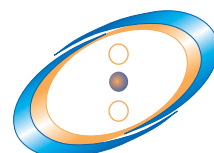


# The State of Communications Sector and ICT Indicators



# Lesotho

FIRST EDITION



LESOTHO  
COMMUNICATIONS  
AUTHORITY



LESOTHO COMMUNICATIONS AUTHORITY  
PUBLICATION

The State of  
**Communications Sector**  
and **ICT Indicators**  
in Lesotho

2009

1<sup>st</sup> Edition – March 2009

**A comprehensive reference guide to the state of communications  
sector and ICT indicators in Lesotho**



## **The State of Communications Sector and ICT Indicators in Lesotho**

Published by Lesotho Communications Authority.

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Kingsway Road  
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ISBN: 978 - 99911 - 660 - 0 - 1

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## Acronyms and Abbreviations

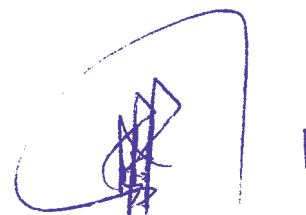
ADSL	Asymmetric Digital Subscriber Line
AFMS	Automatic Frequency Management System
AIDS	Acquired Immuno-Deficiency Syndrome
B&B	Bed and Breakfast
BoS	Bureau of Statistics
CCF	Cross-border Coordinating Forum
CHAL	Christian Health Association of Lesotho
CPE	Customer Premises Equipment
EASSy	The Eastern Africa Submarine Cable System
ECLAC	United Nations Economic Commission for Latin America and the Caribbean
EEL	Econet Ezi-Cel Lesotho
ESCAP	United Nations Economic and Social commission for Asia and the pacific
ESCWA	United Nations Economic and Social Commission for Western Asia
Eurostat	Statistical Office of the European Communities
FCT	Fixed Cellular Terminal
GSM	Global System for Mobile communications
HIV	Human Immuno-deficiency Virus
ICASA	Independent Communications Authority of South Africa
ICT	Information and Communication Technology
IECCD	Integrated Early Childhood Care and Development
ISAS	Institute of Southern African Studies
ISP	Internet Service Provider
ITR	Interconnection and Tariff Rationalisation
ITU	International Telecommunication Union
LCA	Lesotho Communications Authority
LEC	Lesotho Electricity Company
LPPA	Lesotho Planned Parenthood Association
LTA	Lesotho Telecommunications Authority
LTC	Lesotho Telecommunications Corporation
LURP	Lesotho Utilities Sector Reform Project
M	Maloti
MoU	Memorandum of Understanding
NEPAD	New Partnership for Africa's Development
NNP	National Numbering Plan
NUL	National University of Lesotho
OECD	Organization for Economic Cooperation and Development
PrSMS	Premium rated Short Message Service
SADC	Southern Africa Development Community
SIM	Subscriber Identity Module
TL	Telecom Lesotho
TV	Television
UAF	Universal Access Fund
UIS	UNESCO Institute for Statistics
UNCTAD	United Nations Conference on Trade and Development
UNECA	United Nations Economic Commission for Africa
VAS	Value Added Service
VCL	Vodacom Lesotho
WiFi	Wireless Fidelity
WLL	Wireless Local Loop
WSIS	World Summit on the Information Society

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## Acknowledgements

*The Strategic Planning Division of LCA (Lesotho Communications Authority) under the supervision of Motsamai Mochebelele, the Director of Strategic Planning, prepared this report. The authors were Maloko Phakisa, Moliehi Makhele and Motsamai Mochebelele who also edited drafts and the manuscript. Through the Director of Bureau of Statistics, Mrs Liengoane Lefosa, the team worked in consultation with the staff of the Bureau, particularly Matona Mafeka, Thabang Mpeka and Thabo Sofonia during the preparation of sampling frames and sampling. The team also worked with the Institute of Southern African Studies (ISAS) staff, especially during part of the data collection phase when Moipone Letsie and Maloko Phakisa were jointly in charge of the day-to-day supervision of the enumerators during the fieldwork. Mr Teferi Kebede from ISAS, also participated during the review of questionnaires, training of enumerators and field visits.*

*A number of LCA staff, individually and collectively, proffered invaluable support, suggestions and comments. The Authority is indebted to all those who became the subject of this research, such as the communication service providers, businesses, health facilities, schools and the accommodation establishments. The enumerators who endured through the survey work and the data entry exercise deserve a special acknowledgement for their contribution. The report also benefitted from the comments made by Mohaeka Raselimo, Tiisetso Makatjane, Thabiso Masia and Nthabiseng Koatsa to whom we are equally grateful.*



**Monehela Posholi**  
Chief Executive

## Executive Summary

*This is the groundbreaking report on the access to and utilization of ICTs in Lesotho. It is premised on the survey data covering business (trading enterprises and manufacturing), education, health and accommodation business. It also traces key developments in the communications sector, especially since 2000 when the communications regulator was established. The LCA had conceived and executed the study as part of its mandate to contribute to the measurement of information economy statistics.*

*In spite of significant developments that have occurred since the phased liberalization of the sector started in 2000, major challenges remain as only 29 out of 100 inhabitants have a telephone. That is, tele-density has increased from one percent in 2000 to 29 percent by 2008. In terms of coverage, no less than 70 percent of the population now lives in areas that have access to communication services even though land coverage is somewhat low at 40 percent. This has created the need for the Authority to start the universal access fund, targeting the low viability areas in order to close the access gap. Lesotho is very similar to the rest of Africa in that fixed network development has been relatively stagnant while the mobile networks, though relatively new in the market, now command ninety percent of the market share. Since the establishment of the Authority to date, the sector has witnessed a 19 fold increase in the subscriber base from 27,740 to 530, 037, mostly prepaid subscribers.*

*Results of the survey show a wide variation in the connectivity to electricity as a key enabler for usage and access to ICT services. For instance, only 40 percent of the schools were connected to the power grid compared to at least 80 percent of businesses and hospitality businesses and 63 percent of health facilities. The prevalence of computers was relatively high in the hospitality business (56%) while their ownership in the other sectors was no more than 40 percent. Regrettably, use of these computers was predominantly for word processing.*

*Internet connectivity was low across the board, even though more prevalent in accommodation business where 35 percent of them were connected. The most common mode of connection was dial-up despite of the fact that it was least preferred as it is slow and has data capacity limitations. Only a limited number of entities, mostly business, were connected via ADSL and leased line. Web presence is very low though somewhat better in accommodation business with close to a quarter of them having a website. Presence of a fixed telephone was much higher in accommodation business (71%) followed by health facilities (49%), business (48%) and schools (34%). Other entities had to rely on public communication facilities such as payphones in the locality. Nonetheless, there were entities which were located in areas where there were no services at all in their locality.*

*Overall, the results show some progress made towards making Lesotho part of the global information society. However, the sectors still fall short in terms of taking advantage of the benefits that may accrue from fully integrating the ICTs into their way of doing business. The limited rollout of broadband and low connectivity to internet is perhaps the most significant area of concern.*

---

# Chapter 1: Introduction

## 1.1 Continental overview on information society

*By the beginning of the last decade, there were less than 9 million telephone subscribers in Africa, with South Africa and Africa North of the Sahara taking the lion's share. There were barely any mobile network services as the fixed line network services were about the only services with no African country connected to the Internet. In Sub-Saharan Africa, South Africa and Mauritius became leaders in the Internet provision. Most African countries had experienced stagnation in the growth of fixed networks, low telephone densities, poor quality of service, long waiting periods and lists for potential customers, and service limited to a few urban centres. All these prevailed in spite of direct and tacit protection by governments in the form of exclusivity rights over certain services, such as international gateway. Rural areas were neglected even though they were a home for more than 90 percent of the population in the continent.*

*In recent times, the landscape has changed dramatically, marked by a boom in mobile networks subscribers, which to date account for 90 percent of the subscribers. These were spurred by open standards, rapid changes in technology and a paradigm shift by governments from protectionism to sector liberalization and privatization of the incumbent operators. Since the reforms were implemented, some of the noteworthy achievements of the African communications sector are in the increased tele-density, access to Internet and broadband even though rollout on the latter remains wanting. The new initiatives spearheaded by the New Partnership for Africa's Development (NEPAD) in collaboration with governments, and those by the private sector to build intra-Africa networks, should further accelerate development in the provision of broadband (see Box 1).*

### BOX 1: Initiatives primed to accelerate development of communications in Africa

- The Eastern Africa (Optical Fibre) Submarine Cable System, dubbed EASSy Project, shall run about 10,000KM undersea linking eight coastal countries including 22 telecom operators representing 20 countries, Lesotho included.
- SEACOM project proposes to lay 15,000 KM undersea cable connecting East Africa with Asia and Europe with work expected to start in October 2008 for a projected completion date of June 2009.
- The NEPAD's Uhuru Net is perhaps the most ambitious of these initiatives in that it is expected to cover the entire continent.

*While statistics concerning the subscriber base for fixed and mobile networks have been collected by African countries, a lot remains to be done regarding information on access to and usage of Information and Communication Technologies (ICTs) by different segments of the societies and sectors. Detailed ICT indicators, such as usage in schools, tourism, households and business for example, have not been traditionally collected by the national statistical offices. As such, these have not been well documented. Nonetheless, there are a few countries such as Egypt where regular surveys are already being carried out.*

*As the demand for communication services rises sharply in Africa, and as the rollout steadily takes root following recognition of the immense benefits that can be derived for social and economic development, it has become paramount to measure progress in all spheres. The international multi-stakeholder initiative called Partnership on Measuring ICT for Development was launched during United Nations Conference on Trade and Development (UNCTAD XI) in June 2004, in Sao Paulo, responding to the call by the World Summit on the Information Society (WSIS) regarding collection and production of official statistics to*

monitor the information society (see box 2)<sup>1</sup>. The partnership endeavours to promote collection of data on internationally comparable ICT indicators. It has already assisted a number of African countries to undertake surveys on information society, at the minimum, using core ICT indicators that it developed. It has been instrumental in building their capacity by providing training and platform for information dissemination through regional workshops. The key beneficiaries have been communications regulators, national statistical offices and academic institutions, depending on the circumstances in each country.

## 1.2 The need for ICT surveys in Lesotho

Lesotho has never participated in the projects supported by the Partnership to run ICT surveys and no such survey has been undertaken in the country before. While the Bureau of Statistics (BoS) is responsible for collection of all national statistics in Lesotho, it has also not yet started running such ICT surveys, and perhaps it will not do so in the foreseeable future given the weight of its current priorities<sup>2</sup>. For instance, the Bureau is already said to be overly burdened with work from its traditional survey responsibilities such as household budget and agricultural statistics surveys. Introduction of ICT surveys would also have to compete for resources with these traditional surveys which have already put a strain on the BoS's recurrent budgets. Indeed, similar sentiments have been variously expressed by some of the officers from national statistical offices during a Partnership workshop that was held in Addis Ababa in March 2007.

Having felt the need for these surveys, given the dearth of data on the information society, and the increasing demands from local and international institutions including government, the Lesotho Communications Authority (LCA) made a head start to run the ICT surveys. The data is also critical for the Authority's planning, particularly in relation to the proposed implementation of the universal access strategy. This document presents the results of the first of such surveys which will be run from time-to-time depending on availability of funds and other resources from the LCA<sup>3</sup>. The data collection for analysis in chapters three to six was co-sponsored by LCA and the Institute of Southern African Studies (ISAS) in the National University of Lesotho (NUL).

## 1.3 The scope of the study

The current study covers four distinct sectors, namely Business, Education, Health and Tourism as users of ICTs spread throughout all ten districts of Lesotho. In addition to these, there were supply side considerations where information was collected from the service providers made up of three major network oper-

### BOX 2: The Partnership seeks to narrow ICT data gap by

- Taking stock of the available and lack of country-level ICT data;
- Following up on the implementation of WSIS outcomes;
- Promoting the adoption of standardized core list of indicators;
- Developing core indicators for: ICT access and infrastructure; use of ICT by households, individuals and businesses; the ICT sector and trade in ICT goods; and ICT in education and government.
- Providing methodological support for production of ICT statistics; and
- Conducting regional and global events, workshops, and training courses to raise awareness of and build capacity in ICT measurement.

<sup>1</sup> The Partners include International Telecommunication Union (ITU), Organization for Economic Cooperation and Development (OECD), United Nations Conference on Trade and Development (UNCTAD), UNESCO Institute for Statistics (UIS), World Bank, United Nations Economic Commission for Africa (ECA), United Nations Economic Commission for Latin America and the Caribbean (ECLAC), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), United Nations Economic and Social Commission for Western Asia (ESCWA), and Statistical Office of the European Communities (Eurostat).

<sup>2</sup> However, the Bureau of Statistics does include a limited number of ICT indicators in the census questionnaires.

<sup>3</sup> The scope and coverage of subsequent surveys may also vary.



ators, the Internet Service Providers (ISPs) and Internet cafés. The demand side survey called for sampling which had to be done using sampling frames for the four sectors while the supply side data collection included all service providers as they are fewer. Indeed, some of the supply side information is already collected on a regular basis by LCA as part of its routine sector monitoring exercise.

The document is organized around the four sectors outlined above, as well as the documentation of sector developments. In particular, chapter two chronicles developments in the communications sector, especially since the regulator was established in 2000. It covers key issues such as regulatory interventions, subscriber growth, network coverage and market share trends. Chapters three, four, five and six present the results of the user surveys which covered trading enterprises and manufacturing business, education, hospitality business and health respectively. The last chapter provides comparative statistics on the four sectors for selected ICT indicators.

## 1.4 The survey design and data collection

The first task involved the establishment of sampling frames for the ICT demand side survey. This entailed visiting relevant line ministries and institutions for up-to-date listings, where in some cases such as the Ministry of Trade and Industry, district level visits had to be made as individual districts keep their own records for registered businesses. The sampling frames were as follows: 4568 businesses consisting of 4115 small and 453 large businesses, 1692 schools from primary to high school levels, 242 health service centers which included hospitals, health clinics/centers and private surgeries, and finally 80 tourism establishments covering hotels, guest houses, bed and breakfasts and lodges.

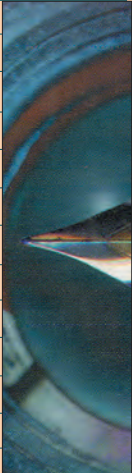
The sample points were randomly selected with the breakdown by district as in Table 1.1. However, there was an exception regarding the tourism establishments, all of which were included as they were fewer in number<sup>4</sup>. For the business sector, there were 709 of them, 86 percent of which were small businesses. Maseru being the capital city and the hub of economic activity, has a little more than 50 percent of them. The education sector sample size was 320 with 55 percent for primary, 12.5 percent secondary and 32.5 percent high school levels with about 80 percent of these being missionary schools. In the health sector, the sample consisted of 142 health service facilities with 30 percent of them located in the Maseru district followed by Leribe with 15 percent while Qacha's Nek was the lowest. All the tourism establishments were included in the sample with Maseru accounting for a little more than a third, followed by Leribe with 11.5 percent while Berea and Mophale's Hoek are indicated to have the fewest tourism establishments at 3.8 percent. Overall, there were 1,251 sample points, less two accommodation establishments as per footnote 4.

The survey was carried out between September and October in 2007 by a team of enumerators who held face-to-face interviews. This was the preferred data collection method as it increases response rate, and more importantly, there were no contact addresses in a majority of cases while some of the areas were in very remote areas where mail was not an option. Every attempt was made to target people holding positions of responsibility as respondents. For instance, owners and managers in the case of business while principals and managers/matrons in schools were targeted.

<sup>4</sup> Note: two of the accommodation establishments were found to have gone out of business during the survey.

**Table 1.1: Breakdown of samples by district**

	Business sector		Education sector		Health sector		Tourism sector	
District	Sample	Percent	Sample	Percent	Sample	Percent	Sample	Percent
Maseru	365	51.5	59	18.4	43	30.3	27	34.6
Mokhotlong	19	2.7	18	5.6	10	7.0	6	7.7
Berea	49	6.9	38	11.9	10	7.0	3	3.8
Leribe	69	9.7	67	20.9	21	14.8	9	11.5
Butha Buthe	40	5.6	24	7.5	7	4.9	7	9.0
Mafeteng	50	7.1	30	9.4	12	8.5	4	5.1
Mohale's Hoek	54	7.6	23	7.2	11	7.7	3	3.8
Quthing	34	4.8	24	7.5	8	5.6	5	6.4
Qacha's Nek	18	2.5	14	4.4	6	4.2	8	10.3
Thaba Tseka	11	1.6	23	7.2	14	9.9	6	7.7
<b>Total</b>	<b>709</b>	<b>100.0</b>	<b>320</b>	<b>100.0</b>	<b>142</b>	<b>100.0</b>	<b>78</b>	<b>100.0</b>



## Chapter 2: The State of Communications Sector

### 2.1 Introduction

*The communications sector plays an important role in the global economy as ICT activities are fast becoming the fundamental catalyst in boosting growth and development in various sectors. The emerging technologies and convergence are creating unimaginable opportunities for investment, development and expansion in all spheres of life. For instance, the possibilities of transmitting voice, video and data on one platform – dubbed “triple play”; availability of Internet services for banking transactions; reading and/or watching the news; e-medicine; distance learning and tracking services for livestock and vehicles are but some of milestone achievements in technology development.*

*Lesotho is no exception to the rest of the world in its endeavour to develop an ICT-based information society. In 2000, the Government of Lesotho established an independent and autonomous regulatory body for the communications sector through the Lesotho Telecommunications Act No. 5 of 2000 (as amended). The Act empowers the Authority to “promote, develop and supervise the provision of efficient local, national, regional and international telecommunications services in Lesotho”. The Lesotho Telecommunications Authority (LTA), now the Lesotho Communications Authority (LCA) was set up as the first step towards liberalization; promotion of competition and provision of universal access and services in the sector. At that stage, the then parastatal Lesotho Telecommunications Corporation (LTC) ceased to assume regulatory functions in addition to being a communications service provider.*

*Since its establishment, the Authority has continued to adapt to the international resolutions for ICT development to facilitate access to communications services, both nationally and globally. To this end, there has been a significant growth in the penetration of communications services countrywide, especially in the mobile industry. The sector has realised amongst others, the phased liberalisation of the market, increase in the number of players and subscribers, increased coverage and wider choice of communication services which contribute towards bridging the digital divide. Currently, the Authority is participating in the EASSy project which is one vehicle for the SADC countries to bridge the digital divide through the introduction of cheaper, high capacity broadband connectivity.*

### 2.2 Regulatory interventions

#### 2.2.1 Regulatory licensing fees

*As an independent and autonomous entity, the Authority does not receive an annual subvention from Government, even though the Act does provide that Government may contribute funds to the Authority. While some targeted grants have been received at times, especially during the setup period, the Authority largely relies on licensing fees to sustain its regulatory mandate. The first regulatory fee structure was formulated in 2001. This fee structure was repealed by the Lesotho Telecommunications Authority (Licensing Fees) Rules 2003, which was in turn repealed by the Lesotho Communications Authority (Licensing Fees) Rules 2008. The new fee structure was meant to address emerging issues such as technology neutrality, increased competition and to remedy deficiencies that had become inherent to the old fee structure which had become obsolete and not user friendly. It provides for efficient utilisation of spectrum and discourages spectrum hoarding.*

### 2.2.2 Interconnection agreements

Following the conclusion of the Interconnection and Tariff Rationalisation (ITR) study in 2006, which was funded by the World Bank through the Lesotho Utilities Sector Reform Project (LURP), the three major network operators Telecom Lesotho (TL), Vodacom Lesotho (VCL) and Econet Ezi-Cel Lesotho (EEL) reviewed their interconnection rates<sup>5</sup> downward (wholesale tariffs) in line with the recommendations of the study and as directed by LCA. The study had recommended that the interconnection rates should be reduced following a glide path over a period of three years based on the costing information of these operators. These are asymmetric interconnection rates where the fixed operator pays a higher rate to the mobile operators. The network operators implemented the revised interconnection rates in July 2007. However, at the first anniversary of these rates in July 2008, the network operators did not reduce the rates further in line with the ITR study recommendations. They contended that the LCA is not mandated to approve interconnection agreements as per LTA Act 2000 (as amended). The parties agreed that the issue shall either be addressed through an arbitrator or a new legislative framework that is currently under development.

### 2.2.3 Universal access strategy

Section 48 of the LTA ACT No. 5 of 2000 (as amended), mandates the Authority to establish the Universal Access Fund (UAF) to ensure that network infrastructure and communications services are expanded to the entire country including the remote areas. In 2003, the Authority suspended the establishment of the Universal Access Fund. This was to afford communications service providers to first implement their own network infrastructure rollout plans.

The Authority commissioned a communications demand study in 2004 which assisted the network operators by identifying commercially viable areas, which they ultimately targeted for rollout without universal access support. By so doing, they were largely successful in bridging the efficiency-gap<sup>6</sup>. Now that the efficiency gap has been sufficiently addressed, the Authority is working towards implementing the universal access strategy with a view to address the access gap<sup>7</sup> and network operators' first contribution is to commence in 2009. The Authority has already put aside some funds as seed capital to start the universal access fund, and will also contribute 25 percent of its annual surplus funds towards UAF.

### 2.2.4 Numbering plan

After its inception, the Authority developed the first numbering plan in 2003. The Lesotho National Numbering Plan (NNP) is an 8-digit, closed numbering scheme complying with ITU E.164 Recommendation. The numbering resources were allocated to the major network operators for provision of access to services, routing and the then legacy systems billing. Following the end of TL's exclusivity, the Authority reviewed the NNP in order to accommodate new services which evolved with technological developments and in anticipation of new entrants in the sector. The exercise included opening up new number levels for emerging services such as value added services (VAS) and Premium rated Message Services (PrSMS).

<sup>5</sup> Interconnection rates are the rates that Network Operators charge each other for transiting, terminating and/or carrying each other's traffic.

<sup>6</sup> Efficiency gap refers to the difference between what markets are actually achieving under current conditions and what they could achieve if regulatory barriers were removed and regulation were used to provide incentives.

<sup>7</sup> Access gap is when some areas or population groups will not be served by the market without intervention, even if the market is operating efficiently and is fully liberalised.

### 2.2.5 Management and monitoring of spectrum

Since the commissioning of the Automatic Frequency Management System (AFMS), the Authority has been able to audit the occupancy and the use of the radio frequency spectrum and to ensure interference-free frequency assignments.

Under the Memorandum of Understanding (MoU) between LCA and the Independent Communications Authority of South Africa (ICASA), there is a Cross-border Coordinating Forum (CCF) which holds meetings to monitor signal spillages in both countries. The MoU is the tool of cooperation between the two regulators on matters of frequency coordination. On regular basis, the Authority undertook GSM drive test measurements (signal spillage) in different regions of the country to control the GSM signal spill-over to acceptable levels. Signal spillage has more severe consequences for Lesotho as most of its urban and densely populated settlements are located along the borders of the two countries. Even the minimum spillage tolerance levels stipulated by ITU cannot be allowed without major losses to Lesotho based operators.

## 2.3 The market structure and sector performance

### 2.3.1 Licensing

The market comprises three major network operators, namely, TL which provides fixed network services; VCL and EEL which provide mobile services. When the Authority came into operation, it reissued licences to the existing licensees (TL and VCL) to align them with the regulatory legislation without changing terms and conditions. The second mobile operator EEL, the subsidiary of TL was licensed in 2001 and became functional in 2002.

Of paramount importance was that the fixed incumbent operator TL, was issued a twenty year licence with five-year exclusivity rights over basic voice, basic data, leased lines and international gateway. The exclusivity period was extended for one year from February 2006 to February 2007. In 2007, following the end of exclusivity, Vodacom Lesotho's licence was amended to include international gateway and data services rights.

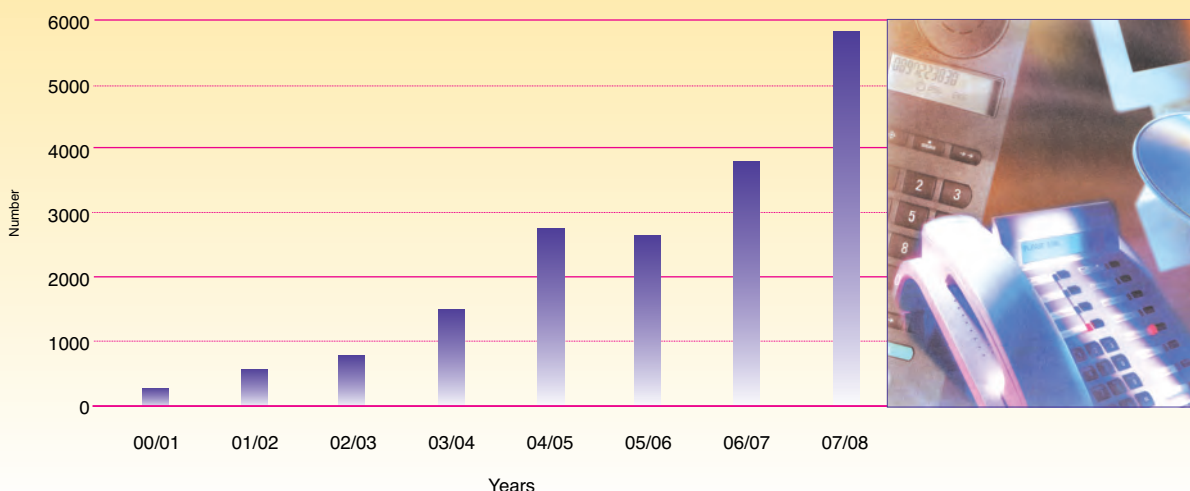
Other licensed market players are the Internet Service Providers (ISPs) and Broadcasters, including registered communication providers such as tele-bureaus/Internet cafés and Customer Premises Equipment (CPE) retailers. Internet Cafés were operated under the tele-bureau licence. The Authority delisted the tele-bureaus and CPE services in 2006, and this included deregulation of Internet cafés. The decision was taken following realization of sufficient levels of competition in these segments of the market, rendering their continued regulation redundant and counterproductive. Figure 2.1 gives trends of both the licensed and registered communications providers from 2000 to 2008. Figure 2.2 is specific to tele-bureaus.

