	0	0	2	5	7	8.2
Number in Urban Areas	6	1	2	4	13	15.3
Number in Rural Areas	29	4	33	6	72	84.7

Manchester

	Primary	Primary and junior high	All-Age	High	Total	% of School
Number of Schools	20	6	32	11	69	
Population	8587	6179	7721	11354	33841	
Number With Electricity Service	19	5	32	11	67	97.1
Number With Telephone Service	7	6	7	9	29	42.0

Number With Internet Service	1	0	1	4	6	8.7
Number in Urban Areas	5	4	2	7	18	26.1
Number in Rural Areas	15	2	30	4	51	73.9

Clarendon

	Primary	Primary and Junior High	All-Age	High	Total	% of School
Number of Schools	40	11	35	16	102	
Population	20105	8070	10920	20723	59818	
Number With Electricity Service	38	11	33	16	98	96.1
Number With Telephone Service	15	6	8	14	43	42.2
Number With internet Service	2	0	3	10	15	14.7
Number in Urban Areas	15	5	5	13	38	37.3
Number in Rural Areas	25	6	30	3	64	62.7

Saint Catherine

	Primary	Primary and Junior High	All-Age	High	Total	% of School
Number of Schools	49	8	36	22	115	
Population	38632	11831	9234	29158	88855	
Number With Electricity Service	49	8	36	22	115	100
Number With Telephone Service	41	6	13	22	82	71.3
Number With Internet Service	4	0	0	6	10	8.7
Number in Urban Areas	33	6	4	19	62	53.9
Number in Rural Areas	16	2	32	3	53	46.1

APPENDIX C: STATISTICS FOR POST OFFICES AND PUBLIC LIBRARIES BY PARISH

Kingston and Saint Andrew

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	11	29		
Number With Electricity Service	11	N/A	100	N/A
Number With Telephones Service	9	21	81.8	72.4
Number With Internet Service	3	11	27.3	37.9

Saint Catherine

	Libraries	Post offices	% of Libraries	% of Post Offices
Total	12	28		
Number With Electricity Service	12	N/A	100	N/A
Number With Telephones Service	11	12	91.7	42.9
Number With Internet Service	4	3	33.3	10.7

Saint Thomas

	Libraries	Post offices	% of Libraries	% of Post Offices
Total	6	17		
Number With Electricity Service	6	N/A	100	N/A
Number With Telephones Service	2	1	33.3	5.9
Number With Internet Service	2	1	33.3	5.9

Portland

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	7	21		
Number With Electricity Service	7	N/A	100	N/A
Number With Telephones Service	6	1	85.7	4.8
Number With Internet Service	3	1	42.9	4.8

Saint Mary

	Libraries	Post offices	% of Libraries	% of Post Offices
Total	11	26		
Number With Electricity Service	11	N/A	100	N/A
Number With Telephones Service	7	4	63.6	15.4
Number With Internet Service	4	4	36.4	15.4

Clarendon

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	10	29		
Number With Electricity Service	10	N/A	100	N/A
Number With Telephones Service	8	6	80.0	20.7
Number With Internet Service	8	1	80.0	3.4

Saint Ann

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	13	26		
Number With Electricity Service	13	N/A	100	N/A
Number With Telephones Service	6	7	46.2	26.9
Number With Internet Service	3	1	23.1	3.8

Manchester

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	13	28		
Number With Electricity Service	10	N/A	76.9	N/A
Number With Telephones Service	5	3	38.5	10.7
Number With Internet Service	4	1	30.8	3.6

Trelawny

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	9	19		
Number With Electricity Service	9	N/A	100	N/A
Number With Telephones Service	3	1	33.3	5.3
Number With Internet Service	2	1	22.2	5.3

Saint James

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	11	23		
Number With Electricity Service	11	N/A	100	N/A
Number With Telephones Service	7	4	63.6	17.4
Number With Internet Service	1	1	9.1	4.3

Saint Elizabeth

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	12	28		
Number With Electricity Service	12	N/A	100	N/A
Number With Telephones Service	6	4	50.0	14.3
Number With Internet Service	5	0	41.7	0.0

Hanover

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	8	16		
Number With Electricity Service	7	N/A	87.5	N/A
Number With Telephones Service	4	1	50.0	6.3
Number With Internet Service	1	1	12.5	6.3

Westmoreland

	Libraries	Post Offices	% of Libraries	% of Post Offices
Total	8	20		
Number With Electricity Service	8	N/A	100	N/A
Number With Telephones Service	4	2	50.0	12.5
Number With Internet Service	4	2	50.0	12.5

APPENDIX D: LEVELS OF CONNECTION TO THE INTERNET

Level of Service

D.0 Two different levels of Internet service are currently being offered in Jamaica – Conventional Dial Up and Broadband.