The Internet cafés have been in operation prior to the establishment of the Authority, that is, before 2000. Even though they already existed, the Authority has not been gathering their statistics. Based on the survey, there were twenty-eight Internet cafés in eight districts with Thaba-Tseka and Quthing having none. Table 2.1 highlights the number of Internet cafés by district in 2007/2008.





Figure 2.2 - Tele-bureaus trends 2000 - 2008



### 2.3.2 ICT indicators

Continuous monitoring of the growth and development of the sector is one of the main functions of the Authority. As one strategy to achieve this, the Authority keeps track of key ICT indicators by collecting them on a quarterly basis, especially from the major network operators. Table 2.2 gives a snap shot of the key ICT indicators at the end of the fiscal year 2007/2008.

Table 2.1 - 2007/2008 Internet cafés by district

District	Internet café
Berea	2
Butha-Buthe	2
Leribe	5
Mafeteng	3
Maseru	11
Mohale's Hoek	2
Mokhotlong	1
Qacha's Nek	2
<b>TOTAL</b>	<b>28</b>


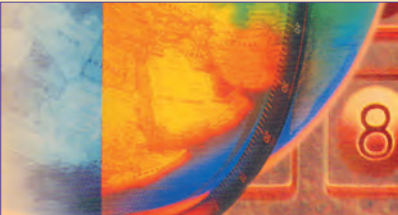


Table 2.2 - Selected ICT indicators as at end of March 2008

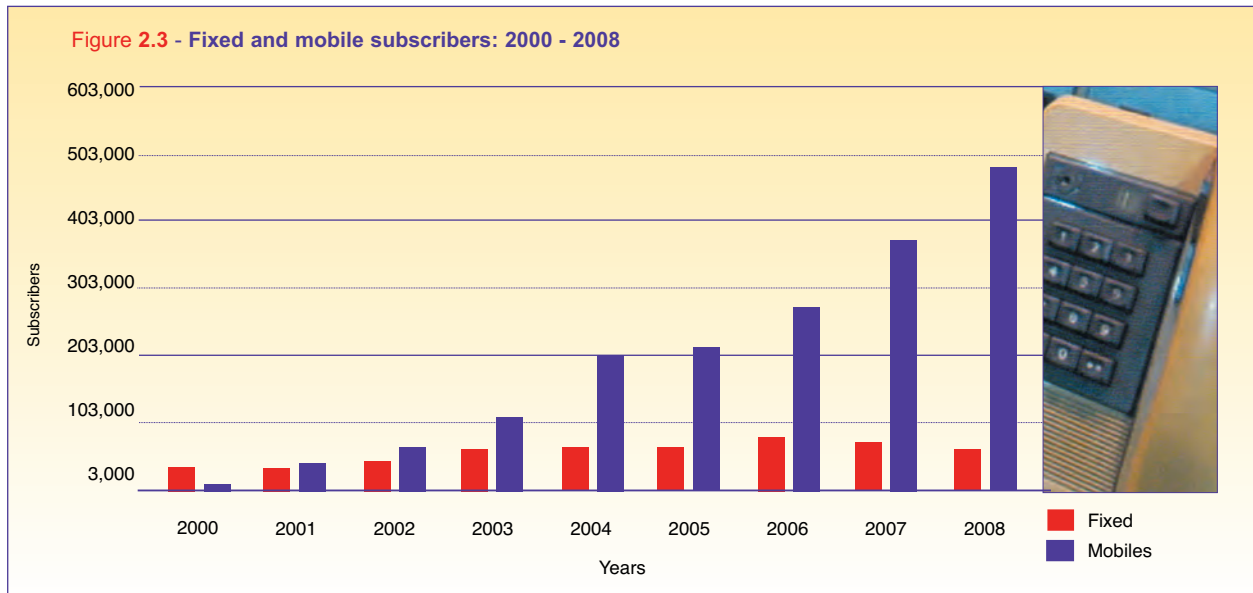
Indicator	Fixed Operator	Mobile Operators	Total
Number of subscribers	47,582	482,455	530,037
Public Payphones	706	5,036	5,742
Number of BTSs	23	135	158
Internet dial-up subscribers	1,360	Not applicable	1,360
Leased Line subscribers	401	Not applicable	401
Turnover	61 million	117 million	178million



### 2.3.3 Subscriber base

Communications sector in Lesotho continues to be characterized by growth reflected in the increasing number of telephone subscribers year on year. The sector is growing despite the slowdown in the growth of fixed line subscribers which is more than offset by the exponential growth of mobile subscribers. This is in part, attributable to further liberalization, increased choice of services, positive economic outlook and relative political stability that has been realized in the last few years. Moreover, in real terms, the network operators have not been increasing tariffs in the past five years even though they may have initially been set high. In line with global trends, the CPE prices, especially the mobile handsets have been gradually decreasing, making them affordable to consumers who could not erstwhile afford them.

When the Authority was established, the subscriber base stood at 27, 740 compared to more than half-a-million subscribers achieved in 2008, being a 19 fold increase. Figure 2.3 gives trends in the subscriber base by Fixed and Mobile Subscribers between March 2000 and March 2008.



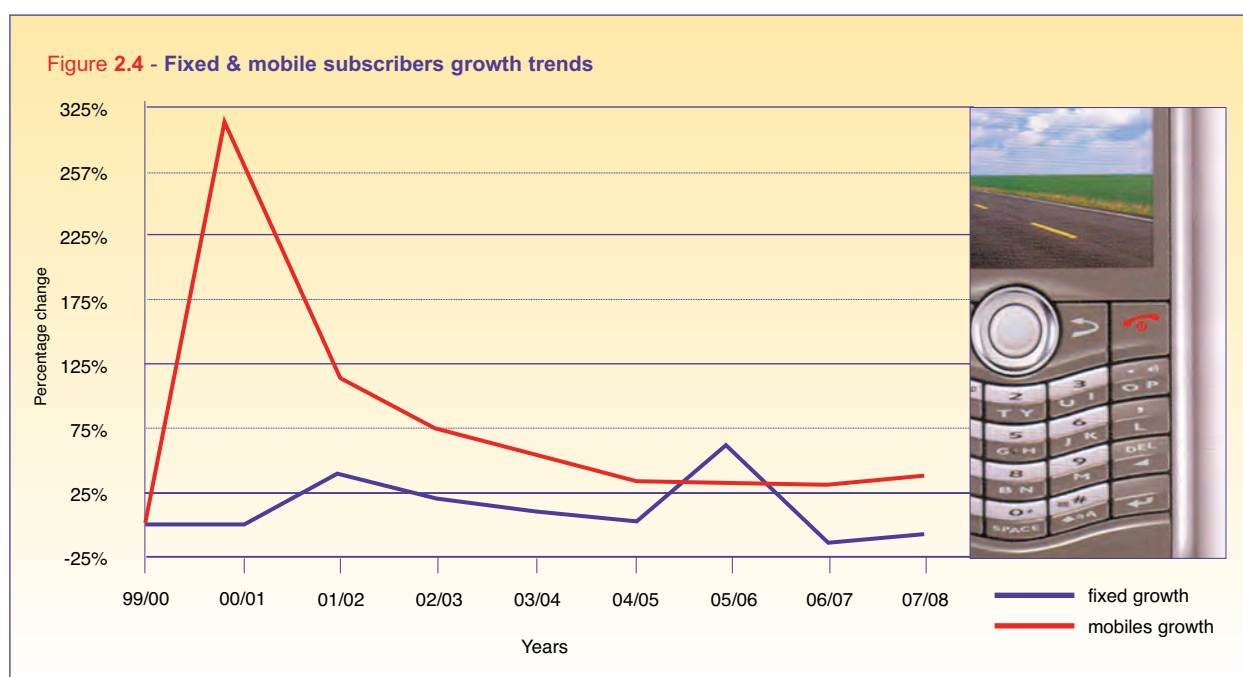
The lackluster performance of the fixed market segment in Lesotho is no exception to the global trends particularly in the developing world where the fixed network operator has never realized any striking growth levels. Figure 2.4 does indeed demonstrate that the fixed operator's year on year percentage growth has generally been on the decline, with the exception of 2002 and 2006.

In 2002, in an effort to increase rollout to meet the regulatory requirements as stipulated in its licence, the incumbent, TL, launched the Fixed Cellular Terminal (FCT) and Wireless Local Loop (WLL) services. FCT is a postpaid product offered on the GSM platform that has been leased from EEL. It has a restricted mobility, as it is sector locked. Wireless Local Loop (WLL) is a product that offers wireless connectivity. As a result, the operator's subscribers increased by 37 percent in 2002 and 20 percent in 2003, as compared to 1 percent increase of 2001. However, in the following years the fixed network's subscribers increased in stumpy rates, being, 8 percent and 3 percent. The decline in the percentage increase of subscribers resulted from TL's inability to repair faulty FCTs and maintain WLL.

Another unique year was in 2006 when TL recorded a 62 percent increase in subscriber base from 38,999 to 63,157. This happened after TL launched Lekomo Flexi that is somewhat similar to FCT services of 2002. Lekomo Flexi is a prepaid product provided on a GSM platform, authorized by LCA with the following conditions: SIM card locking; sector locking, and with limited mobility to mimic fixed services for which TL was licensed. TL had packaged this product with an incentive of a free cell phone in order to increase its subscriber base and meet the rollout targets at the end of its exclusivity period.

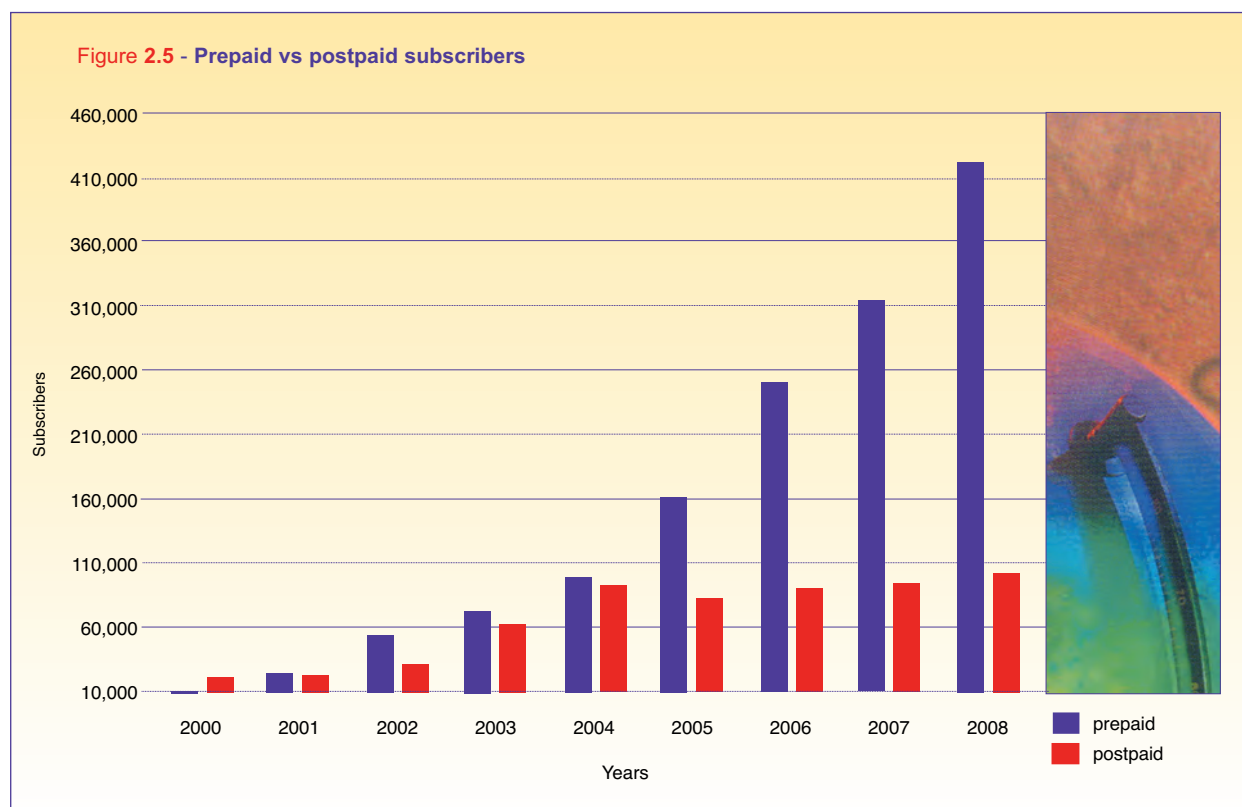
Following the staggering figures of 2006, the fixed network subscribers' growth took a sharp downturn as it changed from a 62 percent increase realised in that year, to negative growth of 16 percent in 2007 and 10 percent in 2008. The decline was caused by the migration of the Lekomo Flexi subscribers to the mobile networks. That is, the Lekomo Flexi subscribers were able to unlock the cell phones in order to connect with the mobile networks. By 2008, TL had 47,582 subscribers, compared to 63,157 in 2006.

On the contrary, the performance of the mobile networks has been improving consistently from one year to another, though at varied rates. The first major highlight of their performance was the 309 percent increase recorded in 2001. This was the period of a large effective demand that remained untapped following the introduction of mobile network services. Furthermore, in 2002, the mobile networks recorded a percentage increase of 109 percent. This arose from the entrance of the second mobile operator, EEL. Unlike VCL, EEL targeted its network rollout to urban settlements of the mountain areas where there were no communication services. This included Thaba-Tseka, Mokhotlong, Qacha's Nek and Quthing towns. VCL subsequently followed EEL's strategy and rolled out services in rural towns and this in turn increased mobile population coverage which is currently estimated at 75 percent. In 2008, the mobile networks realized an increase in the number of subscribers by 35 percent.



#### 2.3.4 Postpaid and prepaid subscriber base

The subscriber base of the sector is dominated by pre-paid customers, a phenomenon that is more prominent for mobile operators (96%) than for fixed operators (71%). Prepayment or 'pay-as-you-go' service allows low and irregular income earners to use communication services at low monthly threshold expenditures and without fixed monthly subscriptions that are characteristic of, and obligatory for post-paid plans. These prepaid products are also structured such that their voucher denominations (M5, M10, etc) are affordable to the majority of the population who fall in the low and middle income groups.

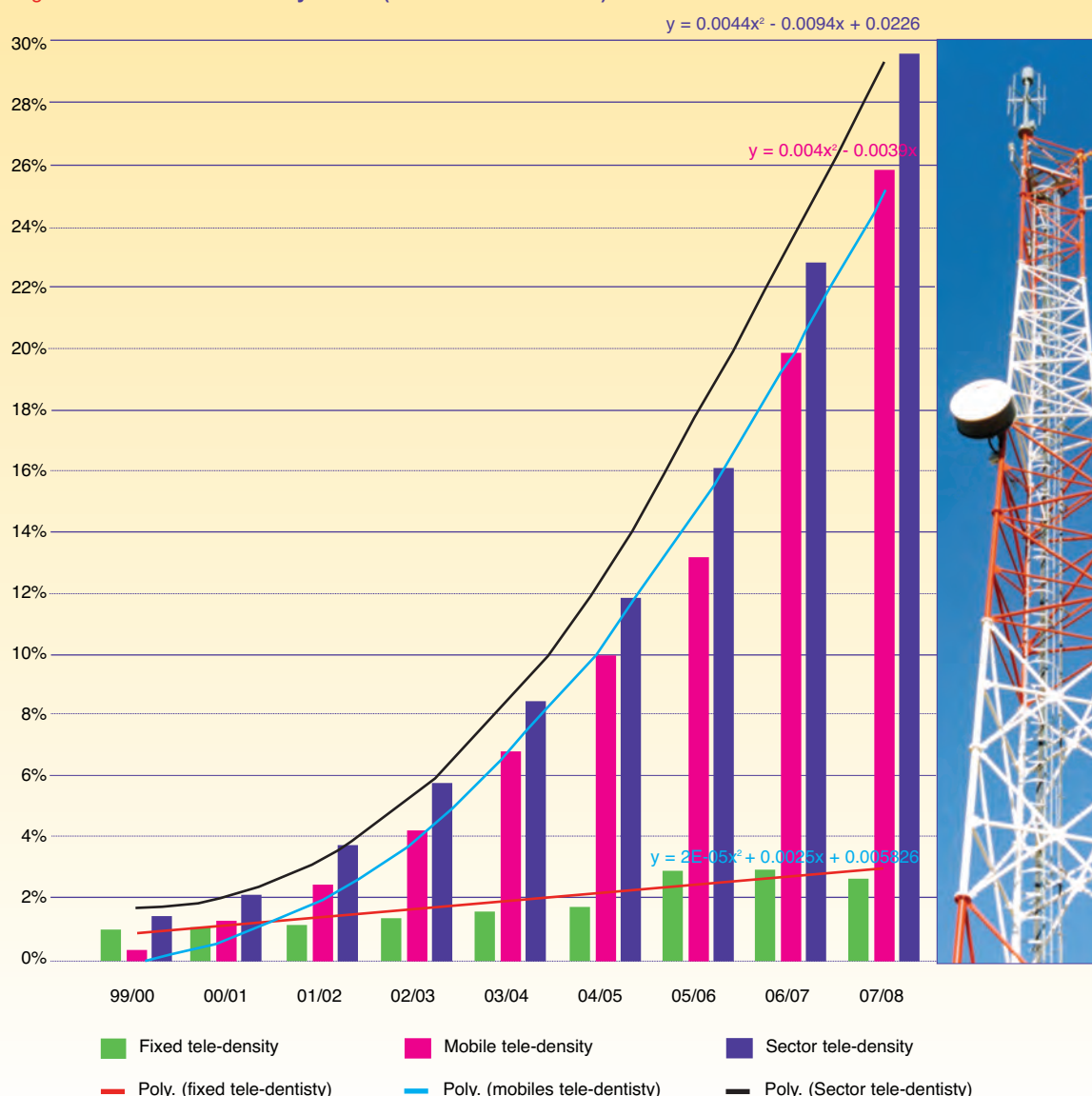


### 2.3.5 Sector tele-density

Tele-density provides a useful general indicator of the deployment of telecommunications networks and their usage within a country. For the purpose of this report, tele-density is measured as access per 100 persons.

Sector tele-density has shown gradual growth over the last eight years as depicted in Figure 2.6. The trends show that fixed tele-density has remained relatively constant while there has been significant increase on the mobile side over the years 2000 to 2008. The fixed tele-density was 0.98 percent in 2000, and has since increased to 2.6 percent in 2008. Again, due to the reasons advanced in section 2.3.3, the fixed tele-density was somewhat high in 2006 and 2007, which were unusual years. Mobile tele-density on the contrary, has increased substantially over the eight-year period, reaching about 26 subscribers per 100 persons by 2008. The tele-density in Figure 2.6 indicates that overall, only 29 percent of Lesotho's population had a telephone (fixed or cellular) in 2008, from one percent in 2000.

Figure 2.6 - Sector tele-density trends (1999/2000 - 2007/2008)

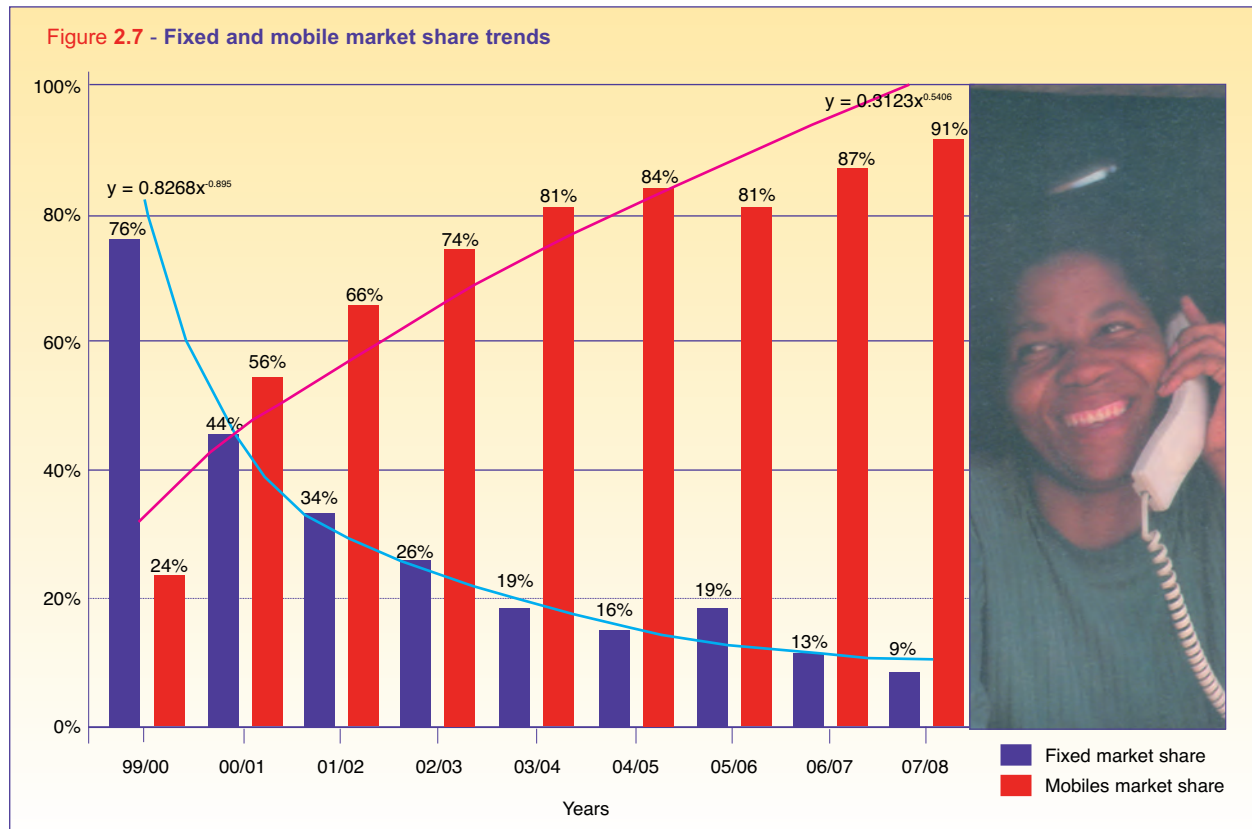


### 2.3.6 Market share

The market share depicts the disaggregation of subscribers by the number of players in the market. In this instance, telephone subscribers are distributed between one fixed and two mobile networks. As evident from Figure 2.7, since the mobile operators came into play, they have continued to register more subscribers than the incumbent, where the mobiles have attracted the untapped demand. The migration of people from fixed network has on the other hand, further boosted the growth of the mobile subscribers. In 2001, the mobile subscribers accounted for 56 percent while fixed had 44 percent. In 2002, the mobile subscribers increased significantly by 10 percent, registering 66 percent of the market share. This, as explained earlier, was due to the impact of the second mobile operator, introduction of new services and value added services amongst others. The rapid growth of mobile subscribers has increased the mobile segment's market share to 91 percent by 2008. The only notable decline in the market share of mobile operators was in 2006 when TL experienced a huge, albeit transient increase in subscribers on account of the lekomo flexi product.



The fixed operators' deployment of FCT and WLL technologies had not had a noteworthy contribution in increasing the number of subscribers. The strategy proved unproductive and unprofitable investment, as TL could not maintain the service and lost these customers. Secondly, these were mainly installed in the urban and peri-urban areas, leaving out the rural and remote areas, some of which were high viability areas. In view of this, the fixed market share stood at nine percent in 2008.



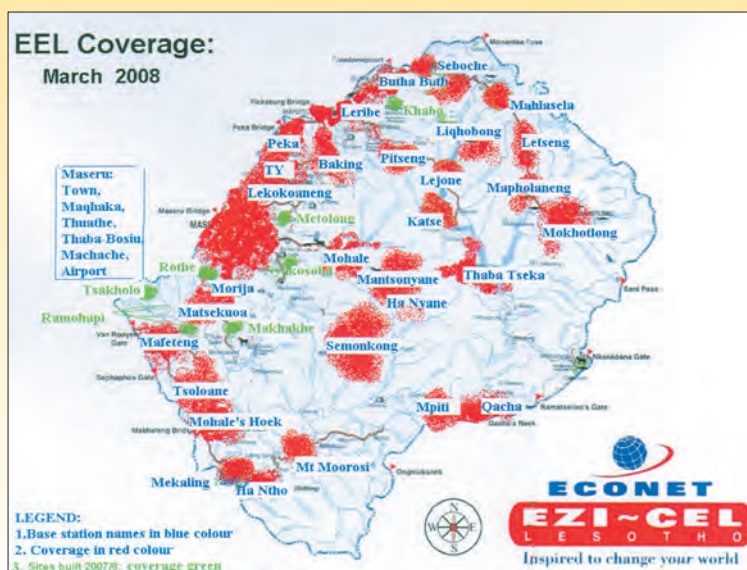
### 2.3.7 Universal access indicators

The current estimate for land coverage of communications services stands at 40% of the country. However, it is estimated that more than 70% of the population resides in areas that have access to communications services (Figures 2.8 and 2.9). These are predominantly urban areas (Highlands and Lowlands), almost





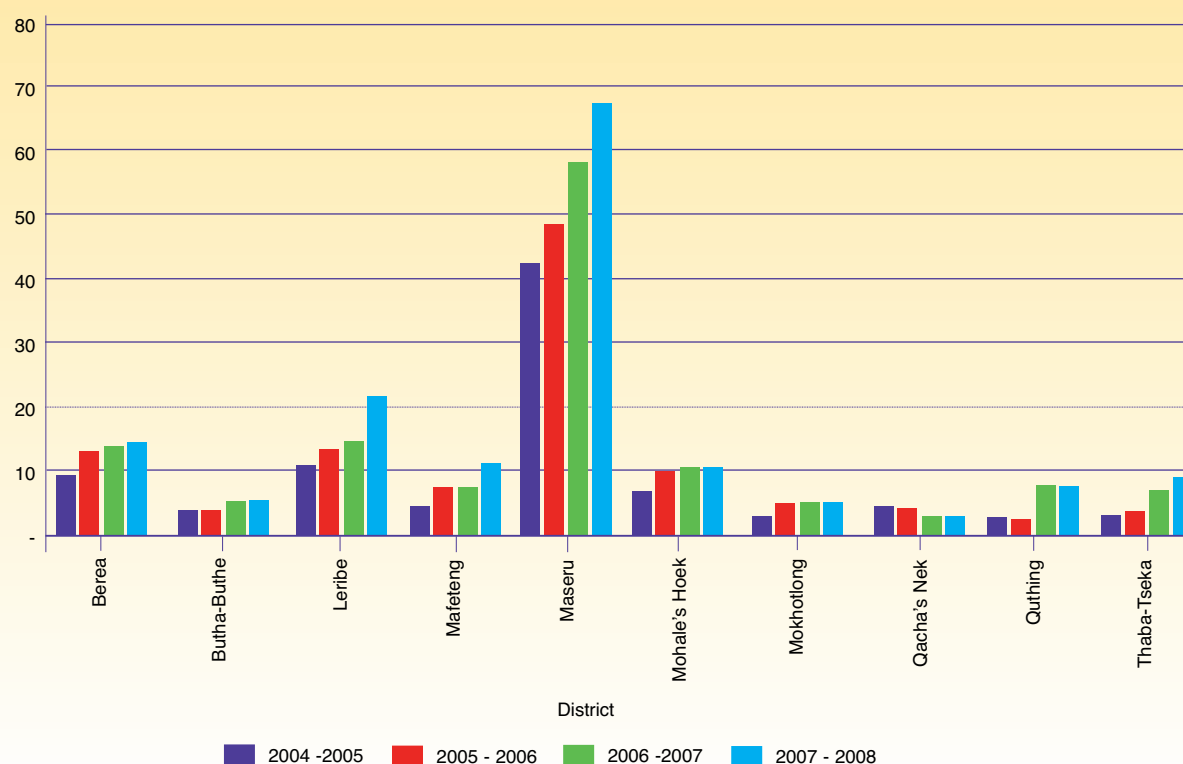
**Figure 2.9 - Econet Ezi-Cel Lesotho coverage map as at 31<sup>st</sup> March 2008**



all Lowland areas and some rural Highland areas with relatively high population densities or with some unique economic activity such as diamond mining.

Figure 2.10 gives an indication of the coverage trends by the number of Base Transceiver Stations (BTSs) in the country since 2004 to 2008. From the chart, it is evident that Maseru district, the seat of the capital city, continues to have more BTSs than any other district. Maseru is followed by Leribe and Berea. As mentioned earlier, the rollout of services to the other districts, which are predominantly rural, has been slow as operators did not deem them economically viable.

**Figure 2.10 - Number of BTSs by district**



## Chapter 3: ICT in Business

### 3.1 Introduction

#### 3.1.1 The structure and organization of Lesotho businesses sector

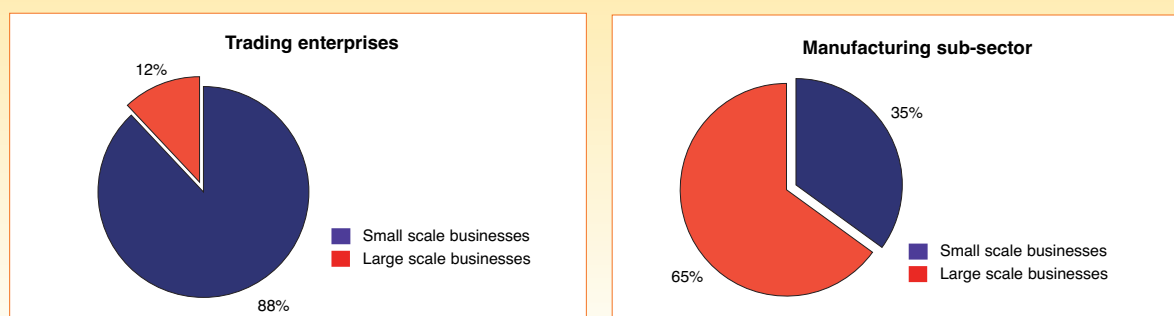
The Lesotho's business sector is made up of a hierarchy of segments, namely manufacturing sub-sector, trading enterprises, cooperatives and street-vendors with the latter mainly in the mould of informal business. The Ministry of Trade and Industry, Cooperatives and Marketing is responsible for the registration and licensing of these businesses. Any of these businesses is categorised accordingly in terms of the head-count of its employees. For instance, the business is classified as micro/small scale business if it has a head-count of up to ten employees, employed directly by the business including full-time, part-time or casual and the self-employed. Those with a workforce in excess of ten employees are classified as large businesses. This definition has some limitations in a sense that a business classified as large, may actually generate lower revenue than one that is deemed to be small. Nonetheless, it has been adopted in this study since other defining features such as revenue were not included in the study. Moreover, based on the results, it has proved adequate as key variables that were expected to be correlated with size of the operation indeed behaved as such.

#### 3.1.2 The scope of the survey

The results presented here include the profile of the current ICT infrastructure in businesses, covering the number of computers available to employees for business purposes<sup>8</sup>. The chapter also gives a brief state of Internet connectivity in business across the country. It looks at the number of Internet-connected computers available in the businesses, the mode of connection used to access the Internet, the proportion of businesses with network servers and websites, as well as the presence of various communication facilities and customer premises equipment (mobile phones, fax machines, two-way radios, etc).

This survey concentrated only on manufacturing and trading enterprises which make up the bulk of the formal business sector while hospitality business is treated on its own in the study. This chapter presents the results of the survey based on 709 businesses. The trading enterprises were dominated by small scale traders accounting for 88 percent while in manufacturing, the large scale manufacturers were in the majority, making up 65 percent of all businesses in manufacturing (Figure 3.1).

Figure 3.1 - Businesses by type and size



<sup>8</sup> From hereinafter, the word "business", unless qualified, refers to both manufacturing and trading enterprises.

### 3.2 Profile of the business employees

A quarter of business respondents were the owners while three quarters of them were employees who assumed varied responsibilities but well positioned to provide the requested information. Forty five percent of the respondents were male while 55 percent were female. About ten out of every hundred (9%) businesses were manned by one person, who in most cases was also the owner or a relative.

In terms of the breakdown of workforce by gender, there was a marked difference between the trading enterprises and the manufacturing. Forty six percent of the employees of trading enterprises were female with 54 percent being male. On average, micro-enterprises had four employees split equally between male and female. Among the large scale trading enterprises, the average figures were 14 male employees and nine female employees. The largest of these enterprises had up to 300 strong workforce. Non-local employees made up eight percent of all the employees of these enterprises.

In manufacturing, the female employees constituted 78 percent of the work force and male employees 22 percent, showing employment in this case to be skewed in favour of women. Small scale manufacturers employed on average four males and three females while large scale manufacturers had an average of 447 employees with 22% being male and 78% females. The largest of these firms employed as many as 6500 in its total workforce. Expatriates made up three percent of all the manufacturers' employees.

**Table 3.1 - The number of business employees by gender**

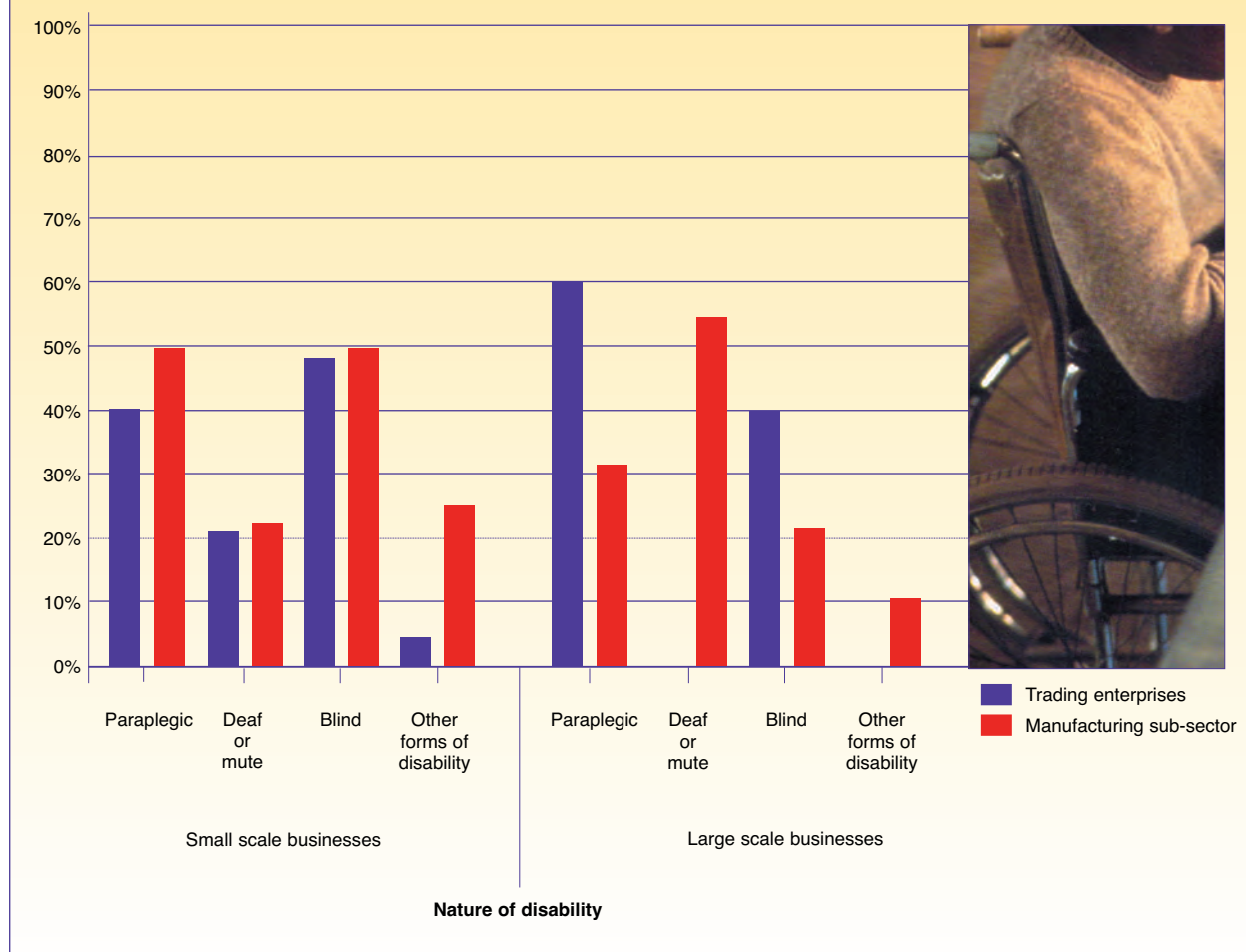
	Trading enterprises			Manufacturing sub-sector		
	Average number of employees per micro -enterprise	Average number of employees per large scale enterprise	Percentage of employees by sex and citizenship	Average number of employees per small scale manufacturer	Average number of employees per large scale manufacturer	Percentage of employees by sex and citizenship
Females	2	9	46	3	350	78
Males	2	14	54	4	98	22
Expatriates*	2	4	8	2	19	3

\* Note: Figures in this row are part of the total made up of the two preceding rows.

#### 3.2.1 Disability

In order to establish the broad incidence of disability among the business employees, we asked all the respondents whether there was any employee with long-standing disability or infirmity. About five percent of the businesses had employees with disability of some form. The most common of these were paraplegic (43%) and blindness (40 %). Businesses with deaf and mute employees constituted 29 percent of those with disabled employees. Figure 3.2 presents a detailed breakdown of the businesses by the nature of disability affecting their employees. Some businesses (5%) had provided for disability facilities such as wheel chairs or wheel chair friendly routes, ramps and access into the buildings, but none of these was ICT related<sup>9</sup>.

<sup>9</sup> The main reason for including disability in the study was to document the forms of disability, and more importantly, the types of support given-ICT related and otherwise.

**Figure 3.2 - Businesses with employees with disability by nature of disability**

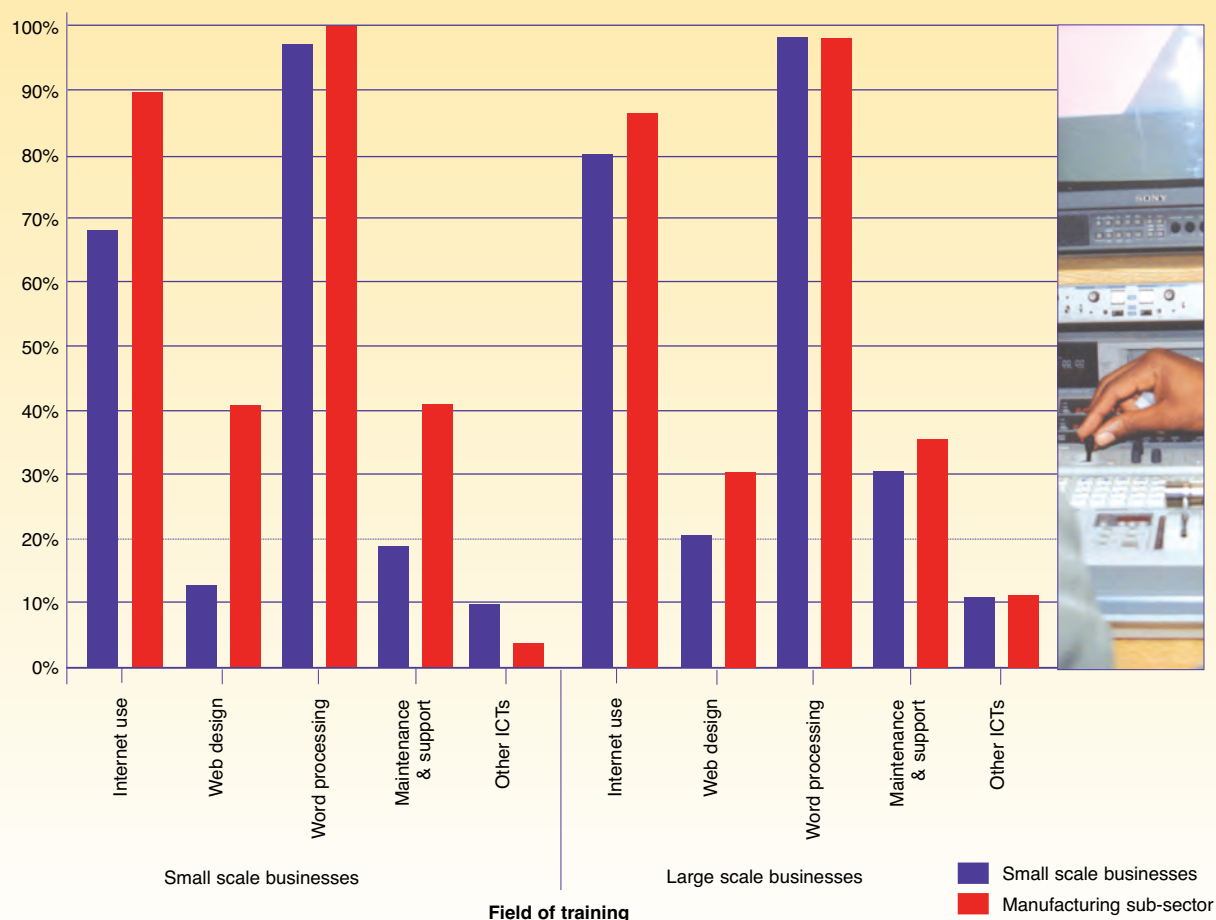
### 3.2.2 Computer awareness and appreciation

The businesses that had at least one employee having some computer literacy/skills (49.6%) were about equal to those which had none at all (50.4%). For businesses with such skills, the most common skill which they had access to was word processing (97%), followed by Internet usage (74%), while businesses with staff trained in technical skills, such as web design, maintenance and support, were fewer. The firms in manufacturing had a slight edge over trading enterprises in terms of ICT skills base. Figure 3.3 gives disaggregated information by the type and size of business<sup>10</sup>.

<sup>10</sup> Throughout this chapter and the next three, there is an attempt to first present aggregate statistics in the narrative.

This is then followed by a figure/table that has more disaggregated data, e.g., data by type and size of business and other details. Since the latter carry more information, it becomes cumbersome to explain in the text. Nonetheless, the reader should find the information quite easy to interpret.

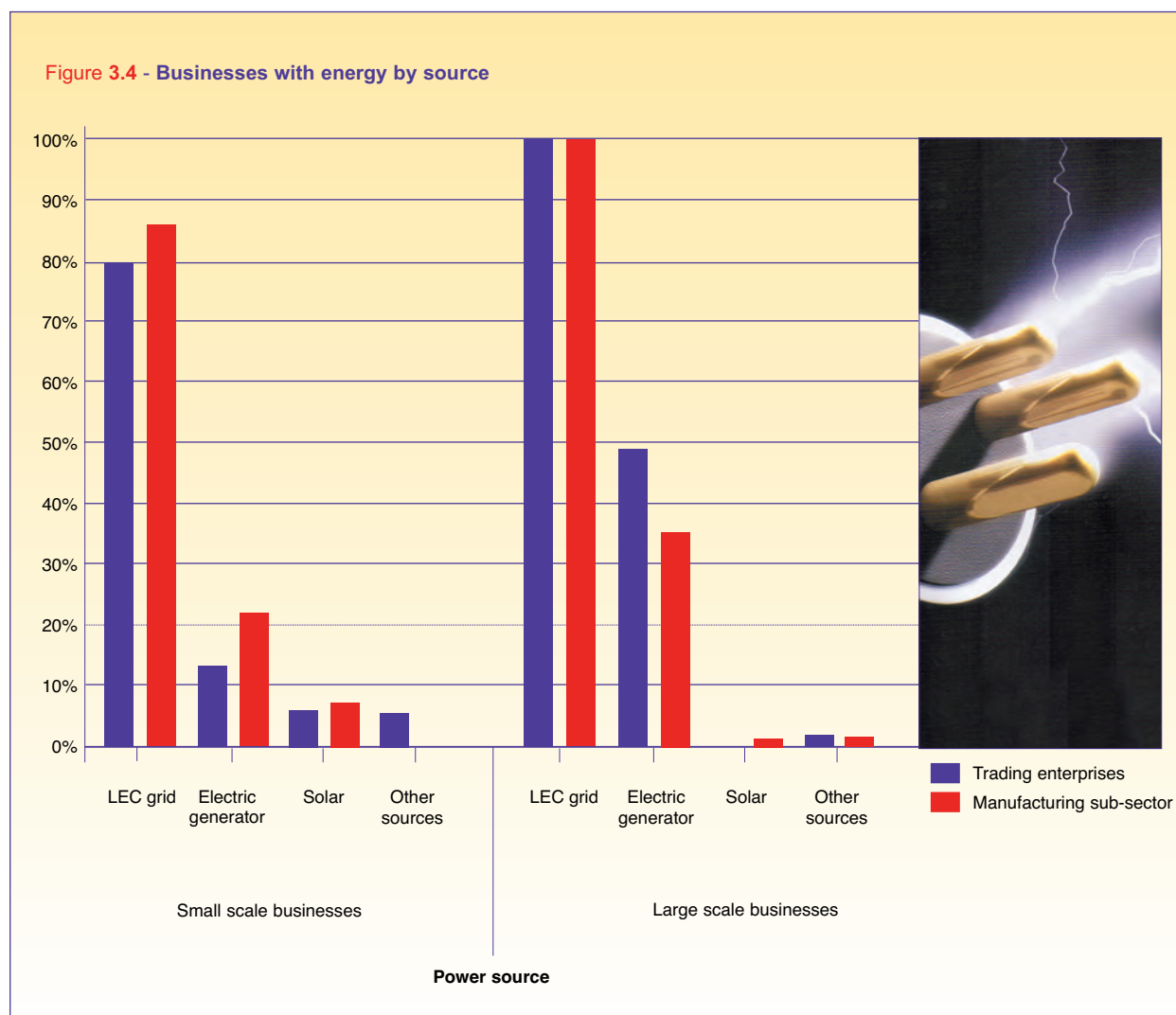
Figure 3.3 - Businesses with ICT skilled employees by type of training or skill



### 3.3 Source of energy in businesses

Eighty five percent of the businesses were connected to the main electricity power grid of Lesotho Electricity Company (LEC), being the most common. Other alternative sources were derived from generators (20%), solar (5%), and other sources such as batteries and electric inverters. The latter were used mostly to power radios and TVs as well as for charging mobile phones and lighting, particularly in the rural areas. About one out of every five (21%) of the businesses connected to the main power grid also had generators for backup, while 10 percent of them also had solar power as complementary to the mains.

The size of the firm had a strong correlation with the connection to the main power grid (Figure 3.4). For instance, all large businesses, irrespective of whether they are in manufacturing or in trading, were connected to the mains power grid and were also more likely to have a back-up generator. More disaggregated information is presented in Figure 3.4.



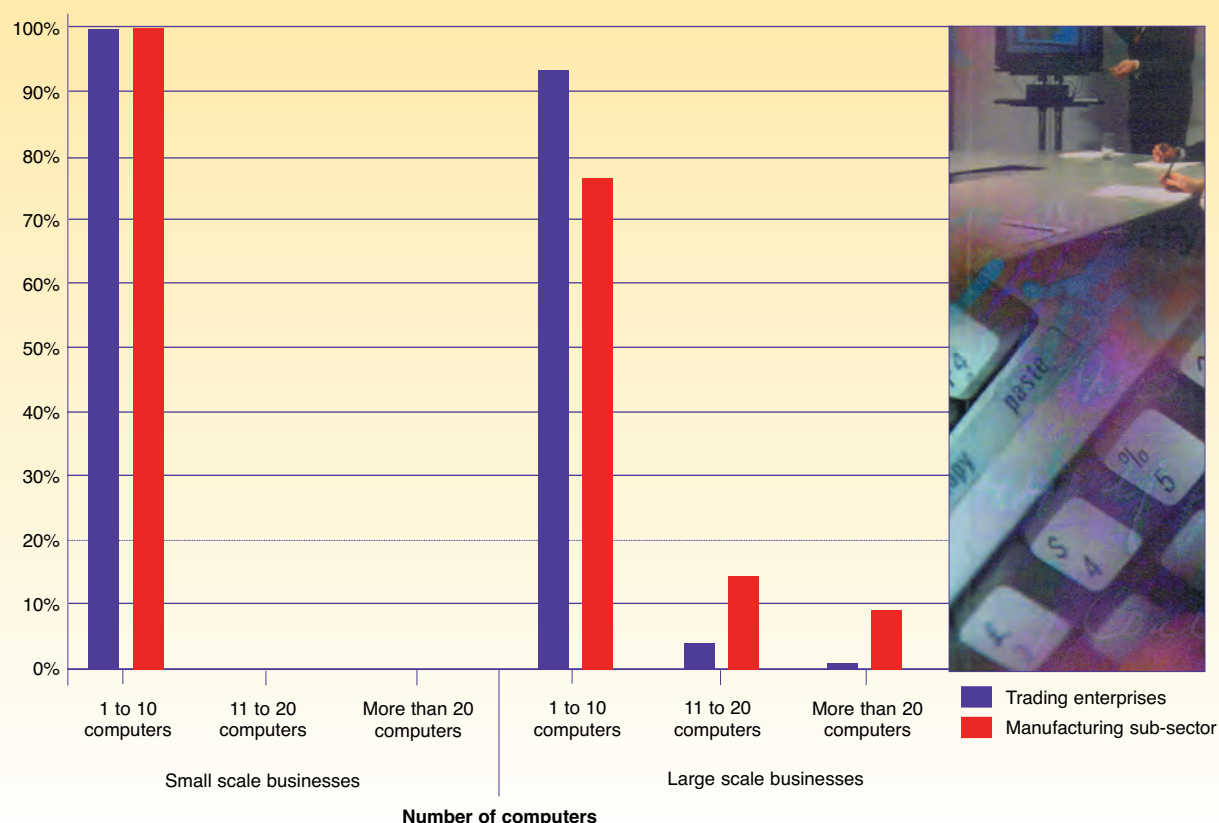
### 3.4 ICT infrastructure, access and usage in businesses

#### 3.4.1 Presence of computers and servers

The survey solicited information in some detail on the presence of ICT equipment in the businesses. In particular, we were interested in the presence of computers and servers. Overall, it is estimated that one thousand four hundred and ninety two (1,492) computers were available for business purposes in the businesses surveyed. A little less than a third (31%) of businesses used computers and of these, about 92 percent own at least 1 to 10 computers, about 5 percent had 11 to 20 computers and 3 percent had more than 20 computers while 69 percent had no computers at all. Forty percent of the businesses with computers had at least one network server and 84 percent had 1 to 10 computers connected to the server, while 10 percent had 11 to 20 computers connected to the server and only 6 percent had more than 20 computers connected to the server.