Conventional Dial Up

D.1 Dial up connection is where the customer gains access to the Internet using his/her regular telephone line. While online, the customer cannot use that telephone line to make or receive calls because it is dedicated to Internet use only. To move beyond this problem, many customers have a second telephone line installed. Dial up connection offers download speeds up to 56kbs.

Broadband

D.2 *"Broadband refers most commonly to a new generation of high-speed transmission services, which allows users to access the Internet and internet-related services at significantly higher speeds than traditional modems. It has the potential technical capability to meet consumers' broad communication, entertainment, information and commercial needs and desires."*[66]

D.3 Broadband service is provided by four different methods:

- Digital Subscriber Line (DSL)
- Cable Modem
- Fixed Wireless
- Satellite

Digital Subscriber Line (DSL)

D.4 Digital Subscriber Line (DSL) is a technology that uses an upgraded telephone line[67] to deliver high-speed Internet access to customers. With this type of connection, the customer can use his telephone in the normal way, while accessing the Internet, without any form of interference.

Cable Modem

D.5 With cable broadband access, Internet traffic travels over the same network as that of the cable television without any interference with television signals.

---

[66] Taken from: "Broadband High Speed Internet Access", published by the FCC. www.fcc.gov/cgb/broadband.html

[67] The telephone line is upgraded by installing special equipment at the telecommunication company's central office. The customer would then need to install a DSL modem in his computer.

Fixed Wireless

D.6 Fixed wireless broadband technology provides high speed Internet access without the use of cable, fiber optic or phone line connections. Data is transmitted via a single cell structure allowing for two-way transmission of data, and video.

Satellite

D.7 Satellite technology to provide high-speed Internet access to customers directly and indirectly.

Some Advantages Broadband Over Dial Up

D.8 Broadband connection offers advantages over dial up in: Speed, economic efficiency and continuous connection.

High-Speed

D.9 Broadband offers much higher speed than that of dial up. The maximum broadband speed currently being offered by CWJ is 1544/256kbs while the minimum is 256/128kbs[68]. The maximum speed is approximately 28 times faster than normal dial-up while the minimum speed is 4 times faster. In practical terms this means that files that would generally take one hour to download using a normal dial-up connection can now be done within 2 minutes with a connection at the highest speed and 15 minutes at the lowest speed.

Economic Efficiency

D.10 Economic efficiency should be promoted in the provision of universal service/access so as to reduce the overall cost to the society. With this view in mind, it might not be appropriate to use dial up connection since an additional phone line would be required, while with broadband connection the present phone line[69] could be used to provide both normal telephone and Internet services simultaneously.

D.11 A typical institution[70] would open to the public for approximately eight hours per day. This approximates 480 minutes online per day. Assuming 22 working/school days during a given month, this would total 10560 minutes per month. At peak, a local call is priced at J$0.40 per minute and the standard line rental charge is J$380.00[71]. A typical Internet service provider (ISP) offering dial-up service would normally price its service at J$1000.00 per month for connection while broadband connection is priced as low as US$55.00[72] per month. If the institutions were to take dial-up service their monthly charge would be approximately J$5604. This would

[68] http://home.cwjamaica.com/content/products_services/business/adsl/ADSL_prices.asp?ID=311
[69] Assuming that the line is upgraded to facilitate DSL service.
[70] Schools, public libraries and post offices.
[71] Rebalancing will force these rates upward closer to costs.
[72] N5 Limited. The maximum speed at this price is 256kbs

be at least J$2850.00 (assuming exchange rate of J$50 to US$1) higher than if they were connected via broadband. Also, even if broadband service is provided at US$75.00[73] or US$93.00[74] per month, it would still be less costly than dial-up.

Continuous Connection

D.12 Broadband facilitates access to the Internet without the hassle of dialling a number. In fact, with this type of service, the customer is "always on" – 24 hours per day, 7 days per week.

[73] Entertainment Systems Limited is currently providing Internet service over its cable facilities at a rate of US$75.00 per month. The company offers download speed up to 512kbs.

[74] CWJ offers broadband (DSL) service at 256/128kbs at this price.