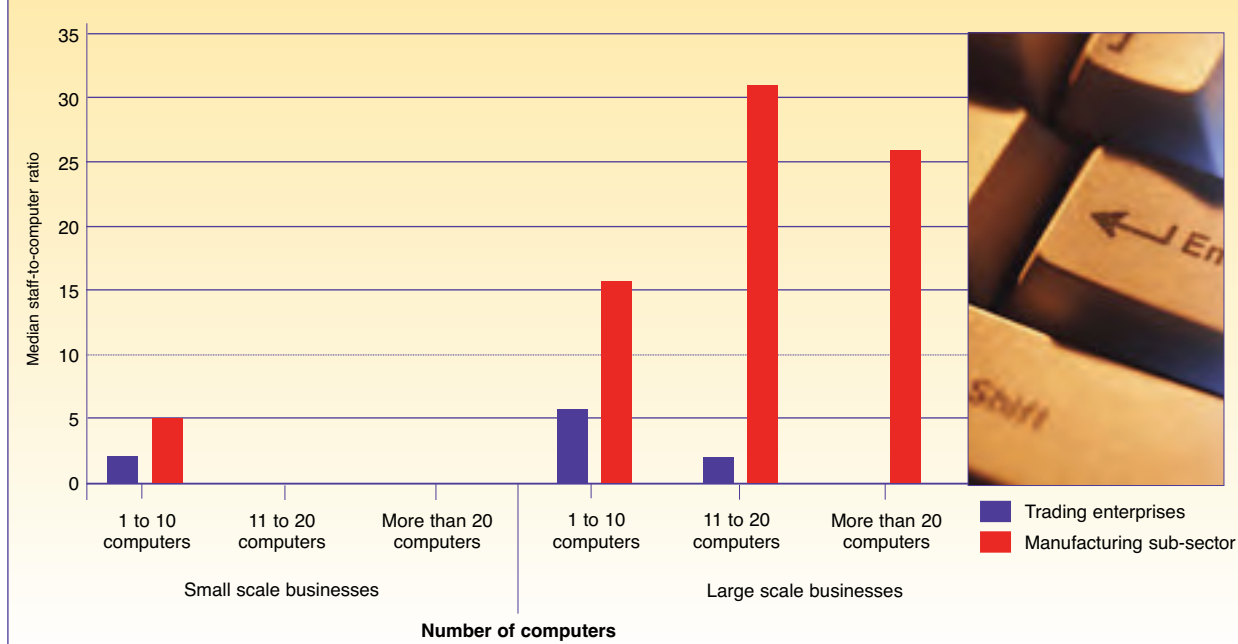


Figure 3.5 - Businesses with computers by category

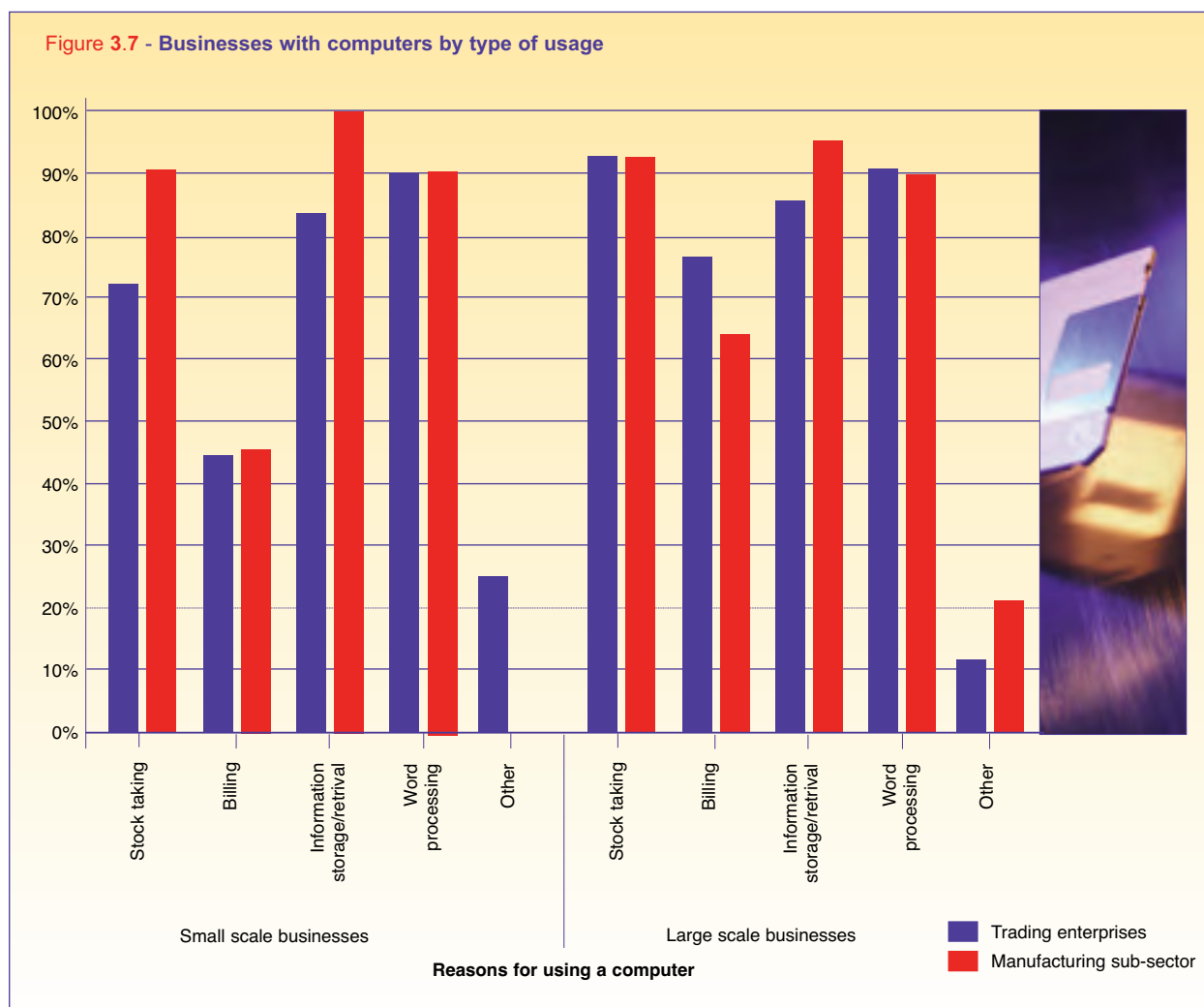


The median number of business employees per computer in trading enterprises was at two for small and five for large scale trading enterprises. By comparison, in manufacturing, the median staff-to-computer ratio was at five and 18 for small and large manufacturers respectively. In both the trading enterprises and in manufacturing, size of the business is closely correlated with the number of computers. For instance, none of the small businesses had more than ten computers (Figure 3.6).

Figure 3.6 - Staff-to-computer ratio by number of computers (businesses with computers)



For the businesses with computers, 84 percent reported to have used them for stock taking, 58 percent used them for billing and about 88 percent reported to have used them for information storage and retrieval. Generally, the majority of the businesses (90%) used computers for word processing, while 20 percent also used them for other purposes such as playing music. Disaggregated information based on the type and size of business is captured in Figure 3.7

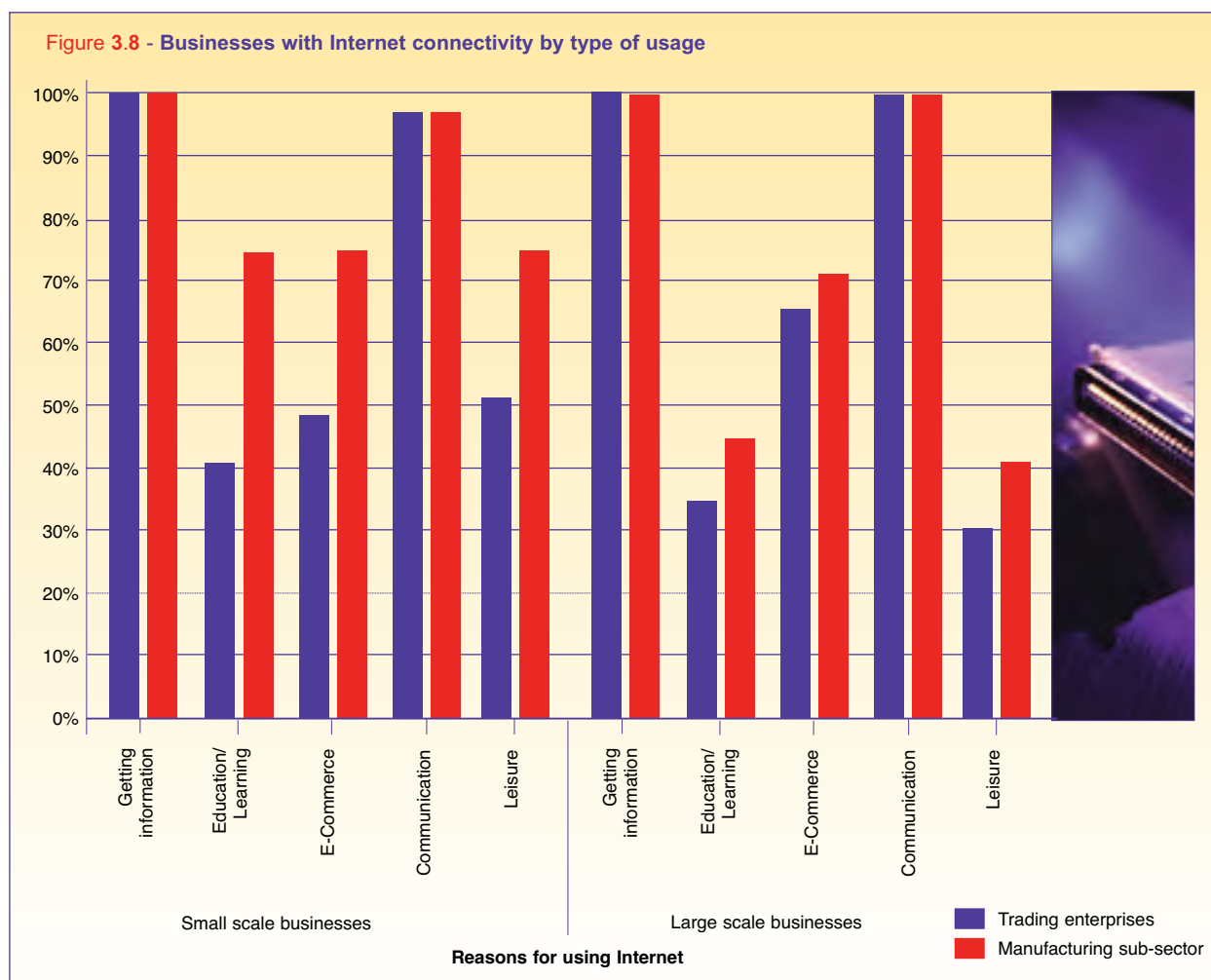


### 3.4.2 Internet connectivity

While Internet has become a critical part of doing business, its penetration remains very low in Lesotho, with access mostly in the urban areas. More than four out of five (86%) of the businesses did not have Internet connectivity and of these, 20 percent had computers. The respondents were asked to state the reasons why they did not have a connection. They cited several reasons such as long distances from the access networks, lack of knowledge of Internet and its value to the business as well as prohibitive connection costs.

Close to 84 percent of the unconnected businesses were not even planning to connect any time in the near future. Less than one percent of the unconnected businesses (but with computers) had installation in progress at the time of study. Two percent were planning to connect within a year with even fewer planning to connect within three years from the time of the study. What this suggests is a rather gloomy outlook regarding the general business uptake of Internet.

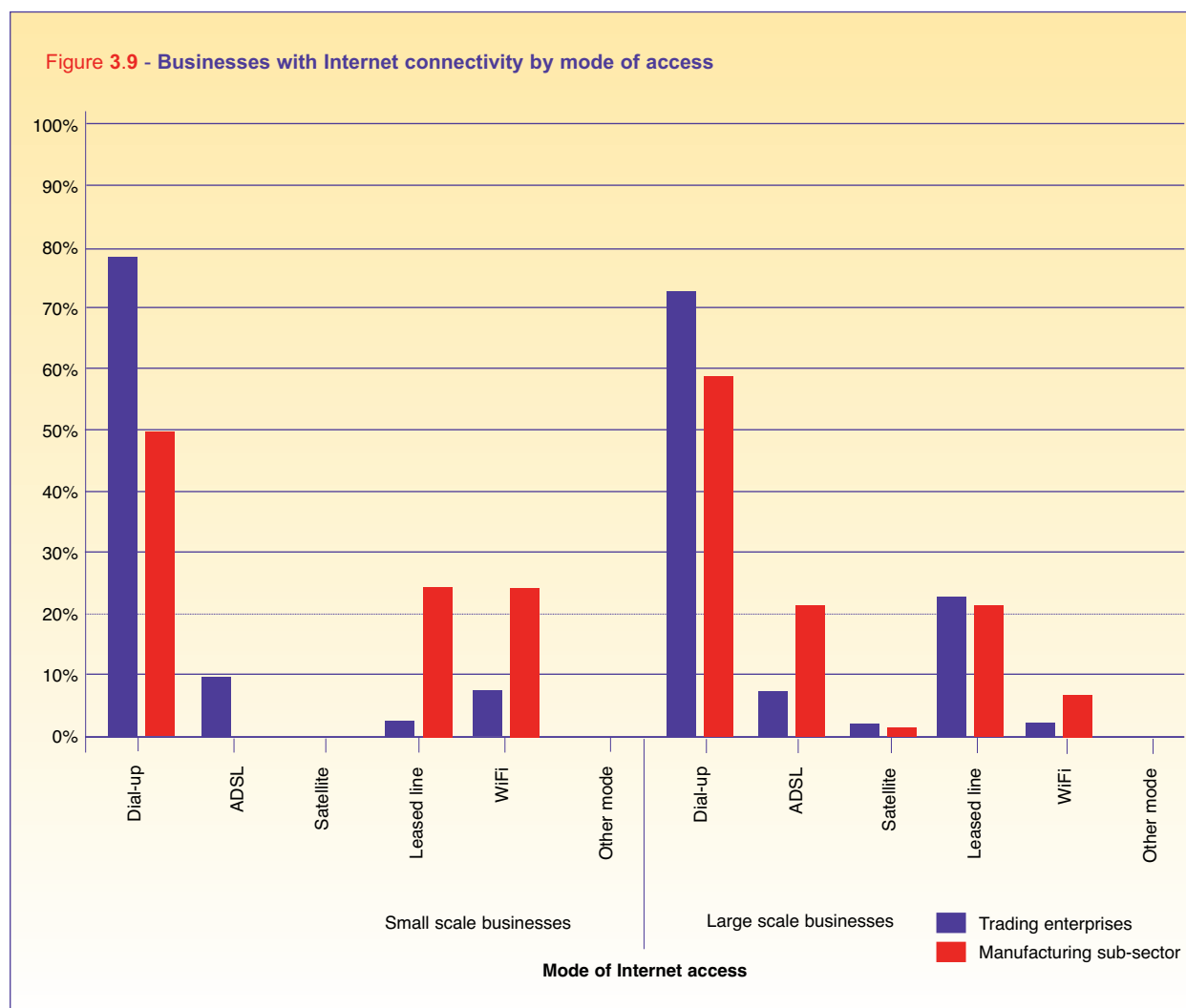
Less than half (45%) of the businesses with computers had Internet connectivity with most of them having no more than ten computers. The connected businesses reported that they use Internet for several reasons<sup>11</sup>. All of the connected businesses reported using Internet for getting information, with 43 percent using it for education and learning, and 63 percent for e-commerce. Almost all (99%) used Internet for communication, with 43 percent using it for leisure activities.



Slightly less than 70 percent of businesses with Internet connection were connected via dial-up, 14 percent reported connecting to Internet via ADSL, 17 percent used leased line (E1), seven percent connected via WiFi service with only two percent using satellite, all of which were large businesses. Perhaps satellite connectivity would have been the most ideal means of connectivity in Lesotho, particularly in the mountain areas. However, there is very little economic activity in these areas as the most densely populated settlements and businesses that can afford the cost are in the lowlands, mainly Maseru urban and Maputsoe in Leribe.

The mode of Internet connection with respect to speed, capacity and quality plays a critical role regarding the productivity and competitive urge of any business. However, the polarisation of broadband to urban areas, high connectivity costs and its late introduction in the country has limited its uptake, to an extent that the slow, unreliable and least preferred dial-up connectivity remains the most widely available option. Figure 3.9 details the connectivity by mode and size of business.

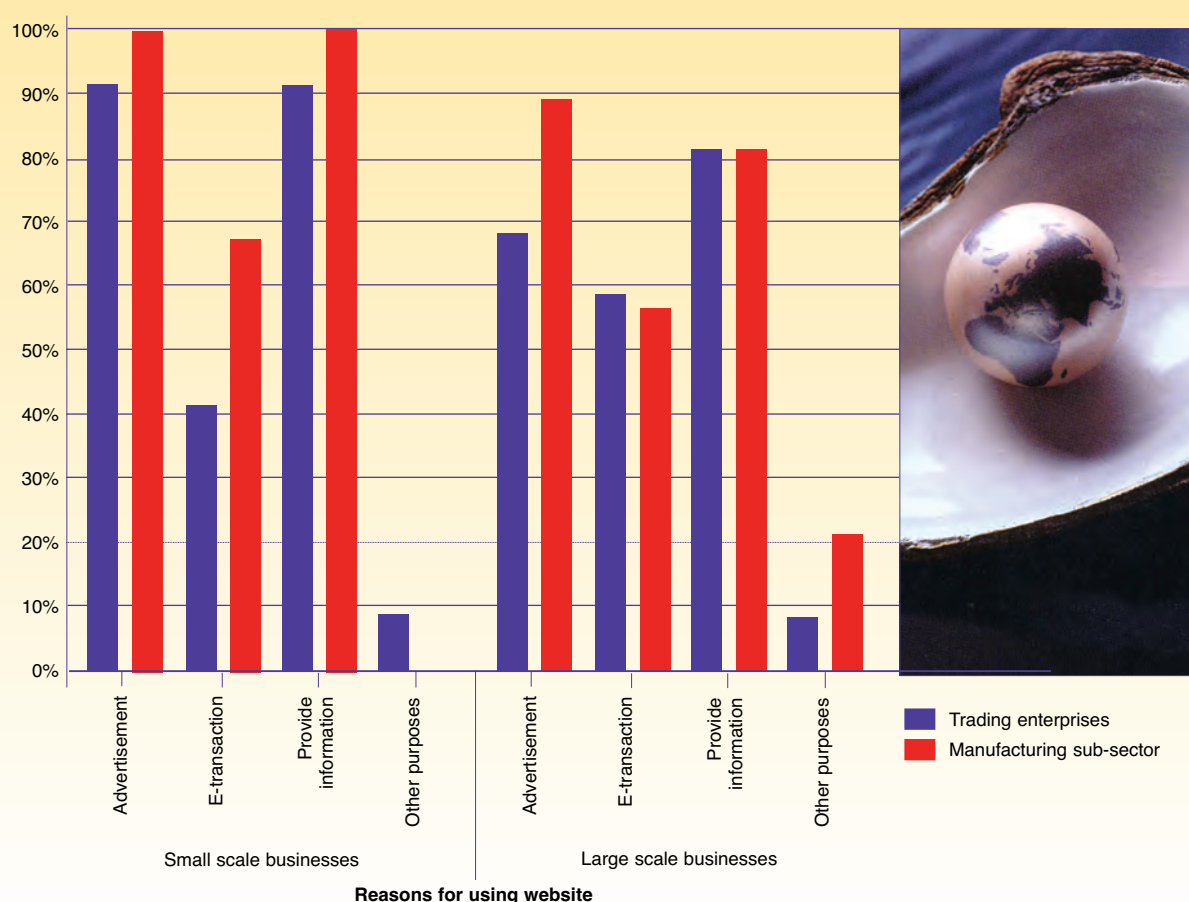
<sup>11</sup> Respondents were free to tick more than one option, totals may not equal to 100%



### 3.4.3 Web presence

Only six percent of the businesses had the business website, suggesting that web presence lacks far behind Internet connectivity. The most dominant and fairly large number (84%) of them reported to have used website for advertising their goods and services, 53.3 percent used their website for e-transaction, and most businesses, 86 percent used it to provide information. A small number (13%), also commonly used the website for any other purposes other than those mentioned above. Forty two percent of the businesses having a website updated their websites within six months while 13 percent took at least one year before updating. Forty five percent had never updated their websites since they were launched. See Figure 3.10 for disaggregated data in terms of type of business and the scale of operation.

Figure 3.10 - Businesses with website by type of usage



### 3.4.4 Onsite presence of communication facilities and CPE

Slightly less than half (48%) of the establishments owned a fixed telephone to transact business while close to a quarter (26%) of them had facsimile machine and eight percent had two-way radios in use. The majority (61%) used a mobile phone for business purposes with fewer (3%) relying entirely on post offices and e-mail for communication. In terms of access to news and other information, 73 percent had radio sets on premises while 19 percent had at least one television set to entertain the staff and customers who would often watch sports. Two out of five businesses used electronic cash register with the rest either having no cash register at all or using outmoded models. Almost invariably, the presence of communications services increased with the size of business, with the exception of radios which were not core to the business operations (Table 3.2).

Table 3.2 - Businesses with communication facilities and CPE

Businesses with communication facilities and customer premises equipment	Percentages by business type and size			
	Trading enterprises		Manufacturing sub-sector	
	Small	Large	Small	Large
Businesses with mobile phone	59	59	80	67
Businesses with fixed telephone	36	91	54	92
Businesses with facsimile machine	12	70	34	80
Businesses using other communication facilities (e.g. E-mail and Postal services)	2	4	3	8
Businesses with two-way radio	6	17	9	18
Businesses with radio set	75	67	83	52
Businesses with television set	18	24	17	26
Businesses with electronic cash register	40	78	54	24

Among the businesses with fixed telephone lines, the majority (69%) had only one fixed line, 18 percent had two fixed lines, seven percent had three fixed lines and only six percent had more than three fixed lines. Again the size of business was a determining factor for number of access lines on premises. For a further breakdown by size and type of business, see Figure 3.11.



While half of the businesses did not have a direct fixed line, the vast majority, 92 percent had access to a public payphone located near or in the business premises. One third of those businesses owned at least one public payphone in the premises alongside other business. On the average, employees had to walk close to four minutes to access the nearest public payphone even though some had to walk up to 40 minutes. Access to Internet cafés varied by geographical area of the businesses as well. Only urban and peri-urban businesses had Internet cafés located within easy reach of their staff. About 38 percent of the businesses had Internet café in their locality, accessible within an average time of 12 minute-walk. Table 3.3 shows the proportion of businesses (by business type and size) with Internet or public phone access and the average walking time to reach them.



**Table 3.3 - Businesses with access to public payphones, Internet cafés and the mean access time**

Business size and type		Access in percentages		Average time in minutes	
		Public payphone	Internet café	Public payphone	Internet café
Trading enterprises	Small scale	92	37	4	11
	Large scale	92	51	2	8
Manufacturing sub-sector	Small scale	94	34	4	21
	Large scale	88	32	4	16



### 3.4.5 ICT Support

Almost all businesses (99%) with computers had at least one staff member, whose responsibility, among others, was to oversee and render support regarding ICT equipment and systems. Nonetheless, businesses largely outsource most of the technical support due to limited pool of skills. Table 3.4 gives details of the ICT support by type and size of the business.

**Table 3.4 - Businesses with access to ICT support**

Business type →	Trading enterprises		Manufacturing sub-sector	
Business size ↓	In house	Out source	In house	Out source
Small	23	77	34	66
Large	32	68	41	59



Table 3.5 presents a summary of statistics on selected key indicators relating to the ownership of computers and internet connectivity for the two business categories by the size of operation.

**Table 3.5 - Integration of ICTs into businesses**

	Business type	Percentage of businesses owning computers		Percentage of businesses with network server (businesses with computers)		Average number of computers connected to the server (businesses with a network server)		Average number of computers connected to Internet (businesses with Internet connection)	
		Small scale	Large scale	Small scale	Large scale	Small scale	Large scale	Small scale	Large scale
Businesses with 1 to 10 computers	Trading enterprises	18	68	26	48	3	4	2	2
	Manufacturing sub-sector	31	68	36.4	36	3	4	2	3
Businesses with 11 to 20 computers	Trading enterprises	0	4	0	100	0	11	0	3
	Manufacturing sub-sector	0	14	0	100	0	12	0	7
Businesses with More than 20 computers	Trading enterprises	0	1	0	100	0	127	0	127
	Manufacturing sub-sector	0	8	0	100	0	93	0	83

## Chapter 4: ICT in Education

### 4.1 Introduction

#### 4.1.1 The structure and organisation of the Lesotho education system

The education system of Lesotho is driven by a tripartite partnership of the government, the missionaries and the community. Table 4.1 shows the number of institutions at each level of schooling. The schools listed were registered with the Ministry of Education and Training in 2007.

**Table 4.1 - Lesotho education institutions, 2007**

Level	No. of schools/centres
IECCD	625
Primary schools	1,447
Secondary schools and High schools	245
Skills training centres	21
Technical institutes	7
Polytechnics	1
Teacher-training colleges	1
Universities	1



**Source:** Ministry of Education and Training

#### 4.1.2 The scope of the survey

The purpose of the survey was to obtain benchmark data on the integration of Information and Communications Technologies (ICTs) in education targeting primary, secondary and high schools. The targeted respondents of the survey were mainly the school principals.

This chapter presents the results of the survey based on 320 schools, 55 percent of which were at primary level with the balance drawn from secondary (12%) and high schools (32%). These schools represent twenty percent of all primary, secondary and high schools in Lesotho. Eighty percent of the schools were owned and administered by missionaries, mainly the three largest denominations – the Roman Catholic Church, the Lesotho Evangelical Church, and the Anglican Church of Lesotho. About equal numbers (8%) were public and community schools. Table 4.2 presents a detailed breakdown of the school level and ownership.

**Table 4.2 - School ownership by school level**

School level	School ownership				
	Public	Missionary	Private	Community	Total
Primary schools	8.5	78.4	3.4	9.7	100
Secondary schools	12.5	75	2.5	10	100
High schools	5.8	82.9	5.8	5.8	100
<b>Total</b>	<b>8.1</b>	<b>79.4</b>	<b>4.1</b>	<b>8.4</b>	<b>100</b>



The results include the profile of the current ICT infrastructure in schools, covering the number of computers available to students and teachers for educational purposes. The chapter also offers a snapshot of school connectivity across the country. It looks at the number of Internet-connected computers available to students and teachers for educational purposes, the modes of connection used to access the Internet, the proportion of schools with network servers and website, as well as the presence of various communication facilities or equipment such as mobile phones, fax machines and two-way radios.

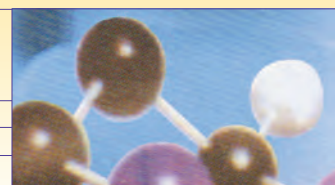
## 4.2 Profile of the school, personnel and students

### 4.2.1 School enrolment

The primary schools had averages of 11 teachers and 414 students. The secondary schools had nine teachers and 214 students on average, while high schools had averages of 21 teachers and 535 students. These translate into student-to-teacher ratios of 36, 23, and 25 for primary, secondary and high schools respectively. Apart from teachers, some schools also had support staff (drivers, book keepers, gardeners etc) with averages of three for primary and secondary schools while high schools had an average of seven of such employees (see Table 4.3).

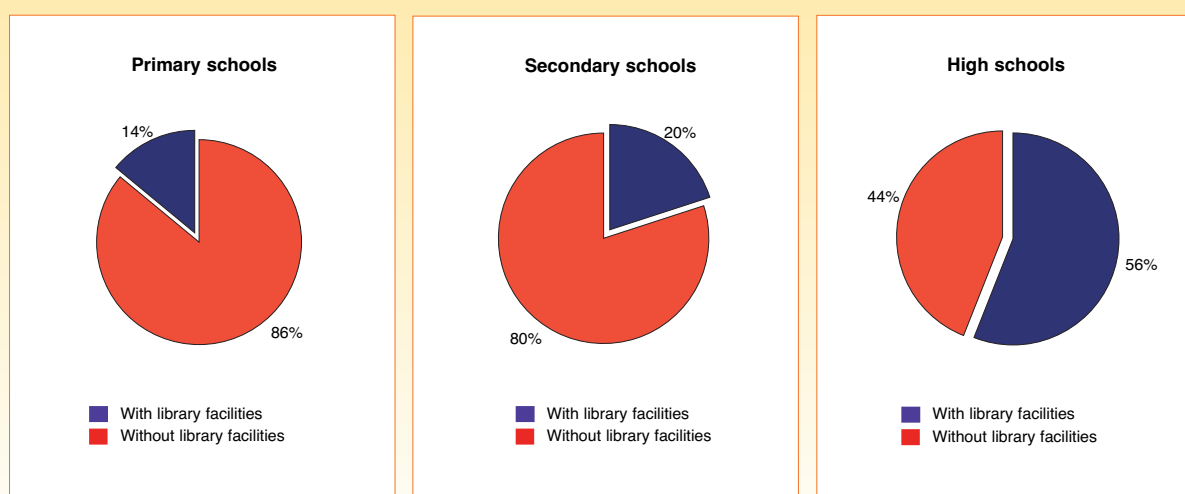
**Table 4.3 - The average number of students and staff by school level**

School level	Students	Teachers	Library staff- (schools with a library)	Non academic staff - (schools having them)	Percentage of schools with expatriates
Primary schools	414	11	1	3	4
Secondary schools	214	9	1	3	32
High schools	535	21	1	7	59



Slightly above a quarter of the schools (28%) had a library or at least a dedicated depository building or classroom to place books and teaching materials. As could be expected, the presence of library facilities varied by the instructional level of the schools. Among the schools with library or classrooms used for library facilities, primary schools accounted for 27 percent, secondary schools 9 percent, whereas high schools constituted 64 percent of those. Overall, 15 percent of the schools with libraries had an archive section. Among the schools with library facilities, 7 percent, 12 percent and 43 percent respectively, in their hierarchical order, had at least one member of staff whose main responsibility was to help students with library facilities (librarian). In the other instances, the service was offered on an ad hoc basis by students or staff. Figure 4.1 presents the proportion of schools with library facilities disaggregated by school level.

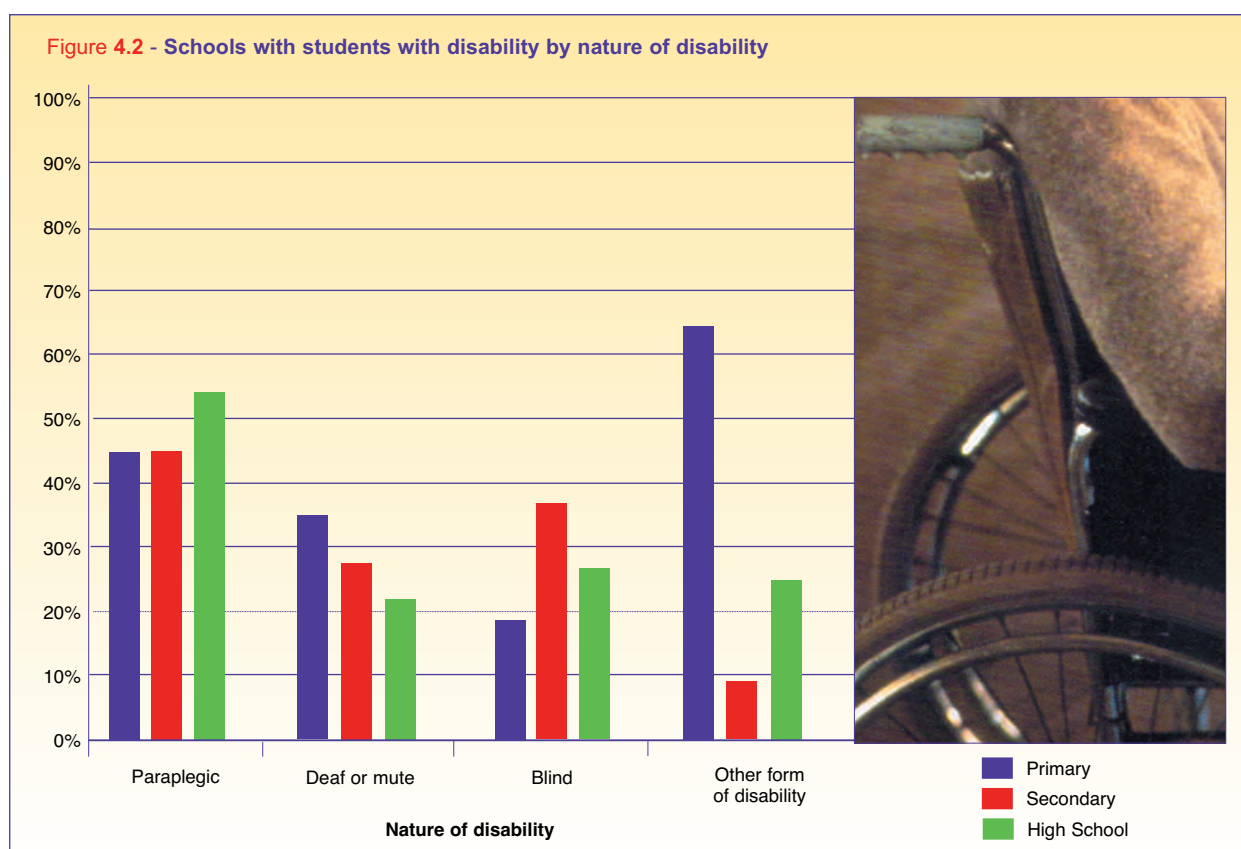
**Figure 4.1 - Schools by library presence**



About four percent of the primary schools had foreign nationals among their teaching staff with an average of four for such schools (Table 4.3). The dearth of teachers seems to increase at higher grades since at secondary schools, 32 percent of them had at least one foreign national while the figure was even higher at 59 percent in high schools.

### 4.2.2 Disabilities

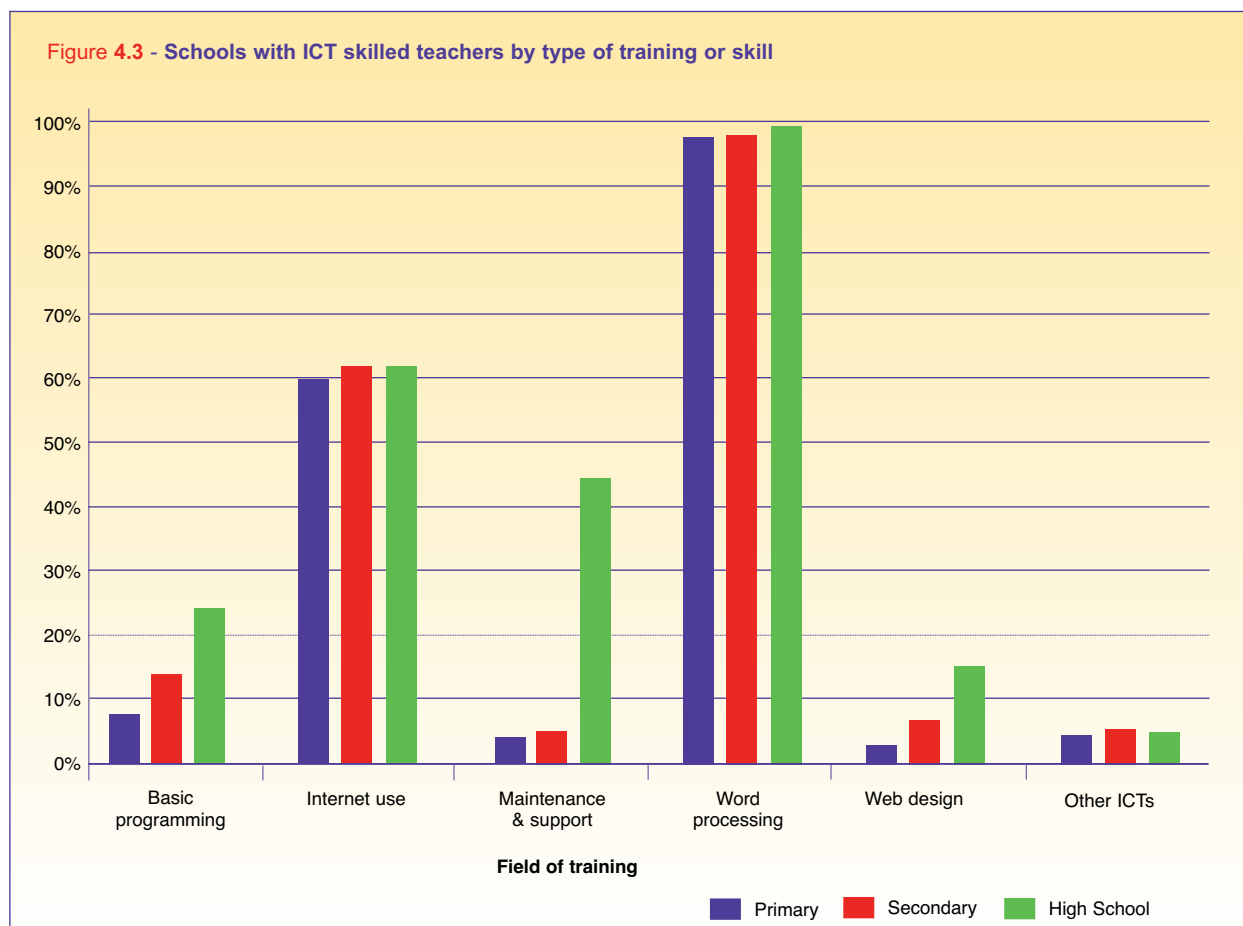
Fifty seven percent of the schools had students with disability while there was no reported disability for staff. Some schools recorded more than one form of disability among their students. Just above half (51%) of the schools with disabled students had students with non print disabilities, such as mental retardation. About 50 percent had paralyzed students, 31 percent had deaf and mute students, and 22 percent had the blind or visually impaired students. Overall, 4 percent of the surveyed schools had facilities of some kind for the disabled students. These included sign language skills for the deaf and mute, wheel chairs and walking aids for the paralyzed. Figure 4.2 shows the split of disabilities across the school levels. None of the listed facilities for the disabled was ICT related such as Braille and screen reader.



### 4.2.3 Computer awareness and appreciation among teachers

Slightly less than 70 percent of all the schools had teachers who had participated in at least one course on computer appreciation training. Among those schools, about 74 percent had teachers who were able to use Internet in their curriculum; a third of the schools had teachers with programming; and 27 percent had teachers trained in maintenance and support. Almost all schools (98%), had staff members who were able to type or produce a word document using a computer. A limited number of schools (19%) also had some teachers trained in web design. Figure 4.3 presents the proportion of schools with teachers trained in ICTs by level of the school.

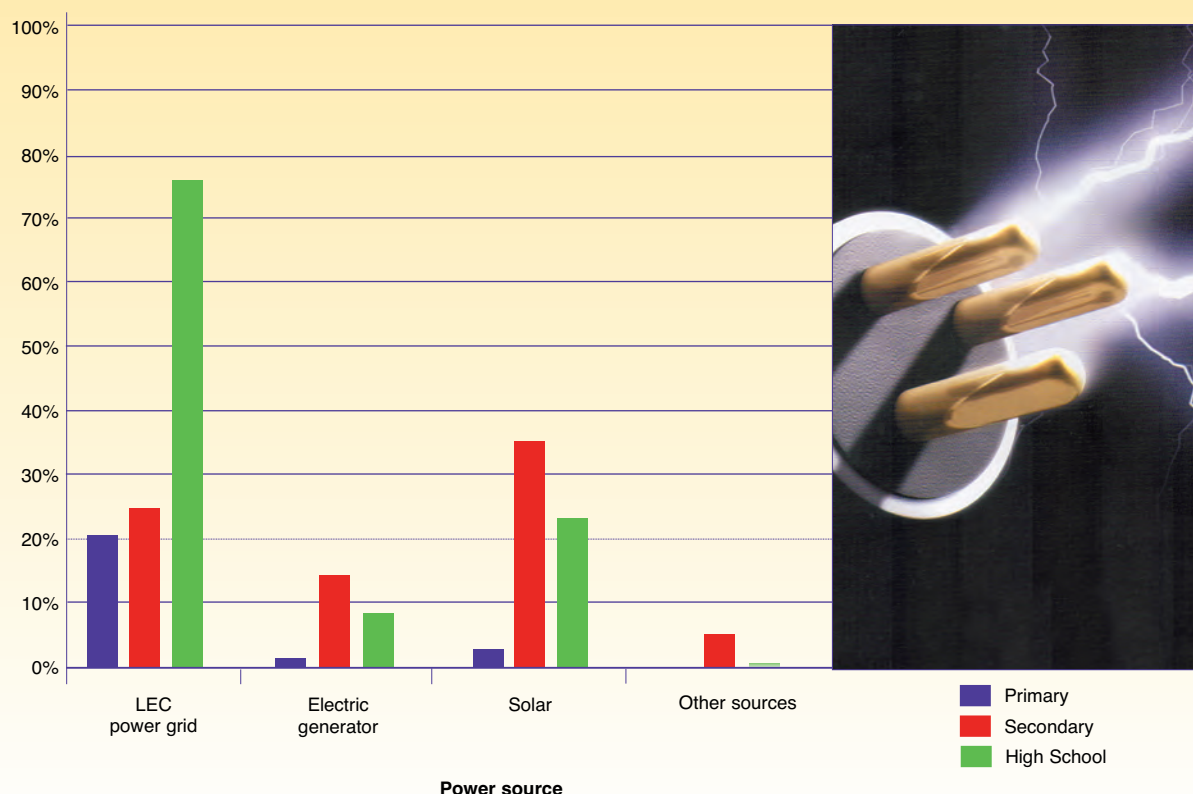
The survey also sought to establish whether the schools had any of their staff still enrolled for distance training, either by mail or online correspondence. Four percent of the primary schools had teachers who were enrolled for distance learning with ICT-component in 2007. Less than a third (32%) of the Secondary schools had teachers who were enrolled in e-learning/distance learning while 62 percent of high schools had teachers enrolled in such training.



### 4.3 Source of energy in schools

The costs of connectivity remain unaffordable for most schools in Lesotho while some are actually located some long distances away from the power grid, often in a difficult terrain. There is a huge disparity between urban and rural schools in terms of access to a reliable supply of electricity. Overall, 40 percent of the schools are connected to the power grid, 6 percent had invested in generators for energy, while 14 percent use solar energy and 0.9 percent use batteries and invertors to charge the staff mobile phones and to power other low consuming appliances. Figure 4.4 illustrates the proportion of schools with energy sources across the school levels.

Figure 4.4 - Schools with energy by source



## 4.4 ICT infrastructure, access and usage in schools

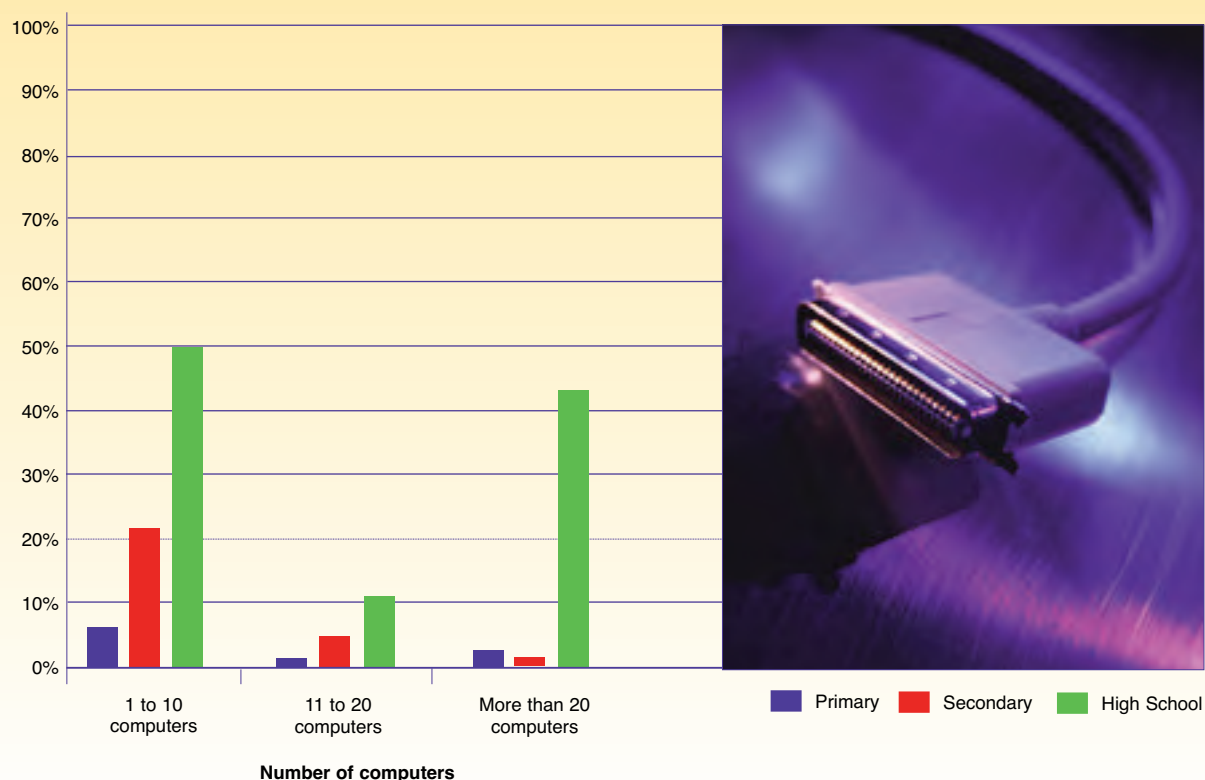
### 4.4.1 Presence of computers and servers

The dominant ICT access model in schools is the computer lab, involving between one and 60 mostly second-hand and refurbished computers, some of which are networked, although most are standalone computers. These computers are used both for administration as well as support tools to aid in teaching. Overall, it is estimated that more than two thousand (approximately 2,193) computers were available for educational use in the schools surveyed. Forty percent of these schools had computers in working condition.

Close to 70 percent of the schools with computers offer computer studies as a credit subject. Of these schools, 71 percent offered computer studies as a compulsory subject while others left it as an elective. Amongst the schools offering computer studies as an optional subject, about 45 percent of the students normally register for the subject. More importantly 6 percent of the schools had network points in their class rooms.



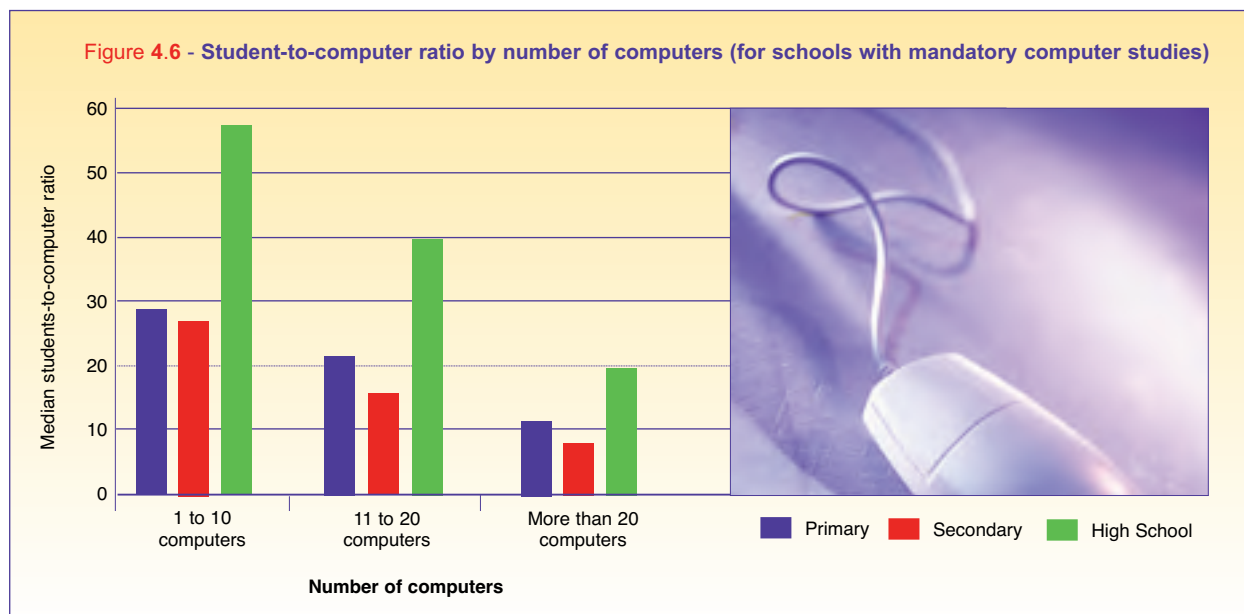
**Figure 4.5 - Schools with computers by category**



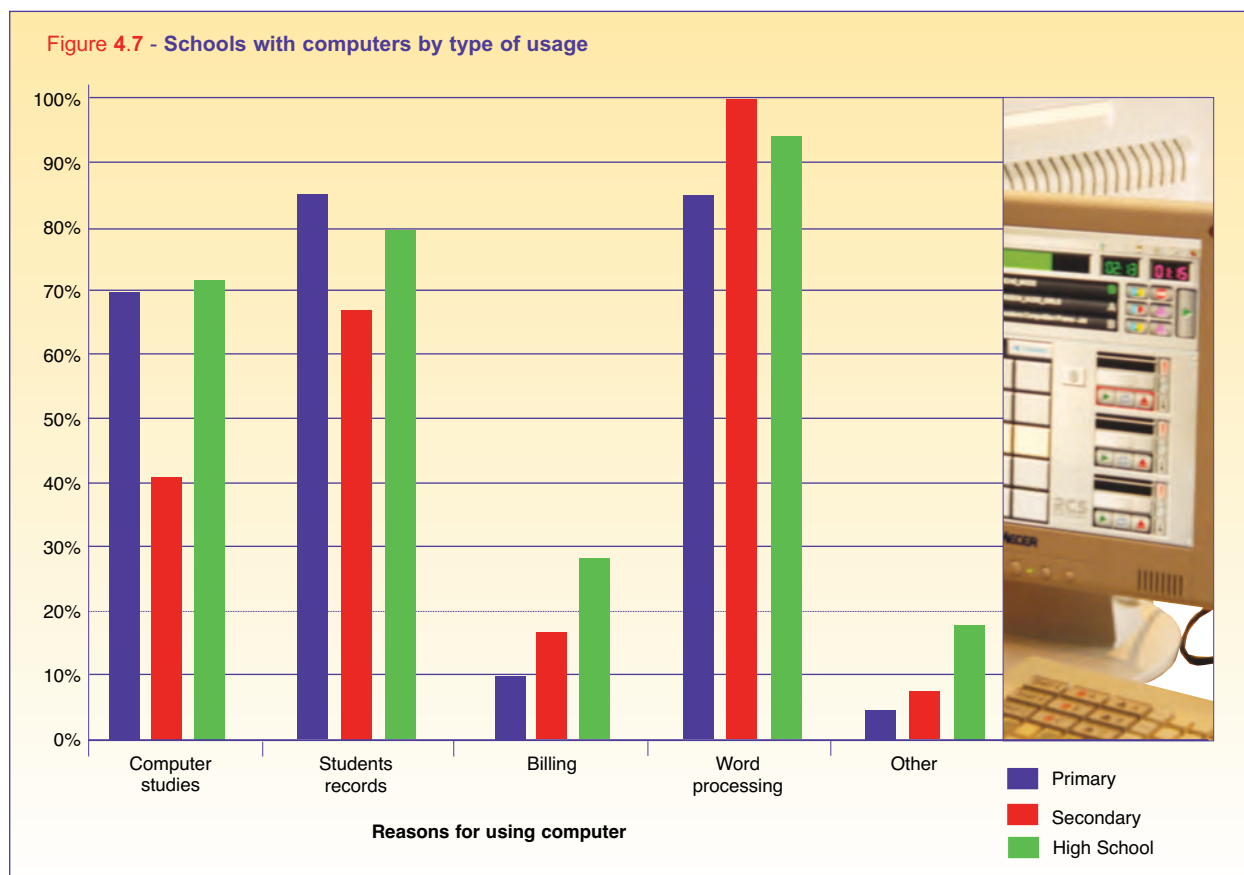
One of the major findings of the survey was the student-to-computer ratio, that is, the number of students per computer in the school (for schools with computers and offering computer studies as the compulsory subject). The median number of students per computer in primary schools was estimated at 14, for secondary schools 16 and for the high schools 21.

#### **Box 3: Median student-to-computer ratio**

To better explain how computer availability may vary between schools, the median of the ratio is used in this analysis. Unlike means, which may be influenced by higher values, median student-to-computer ratio indicate the typical number of students per computer, with half of the schools having more students per computer and half having less. For example, a “median” student-to computer ratio of 14 means that 50 percent of schools had 14 students or less per computer.



About 30 percent of the schools with computers reported to have regularly used computers for record keeping and 9 percent used them to process bills and payments. Slightly above 35 percent of the schools used computers for word processing, while only 6 percent used them for other purposes such as mathematical modelling on spreadsheets.



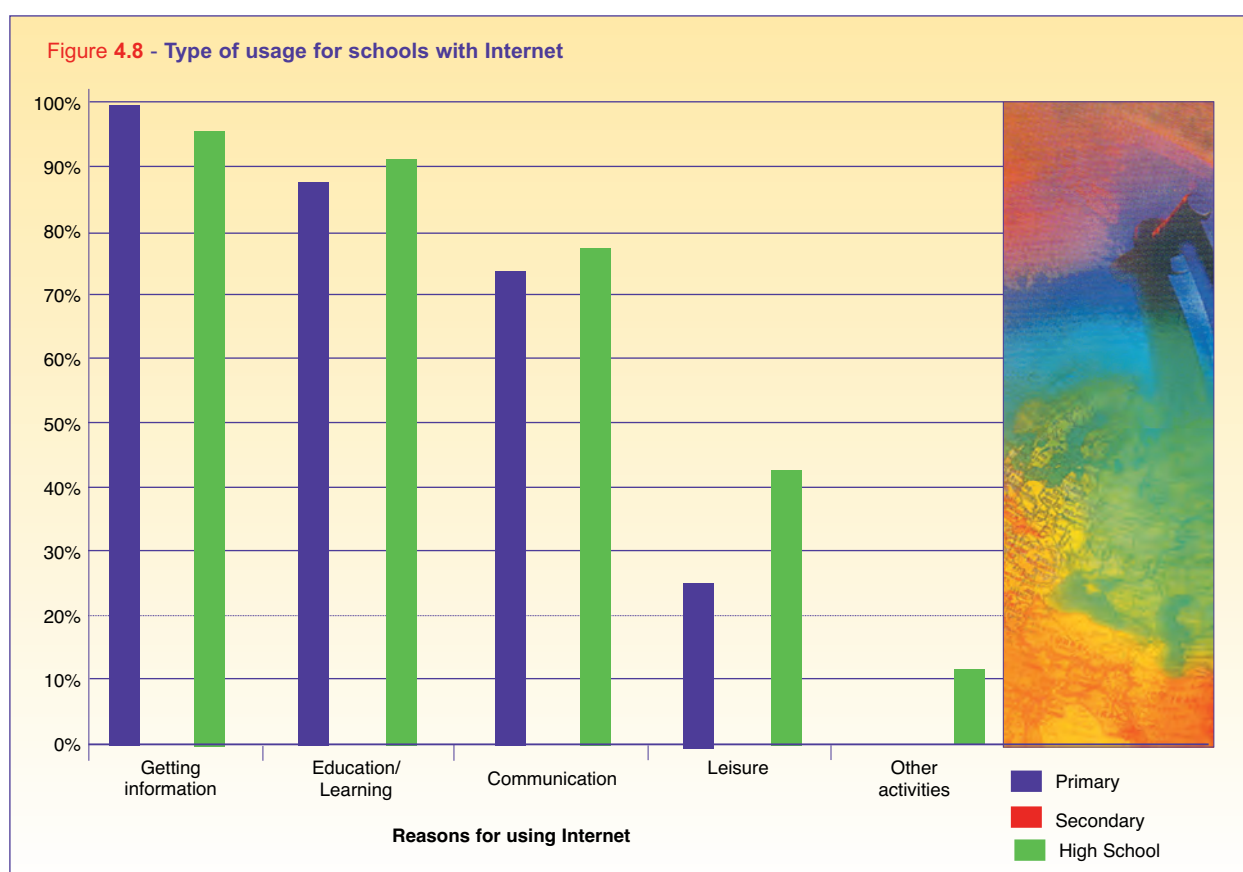
Only a limited number of schools (7.5%) had at least one network server with an average of 24 computers connected to the server. According to the respondents in the schools without computers, the main

obstacles to acquiring computers were lack of electricity; lack of funding, insufficient space, lack of ICT trained staff, and poor security.

#### 4.4.2 Internet connectivity

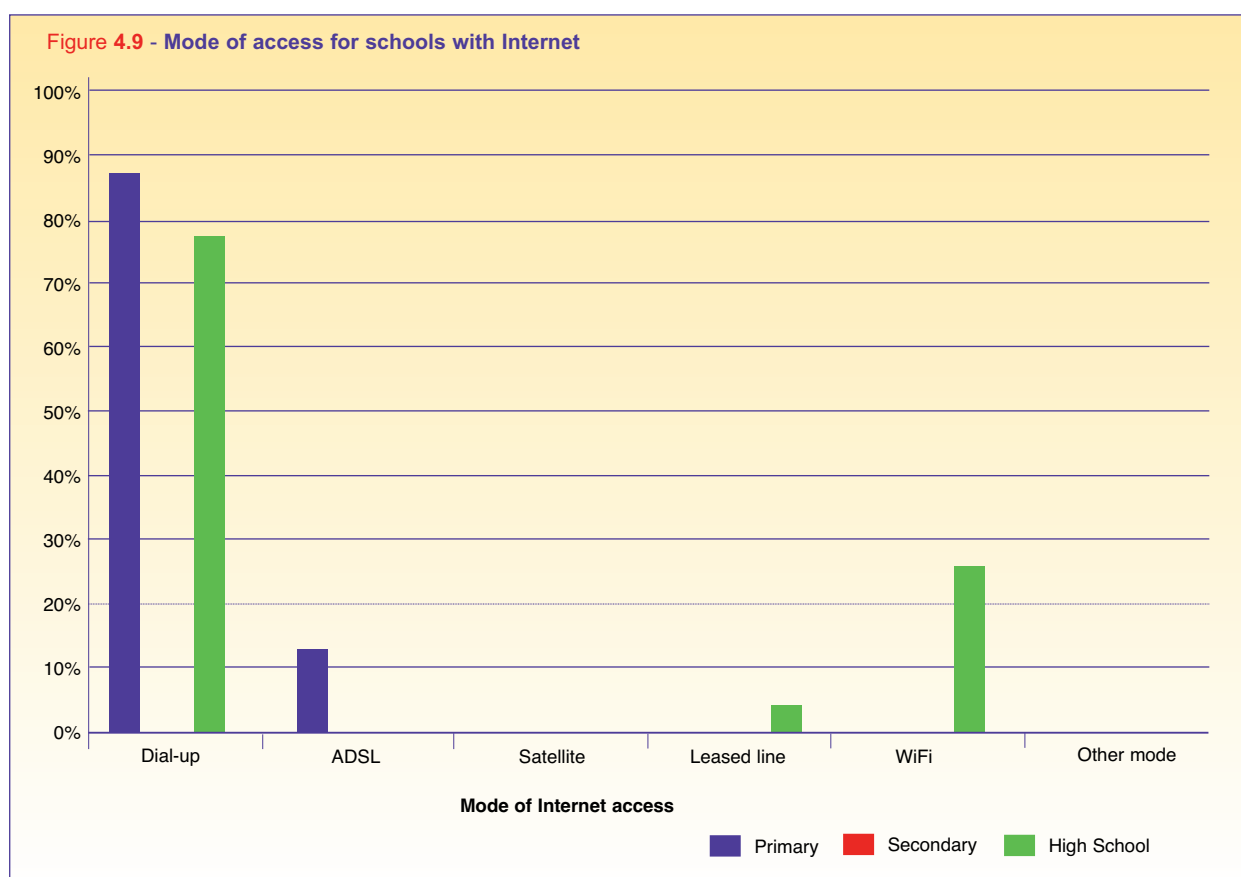
In Lesotho, the Ministry of Education has negotiated, at least in principle, Internet access to schools at reduced rates. However, majority of schools that own computers still do not have access to the Internet and they reported that the cost is prohibitive. For instance, only a quarter of the schools with computers had Internet connection with an average of 10 computers connected to Internet. Amongst the schools with computers but no Internet connection, 74 percent were not even envisioning to be connected in the foreseeable future while 26 percent were optimistic that they could be connected within three years from the time of the survey.

Almost all schools (98%) with Internet access reported using it to get information, 90 percent used it for education and learning, 77 percent used it for communication, only 38.7 percent reported to have used Internet for leisure activities (such as playing games, music etc). About 9.7 percent used Internet for other purposes such as e-mail. Figure 4.8 shows the proportion of schools (by school level) using Internet for different purposes.



There are many ways to connect to the Internet, but not all types of connections are available in every geographical area in the country. The results showed that the method of accessing the Internet varies according to the school location and its instructional level. Urban schools, for example, were more likely to use different modes of Internet access than their rural counterparts. The majority (81%) of the schools with Internet connection were connected via Dial-up telephone line with a modem, while only three percent was connected through ADSL and one percent through leased line.

The predominance of Dial-up connectivity reflects the relative access and spread of these technologies rather than preference as ADSL and other means of connectivity are preferred to the slower Dial-up, but their availability is limited to Maseru. Recent studies show that wireless networks are emerging as a cost-effective way of establishing connectivity among and within schools but the survey results indicate that only 19% of the schools with Internet connection were connected via WiFi service and no school covered in the survey used satellite for Internet connection. Figure 4.9 shows the proportion of schools by mode of Internet connection across the school levels.



Amongst the schools with Internet access, only about a quarter (26%) allowed students to freely surf Internet. The remaining three quarters (74%) of the schools with Internet connection, which did not allow students to access Internet reported that Internet was the preserve of teachers, to a larger extent the school principals.

#### 4.4.3 Web presence

Only two schools (one primary and one high school) reported to have a website (0.6%). Only the primary school with the website claimed to have used its website for research. Both schools reported to have used website to provide information and reported that their websites had never been updated since they were launched.

#### 4.4.4 Onsite presence of communication facilities and CPE

Inadequate communication facilities and/or equipment in schools remains a major bottleneck. For instance, only 10 percent of the schools had at least one fax machine, one percent use two-way radios for communication and less than a third (32%) use mobile phones for school purposes. About 8 percent

depend solely on post offices for communication. As for other ICT equipment, 58 percent and 23 percent of the schools reported having radios and television sets respectively. Only 3 percent of the schools had electronic cash registers for processing payments. Table 4.4 gives a detailed presentation of the proportion of schools with communication facilities and equipment across their respective levels.

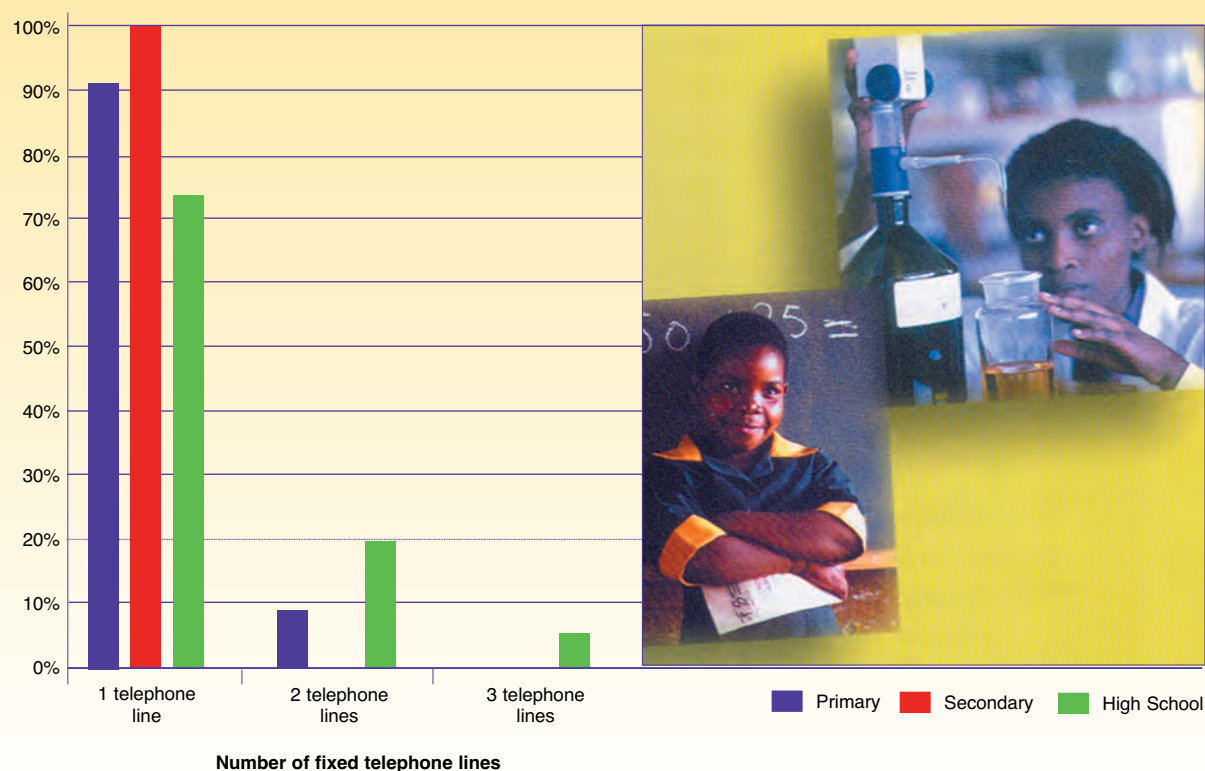
**Table 4.4 - Schools with communication facilities and other ICT equipment**

Communication facilities and other ICT equipment	Percentages per school level		
	Primary	Secondary	High
Schools with mobile phone	23.9	50	38.5
Schools with fixed telephone	19.9	22.5	63.5
Schools with facsimile machine	5.1	2.5	21.2
School using other communication facilities (e.g. E-mail and Postal services)	5.1	12.5	10.6
Schools with two-way radio	1.1	0	1.9
Schools with radio set	73.3	27.5	44.2
Schools with television set	7.4	15	53.8
Schools with electronic cash register	0.6	5	6.7



The telephone line and a personal computer are key components for Internet access in Lesotho. For example, Dial-up Internet access, being the most common mode of connection, requires a telephone line and personal computer (with a modem), but only 34 percent of the schools had a fixed line telephone. Of those owning a fixed line telephone, 82 percent had only one line, 14 percent had two telephone lines and four percent had three telephone lines<sup>12</sup>. See Figure 4.10 for a breakdown by school level.

**Figure 4.10 - Schools with fixed telephone lines by number of lines**



<sup>12</sup> The network operators had not introduced mobile internet connectivity at the time of the survey.

While most schools did not have a direct fixed line, at least three quarters of them (76%) had access to a public payphone located near the school premises or within the easy reach of students and teachers. On the average, students and staff had to walk close to nine minutes to access the nearest public payphone. Access to Internet cafés varied by geographical area of the schools as well. Only urban and peri-urban schools had Internet cafés located within the easy reach of their students and staff. About 12 percent of the schools had Internet cafés in their locality, accessible within an average walking time of 19 minutes. Table 4.5 shows the proportion of schools (by school level) with Internet café or public phone access and the average walking time to reach them.

**Table 4.5 - Schools with access to public payphones, Internet cafés and the mean access time**

School level	Access in percentages		Average time in minutes	
	Public payphone	Internet café	Public payphone	Internet café
Primary	54.5	35	10	18
Secondary	11.9	2.7	10	15
High school	33.6	62.2	6	19



#### 4.4.5 ICT support

Schools across Lesotho have experienced significant use of second-hand and refurbished computers. In order to sustain quality use, the initial installation of ICT needs to be followed by ongoing maintenance and technical support (fixing ICT problems and answering requests from users). Naturally, the amount of technical support required depends on the number of computers, the number and type of applications and the intensity of use. The influx of these second-hand computers has led to the establishment of local computer refurbishment and technical service centres. Close to 20 percent of the primary schools owning computers had some of their staff members who support the deployment and maintenance of computers. Secondary schools owning computers reported to fully out-source the ICT support, whereas 29 percent of high schools had the in-house ICT support and 71 percent outsourced all ICT support services.



**Table 4.6 - Integration of ICTs in schools**

	School level	Percentage of schools owning computers	Percentage of schools with network Server	Average number of computers connected to the server (schools with a network server)	Average number of computers connected to Internet (schools with Internet connection)	Number of schools with network points in class rooms	Percentage of schools offering computer studies as a credit subject (schools with computers)	Percentage of schools with computer studies (schools with mandatory computer studies)	Percentage of students taking computer studies (schools having computers studies but not mandatory)
Schools with 1 to 10 computers	Primary	5.7	-	-	1	1	20	21.2	40
	Secondary	22.5	2.5	8	0	1	16.7	40	-
	High school	50	1	5	1	2	8.8	9.2	80
Schools with 11 to 20 computers	Primary	1.7	0.6	21	4	-	15	7.1	36
	Secondary	5	-	-	1	-	16.7	40	-
	High school	11.5	2.9	10	1	2	13.2	13.8	45
Schools with More than 20 computers	Primary	3.9	2.3	25	11	2	35	35.7	37.5
	Secondary	2.5	-	-	-	-	8.3	20	-
	High school	44.2	13.5	27	13	10	49.5	47.7	47.9

## Chapter 5: ICT in Hospitality Business

### 5.1 Introduction

#### 5.1.1 The structure of accommodation and hospitality industry

The Lesotho tourism industry is made up of a mix of interrelated service providers. These include accommodation and hospitality providers, travel agencies, public sector organisations and other industry players such as insurance and car hire companies. All of these stakeholders are expected to work in tandem to promote the industry and bring local and international tourists to their destinations of choice. The Lesotho Tourism Development Corporation is the regulatory body charged with the primary mandate of promoting and facilitating the development of the industry in Lesotho.

Hospitality facilities and services are a vital component of this growing but young multi-stakeholder industry which has a great potential for foreign exchange earnings. The key hospitality facilities include hotels, lodges, guesthouses, bed & breakfasts (B&B). Some of the lodges are an integral part of the tourist destinations such as nature reserves and national parks. For the growth and development of this industry, it is critical that ICTs become an integral part of doing business and contribute to cost savings. ICTs should not only benefit the business to market itself 24 hours on the web and let tourists book online, but should also get guests to remain connected with their families and workplaces as some may actually be business visitors. However, the utilization of ICTs by the hospitality facilities remains very low in Lesotho and has not been documented before. This study sought to fill that void by providing information that should aid the relevant policy makers, potential investors as well as existing communications service providers.

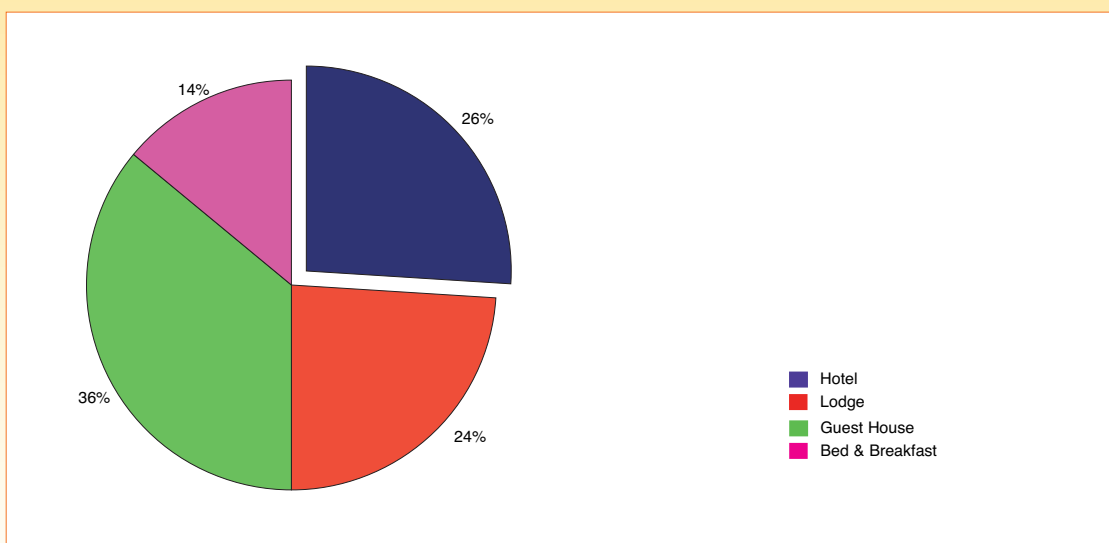
#### 5.1.2 The scope of the survey

The study covered all the accommodation establishments registered with the Lesotho Tourism Development Corporation. Close to half (48%) of the establishments were located in the countryside, with 36 percent in the urban centres and 10 percent in the peri-urban areas. Together these establishments attracted more than ten thousand tourists in one month in the year 2007, with the minimum of six guests and maximum of 1200 guests in a month, reflective of quite a wide variability among them. This includes both international and domestic guests. Table 5.1 shows the number of establishments included in the census while Figure 5.1 gives the proportional breakdown. The defining feature of these accommodation establishments, among others, is that a hotel should have a minimum of twenty guestrooms, a lodge sixteen, a guesthouse four and a bed & breakfast two.

**Table 5.1 - The Lesotho accommodation establishments**

Type of accommodation establishment	Number	Percentages
Hotel	20	26
Lodge	19	24
Guest House	28	36
Bed and Breakfast (B&B)	11	14



**Figure 5.1 - Breakdown of accommodation establishments**

## 5.2 Profile of the hospitality business employees

As illustrated in Table 5.2, there were more female employees in all establishments compared to their male employee counterparts. Reflective of their large capacities, hotels had the highest average number of employees (36), by comparison to 17 for lodges, guesthouses eight and bed & breakfasts 10. As expected, hotels had more guest rooms than other establishments, with an average of 49 guest rooms, lodges had 21, guesthouses had 12 while bed & breakfasts had 11. Differences are also demonstrable in the dispersion of the guests across the types of the accommodation establishments per month. Hotels accommodated 246 guests per month on average, lodges 178 guests, guesthouses 78 guests while bed & breakfast accommodated 56 guests.

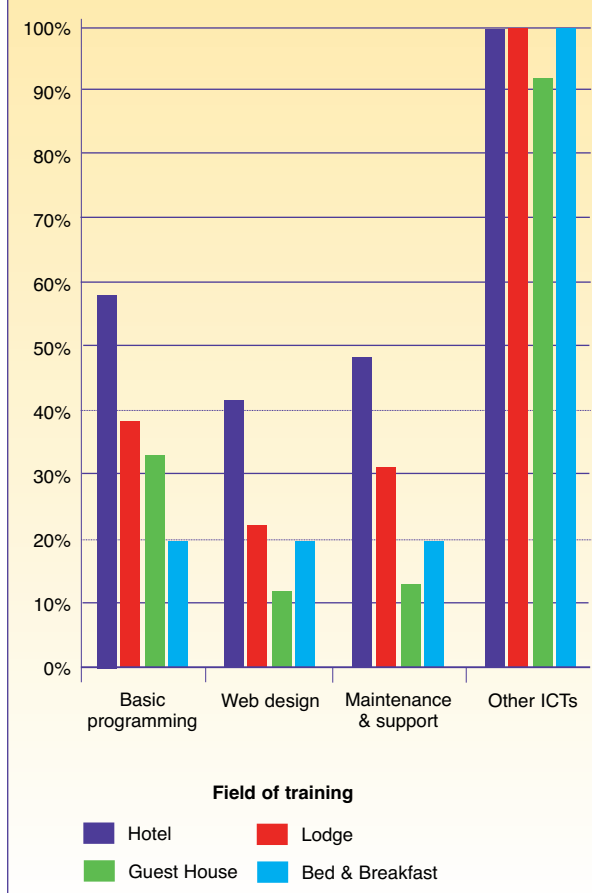
**Table 5.2 - Number of employees, guests and guest rooms by type of establishment**

Business type	Average number of employees		Average number of quest rooms	Average number of guests per month	Percentage of establishments with expatriates
	Male	Female			
Hotel	15	20	49	246	35
Lodge	7	10	21	178	14
Guesthouse	3	5	12	78	37
Bed & Breakfast	5	6	11	56	27

### 5.2.1 Computer awareness and appreciation

A little less than three out of four (73%) of the service providers had at least one staff member who was trained in ICT related courses. In terms of important technical skills such as programming, maintenance and web design, the hotels were better served than the other service categories (Figure 5.2). For instance, almost three fifths (58%) of the hotels had staff trained in basic programming compared to lodges with two fifths (39%) with the other categories registering no more than a third. Almost all these service establishments had staff that was skilled in word-processing.

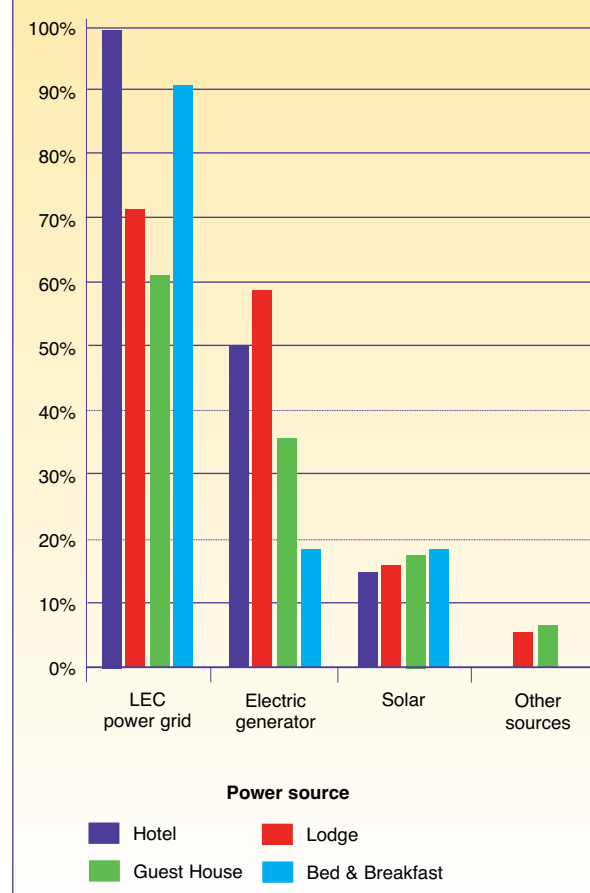
**Figure 5.2 - Accommodation establishments with ICT skilled employees by type of training or skill**



### 5.2.2 Source of energy in accommodation establishments

All the hotels sourced energy from the main power grid, and half of them also had an electric generator to provide for redundancy with another 15 percent having solar systems as an extra back-up. Compared to hotels, the lodges, though second to hotels in most facilities, had a much lower percentage (63%) of them connected to the main electricity grid. As a consequence, they tended to depend more heavily on generators (57%) for energy than was the case with hotels. Sixteen percent of the lodges also used solar energy for back-up provision. The majority, in excess of 70 percent of the guesthouses had the main grid power supply and slightly above one third had invested in electric generators for back-up, and 10 percent had solar energy. Only seven percent of the establishments (some lodges and guesthouses) reported to have used batteries to power televisions and radios.

**Figure 5.3 - Accommodation establishments with energy by source**

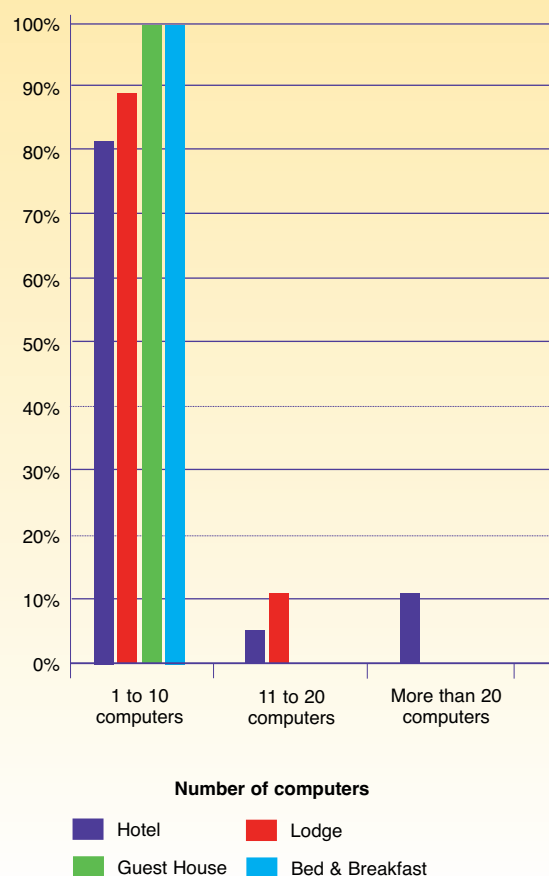


### 5.3 ICT infrastructure, access and usage in accommodation establishments

#### 5.3.1 Presence of computers and servers

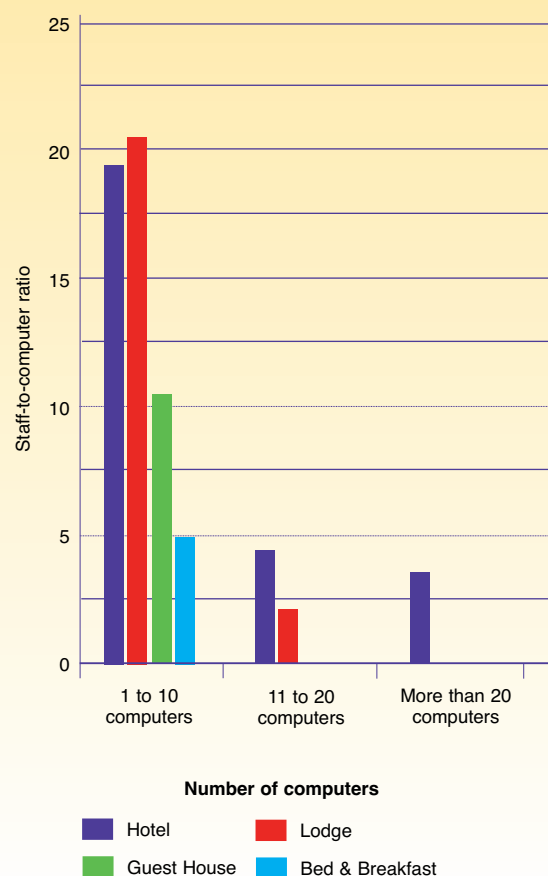
Some establishments had computers for business purposes and 85 percent of the hotels had them compared to the bed & breakfasts (64%), lodges with 47 percent and guesthouses at 39 percent. Only 10 percent of the establishments had network servers and three quarters of those were the hotels. Figure 5.4 presents a detailed breakdown in terms of the number of computers in a cluster by the type of establishment for those establishments with computers. The bulk of the establishments have one to ten computers with only the hotels having more than 20 computers per establishment.

**Figure 5.4 - Accommodation establishments with computers by category**



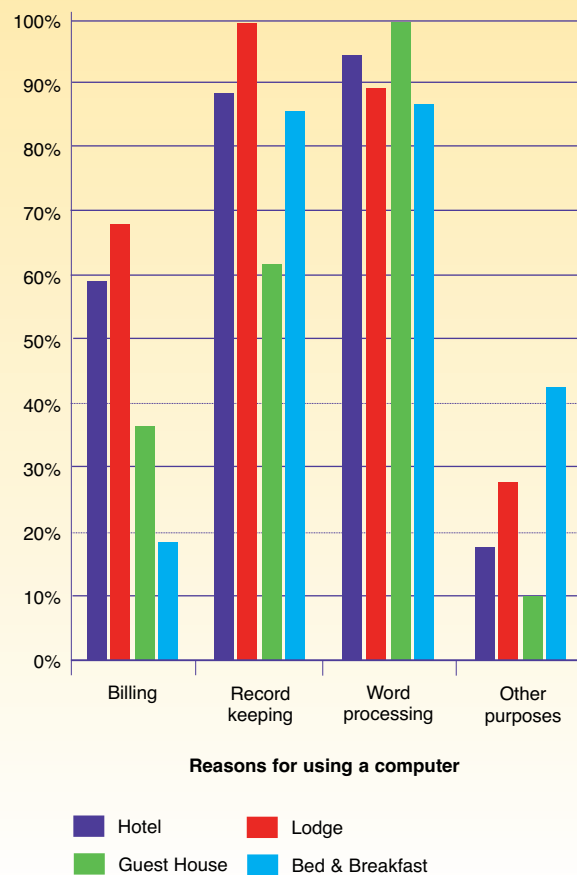
The average number of employees to computers was estimated at 16 for hotels, 19 for lodges, 11 for guesthouses and 5 for bed & breakfasts. (See Figure 5.5 for detailed breakdown).

**Figure 5.5 - Staff-to-computer ratio by number of computers (establishments with computers)**

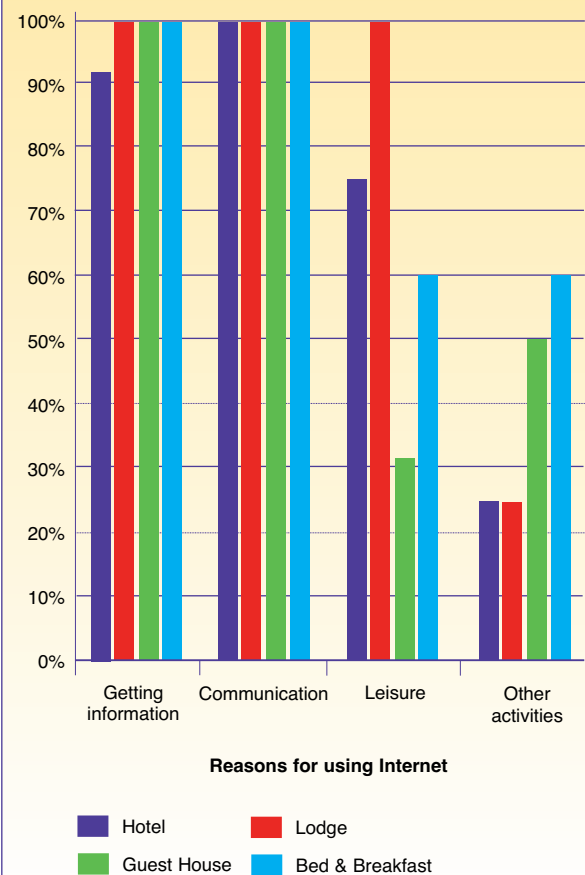


As Figure 5.6 shows, the main function carried out was word processing (93%), followed closely by record keeping at 84 percent. Some 50 percent used their computers for billing. In relation to "other" category, the most dominant usage of computers reported by our respondents (22%) was in spreadsheet.

**Figure 5.6 - Accommodation establishments with computers by type of usage**



**Figure 5.7 - Accommodation establishments with Internet connectivity by type of usage**

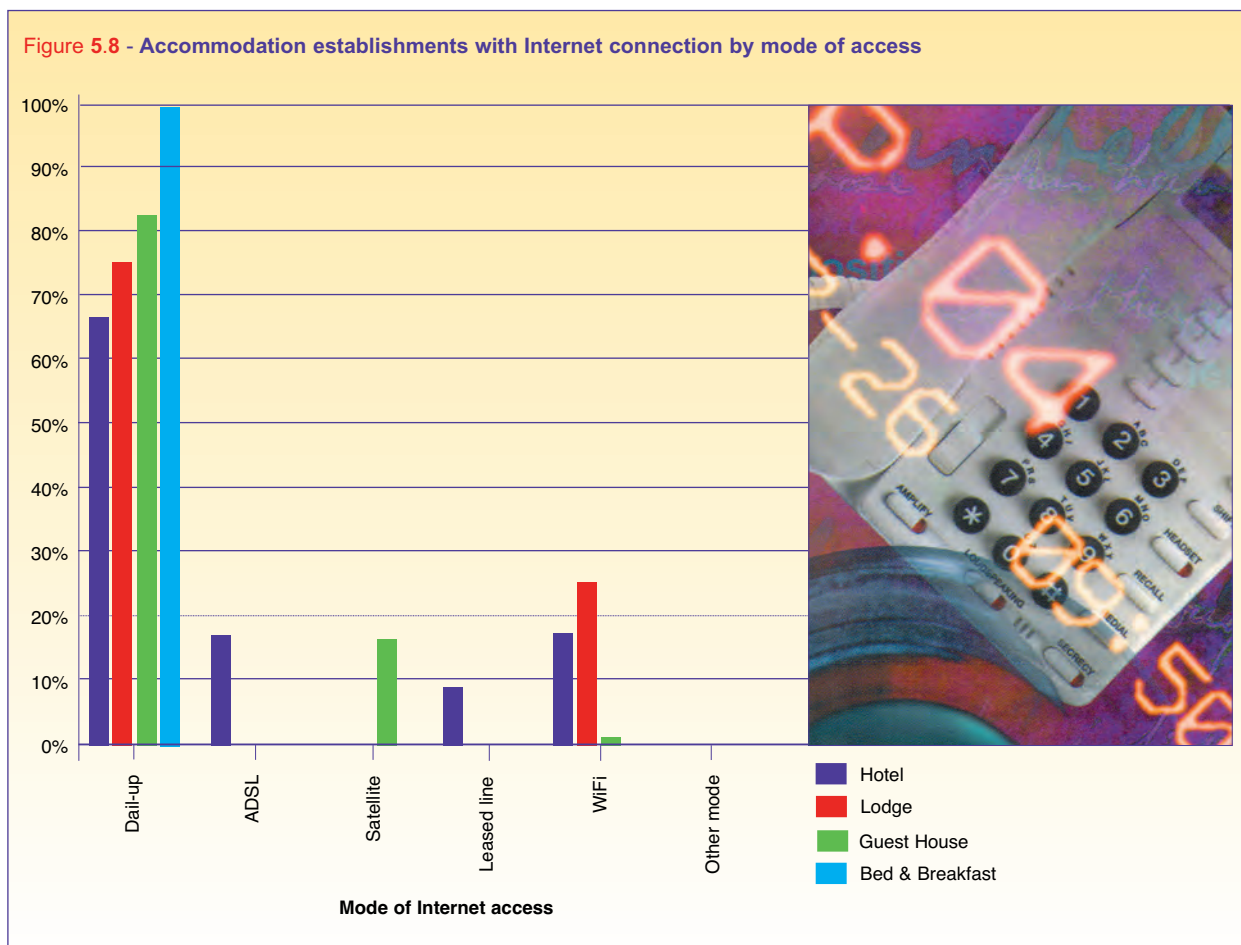


### 5.3.2 Internet connectivity

More than 60 percent of the establishments with computers had Internet connection, and almost all of them used Internet for communication and information sourcing. Three quarters of the hotels with Internet connection used Internet for leisure, with all of the lodges using it for leisure activities. Only one third of the guesthouses had used Internet for the same reason, while 60 percent of the bed & breakfasts had also used Internet for leisure. For the unconnected establishments with computers, majority were not even planning to connect, with only a few intending to connect in the foreseeable future.

In relation to Internet connection methods, 67 percent of hotels, three quarters of lodges, 83 percent of guesthouses and all bed & breakfast establishments with Internet used a standard telephone line (dial-up mode of Internet access). Seventeen percent and eight percent of hotels used ADSL and leased line respectively. Seventeen percent of guesthouses used satellite and none of the establishments had a broadband connectivity. Only 17 percent of hotels and a quarter of lodges had WiFi access covering the hotel premises, including the guest rooms, meeting rooms and public areas.





### 5.3.3 Web presence

The majority (93%) of the establishments with Internet connection also had a website. Further analysis showed that three quarters of establishments with a website had a website specifically designed for them while one quarter of those had a website hosted elsewhere (e.g. Sun International hotels have one website carrying information of different hotels falling under the umbrella of Sun International hotels). Notably, no bed & breakfast establishment had a website. Seventy eight percent of hotels, 83 percent of lodges, and 70 percent of guesthouses had websites specifically designed for them. Others, 22 percent of hotels, 17 percent of lodges and 30 percent of guesthouses had websites hosted elsewhere.

In relation to promoting their business on-line, all establishments with websites were on the affirmative. All establishments who promoted on-line (who have website) advertise and post information on websites. Seventy eight percent of hotels, 83 percent of lodges and 30 percent of guesthouses executed e-transactions. Less than 20 percent of lodges and nearly the same number of guesthouses used their websites for other purposes. When asked for their individual website addresses, the majority of accommodation providers gave a group/chain address, indicating that most on-line promotion is carried out as members of chain/marketing groups. Table 5.3 provides the frequency of the website updates.

**Table 5.3 - Accommodation establishments with website by frequency of web updates**

Frequency of website update	Hotels	Lodges	Guest House	Bed & Breakfast
Quarterly	37.5	0	0	No website
Semi-annually	12.5	0	0	No website
Annually	37.5	33.3	37.5	No website
Do not know	12.5	66.7	62.5	No website



### 5.3.4 Onsite presence of communication facilities and CPE

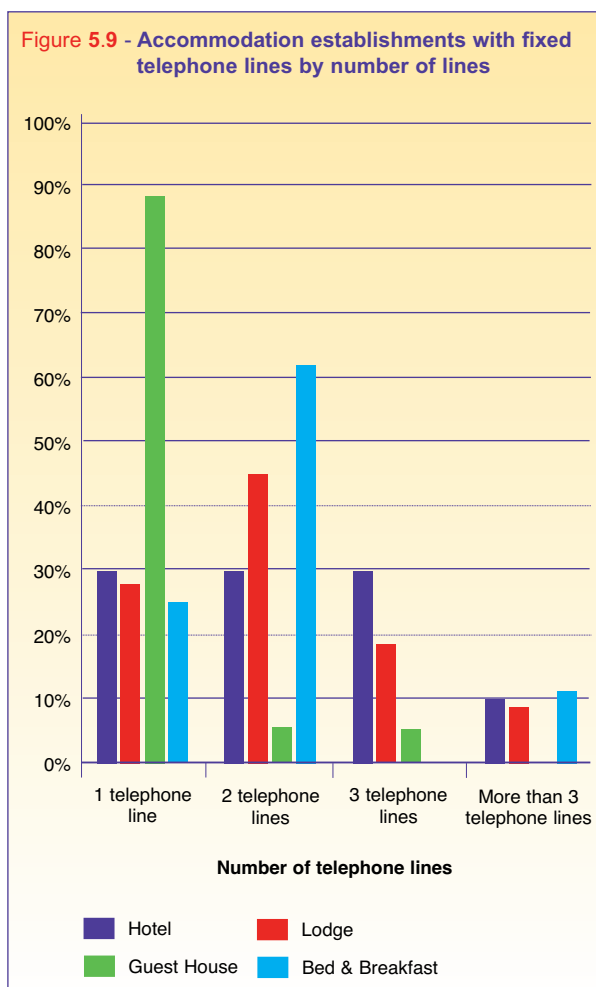
The most common technologies used for communication and information purposes in the accommodation sector were fixed telephones, faxes, mobile phones, computers, radio and television sets. Table 5.4 presents the proportion of the accommodation providers with communication and information facilities and equipment.

**Table 5.4 - Proportion of accommodation establishments with communication facilities and CPE**

Accommodation establishments with communication facilities and customer premises equipment		Hotel	Lodge	Guesthouse	Bed & Breakfast
Fixed telephone line in the	Guest rooms	-	-	-	-
	Offices	100	57.9	57.1	72.7
	Conference hall	-	-	-	-
Fixed telephone extension in the	Guest rooms	60	5.3	0	0
	Offices	100	57.9	57.1	38
	Conference hall	0	47.4	35.7	45.5
Facsimile machine in the	Guest rooms	-	-	-	-
	Offices	85	36.8	32.1	45.5
	Conference hall	-	-	-	-
Two-way radios in the	Guest rooms	5	5.3	0	0
	Offices	10	15.8	14.3	0
	Conference hall	0	47.4	35.7	45.5
Radio sets in the	Guest rooms	10	5.3	10.7	18.2
	Offices	-	-	-	-
	Conference hall	-	-	-	-
Television sets in the	Guest rooms	100	42.1	28.6	63.6
	Offices	-	-	-	-
	Conference hall	0	47.4	35.7	45.5
Electronic cash register in the	Guest rooms	-	-	-	-
	Offices	75	42.1	21.4	36.4
	Conference hall	-	-	-	-



Among the accommodation establishments with fixed telephone lines, majority (46%) had only one fixed line, 30 percent had two fixed lines, 16 percent had three fixed lines and only 7 percent had more than three fixed lines and those were mostly the hotels on the aggregate. See Figure 5.9 for disaggregated data in terms of number of lines and type of establishment.

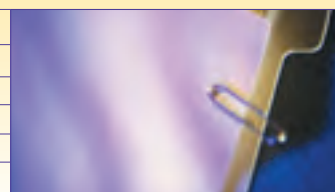


The nature and the business imperatives of the accommodation providers oblige the sector to have adequate communication infrastructure. But in Lesotho, we still have close to 28 percent of the establishments without fixed telephone lines. Those were mainly the guesthouses and B&Bs which are usually family businesses. The vast majority of the accommodation establishments reported to have a public payphone located near or in the business premises. On the average, employees and guests have to walk a minimum of four minutes to access the nearest public payphone.

Access to Internet cafés varied by geographical area of the accommodation establishments as well. Only urban and peri-urban establishments had Internet cafés located within the easy reach of their staff and guests. About 31 percent of the establishments had Internet cafés in their locality, accessible within an average walking time of 12 minutes. Table 5.5 shows the proportion of businesses (by establishment type) with Internet and public phone access and the average walking time to reach them.

**Table 5.5 - Accommodation establishments with access to public payphones, Internet cafés and the mean access time**

Establishment type	Access in percentages		Average time in minutes	
	Public payphone	Internet café	Public payphone	Internet café
Hotel	100	75	4	12
Lodge	63.2	0	7	-
Guesthouse	82.1	21.4	8	13
Bed & Breakfast	81.8	27.3	5	14



### 5.3.5 ICT Support

Overall, a fairly small number (23%) of the establishments using computers had “in-house” ICT support provided by their staff. Table 5.6 illustrates the proportion of accommodation establishments with computers and the ICT support.

**Table 5.6 - Accommodation establishments with access to ICT support**

Establishment type	In-house	Out-source
Hotels	35	65
Lodges	37	63
Guesthouses	0	100
Bed & Breakfast	14	86



**Table 5.7 - Integration of ICTs in accommodation establishments**

	Establishment type	Percentage of establishments owning computers	Percentage of establishments with a network server	Average number of computers connected to the server (establishments with a network server)	Average number of computers connected to Internet (establishments with Internet connection)
Establishments with 1 to 10 computers	Hotel	70	15	5	3
	Lodge	42.1	3.8	3	1
	Guesthouse	39.3	0	0	1
	Bed & Breakfast	63.6	9.1	4	2
Establishments with 11 to 20 computers	Hotel	5	5	10	10
	Lodge	5.3	0	0	0
	Guesthouse	0	0	0	0
	Bed & Breakfast	0	0	0	0
Establishments with More than 20 computers	Hotel	10	10	24	18
	Lodge	0	0	0	0
	Guesthouse	0	0	0	0
	Bed & Breakfast	0	0	0	0

## Chapter 6: ICT in Health Facilities

### 6.1 The structure and organisation of the Lesotho health system

The health system in Lesotho can be divided into three tiers. At the primary level, there are health posts which provide basic services and operate at some regular intervals other than daily. Included in this level are the health centres (medi-clinics, filter-clinics, nursing homes, surgeries etc) which provide basic preventive, promotive, curative and rehabilitative services. The primary level is followed by the secondary level which comprises 16 district hospitals that provide services similar to health centres, though at this level services are more comprehensive. The tertiary level covers Queen Elizabeth II Hospital, Mohlomi Mental Hospital, Bots'abelo Leprosy Hospital and Sankatana AIDS Clinic which are referral points. These provide specialised referral services for all the district hospitals in the country (Ministry of Health and Social Welfare).

In Lesotho, the health service sector is geared to experience a fundamental change, especially in and between hospitals. For example, it is faced with changing patterns of diseases, as well as technological capabilities. These health services are subject to constant impulses from the national government and insurance companies to improve efficiency and effectiveness. Due to these changing dynamics of organisational, socio-economic developments, and the rapid technological advancements, health service providers are now becoming aware of the potential value of integrated services and the collaborative advantage of using ICTs in their day to day operations. These will be significantly promoted, directly and indirectly under the US-funded Millennium Challenge Corporation development program. In this chapter we focus on measuring ICT use and infrastructure in health services covering:

- the number of computers available to health service providers,
- the connectivity of the health services,
- the number of Internet-connected computers available to staff (doctors, nurses, etc), the modes of connection used to access the Internet,
- the proportion of service providers with network servers and website, as well as the presence of various information and communication facilities such as mobile phones, fax machines, two-way radios.

Table 6.1 presents the number of the health services registered with the Ministry of Health and Social Welfare in 2007.

**Table 6.1 - Lesotho health facilities, 2007**

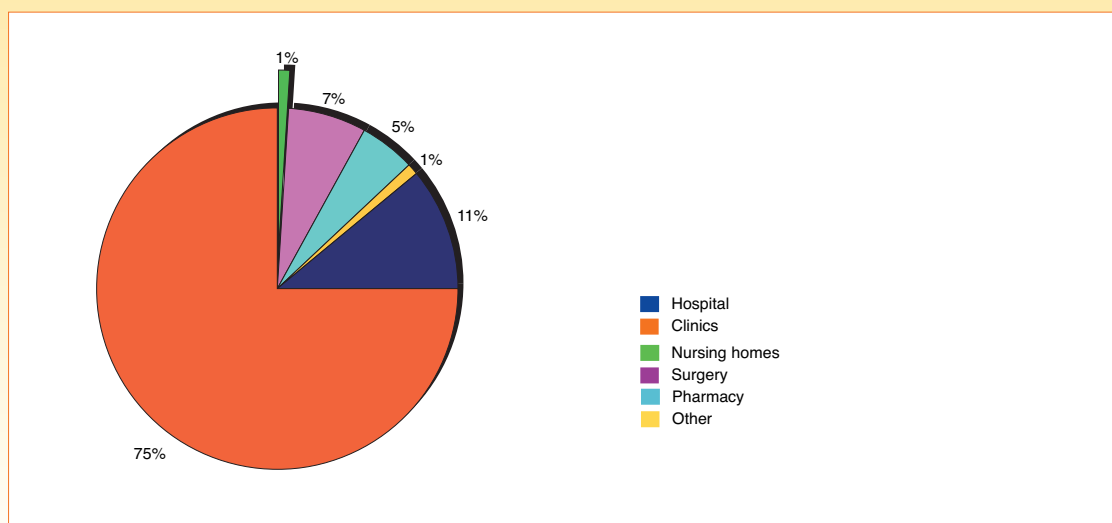
Type of the health facilities/services	Number of health facilities
Hospitals	23
Health centres/Clinics	210
Nursing homes	2
Other	7
<b>Total</b>	<b>242</b>

Source: Ministry of Health and Social Welfare

### 6.2 The scope of the survey

The survey concentrated mainly on the hospitals, health centres/clinics, nursing homes, surgeries, pharmacies and other health service providers/associations such as Lesotho Planned Parenthood Associations (L.P.P.A) and maternity homes. The results presented in this chapter are based on the sample of 142 health service providers, 11 percent of which were hospitals, three quarters clinics, seven percent surgeries, and five percent pharmacies.

Figure 6.1 - The proportion of Lesotho health services



In terms of ownership and administration of the health services, the government is a significant player, understandably so, given that health services are a distinctive public good, particularly for a developing country like Lesotho. For instance, the public health entities constituted a third of all the facilities surveyed. Similarly, churches have historically assumed a critical role in the provision of social services as well, accounting for almost two out of five (37%) of the facilities surveyed. These missionary entities are administered under the curatorship of the Christian Health Association of Lesotho (CHAL). Private health services made up 30 percent of all facilities. Table 6.2 shows the ownership of the health services by type or category.

Table 6.2 - Percentage ownership of the health services by type

Type of the health service	Ownership of the health service			
	Public	Missionary (CHAL) <sup>13</sup>	Private	Total
Hospital	40	47	13	100
Clinics/Health centre	36	42	22	100
Nursing home	50	50	0	100
Surgery	10	0	90	100
Pharmacy	0	0	100	100
Other	50	0	50	100
<b>Total</b>	<b>33</b>	<b>37</b>	<b>30</b>	<b>100</b>



### 6.3 Profile of the health facilities personnel

Forty two percent of the health service providers had at least one medical doctor. A little more than three out of every five (64%) health service facilities had one doctor while some had doctors ranging from two up to nine. However, there were facilities that did not have doctors based at the facility, but which would have scheduled visits, say once or twice a week. Most of the facilities (97%), had at least one nurse, nurse assistant or clinical nurse. Thirty percent of the health service providers had some professional staff who

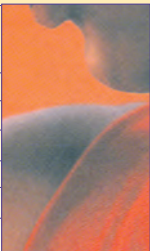
<sup>13</sup> Christian Health Association Lesotho - is an amalgamation of Christian churches that are committed to the provision of quality health services to Basotho particularly in remote areas of the country.



were expatriates. This is demonstrative of the acute shortage of local health professionals, especially with the current burden of diseases on the health system, particularly HIV/AIDS related illnesses. The shortage is more glaring in hospitals where four out of five have at least one expatriate doctor.

**Table 6.3 - The health facilities by profession of employees**

Type of the health services	Percentage of health facilities with the type of professionals				Percentage of health services with expatriates
	Doctors	Nurses	Pharmacists	Other (e.g. receptionist)	
Hospital	93	100	73	93	80
Clinics/Health centre	31	98	18	87	25
Nursing home	0	100	50	50	50
Surgery	100	80	60	90	10
Pharmacy	86	86	71	57	14
Other	50	100	0	0	0



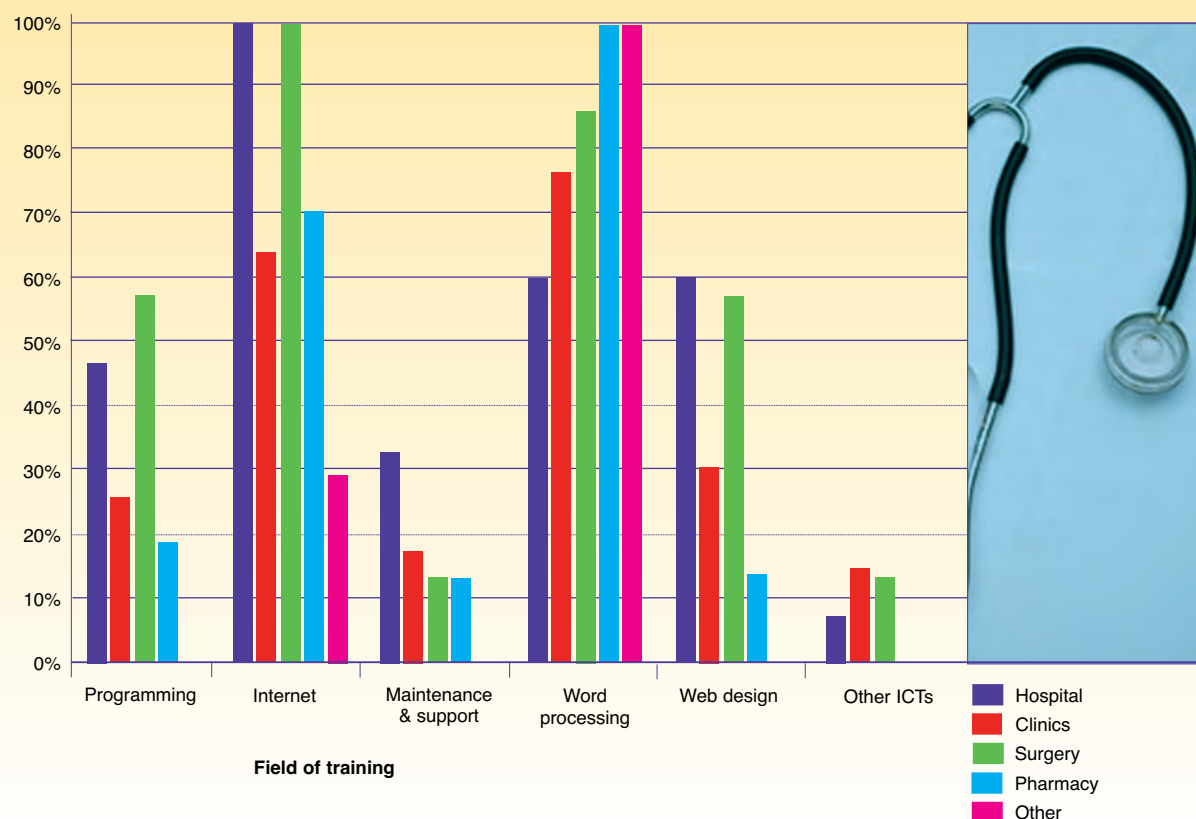
### 6.3.1 Disabilities

Eight percent of the health services had staff members who were living with some disabilities. Three hospitals had members of their staff who were paralysed, and nine clinics recorded more than one form of disability among their employees. Four reported to have paralysed employees, two had deaf or mute employees and the same number had blind employees, only one clinic reported to have employees with other forms of disability such as periodical or seasonal mental disorder. Overall, 25 percent of the surveyed health services had some disability facilities for disabled staff and patients. These included wheel chairs, ramps and working aids. However, none of these were ICT related support systems.

### 6.3.2 Computer awareness and appreciation

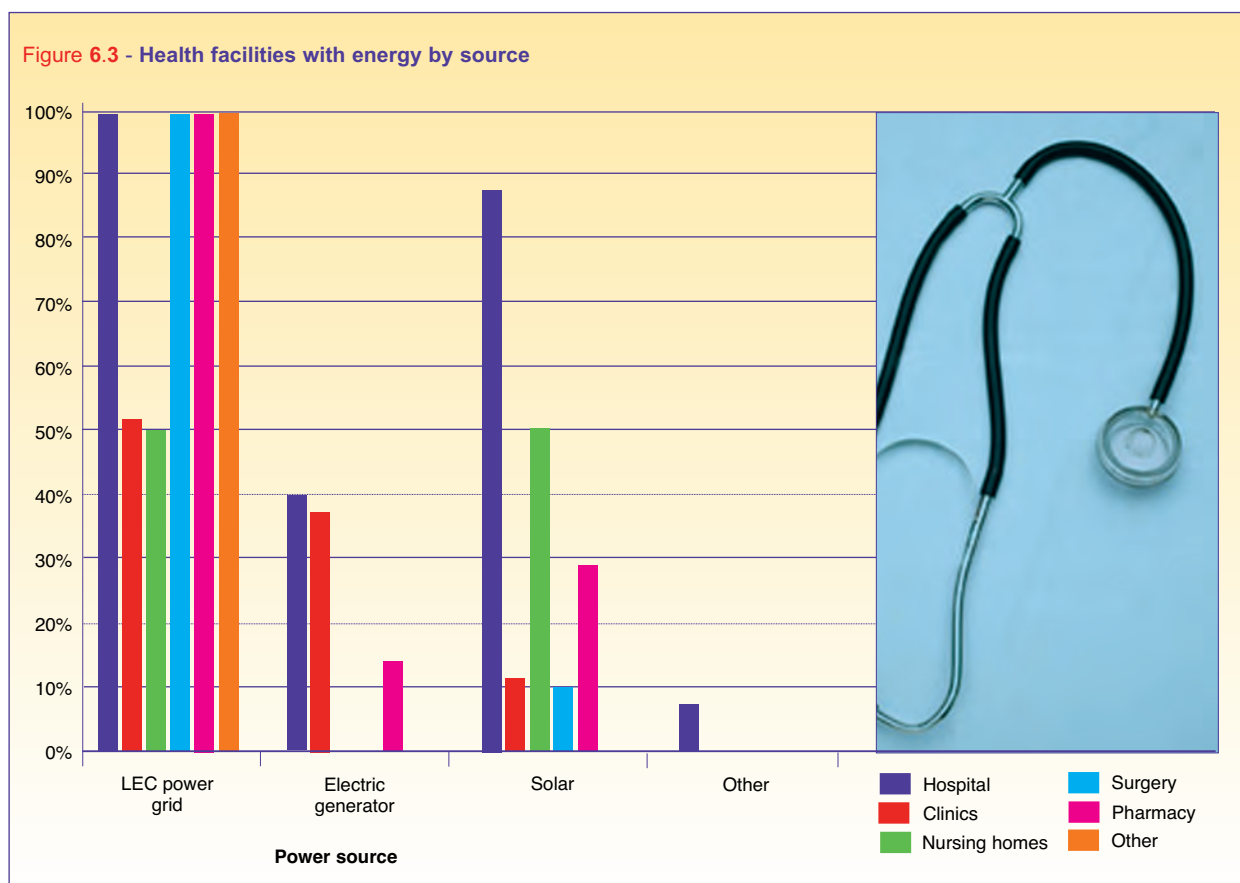
Slightly less than three out of five of all the health facilities had staff members trained in computer awareness or appreciation. Among those, majority had staff trained in word processing (45%); nearly the same number (44%) had staff trained in Internet use; and 22 percent had staff trained in web design. Nineteen percent had staff members who had some basic programming exposure. A limited number of health service providers (11%) also had staff trained in maintenance and support; only seven percent had employees trained in some other computer programmes and software packages such as oracle, visual studio and SQL servers. Figure 6.2 presents the proportion of health services with employees trained in ICTs by type of the health service. The survey also sought to establish whether any of the health service providers was linked to health net. Only 9 percent of them were linked to health net, and these were mostly the hospitals.

Figure 6.2 - Health facilities with ICT skilled employees by type of training or skill



## 6.4 Source of energy in health facilities

Overall, 63 percent of the health facilities were connected to the power grid; 21 percent had invested in generators for energy; while 33 percent used solar energy (almost all rural health services had solar installations, but most of them were not working with lack of maintenance cited as the main problem) and less than one percent used batteries and invertors to charge staff mobile phones and power other clinic apparatus. Most of the primary health service providers are located some long distances away from the main power grid and there is a huge disparity between urban and rural health services in terms of access to a reliable supply of electricity. Figure 6.3 illustrates the proportion of health service providers with energy sources by type or category of the health service.

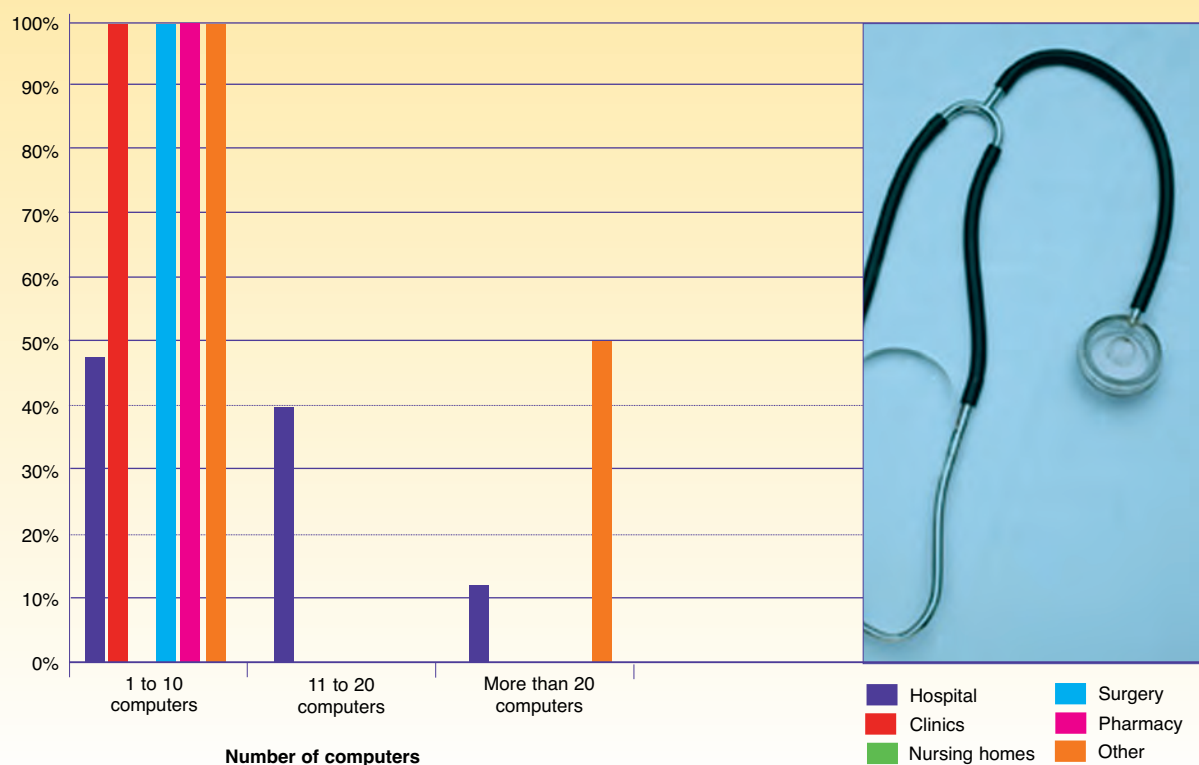


## 6.5 ICT infrastructure, access and usage in health facilities

### 6.5.1 Presence of computers and servers

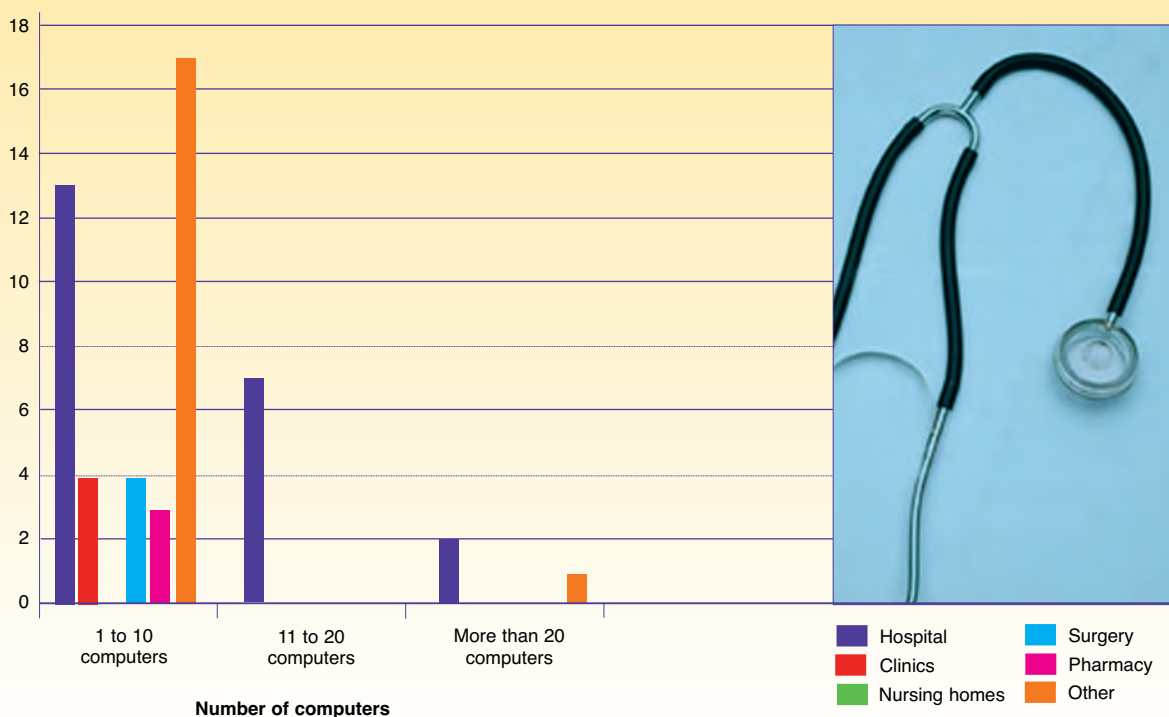
One third of the health service providers had computers in working condition. These computers were used mainly for administration and as support tools to aid in clinical procedures. Only a limited number of health services (5%) had at least one network server with an overall average of 13 computers connected to the server.

Figure 6.4 - Health facilities with computers by category

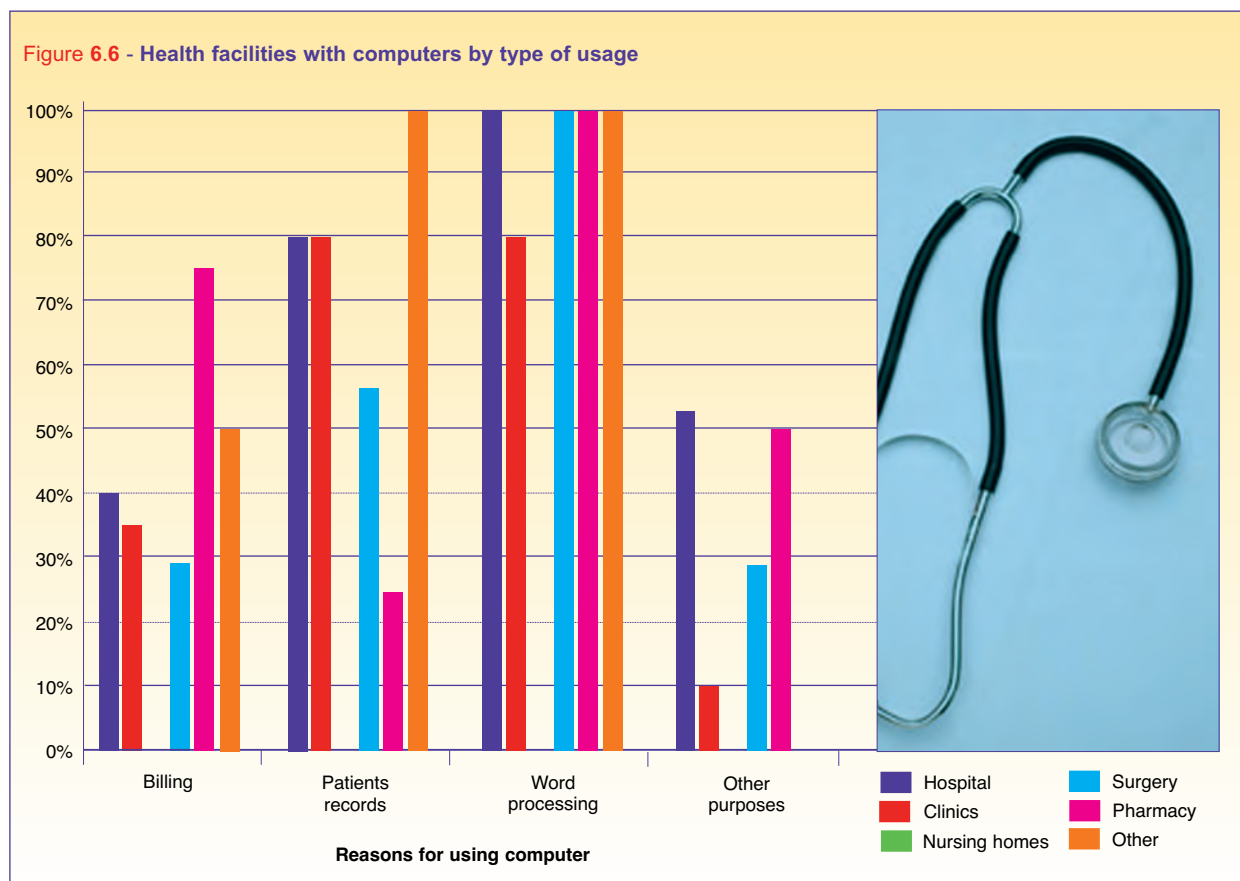


In relation to the staff-to-computer ratios, we used the mean number of employees per computer (health services with computers). The hospitals and “Other health service providers” recorded higher ratios at nine, clinics five, surgeries four, and pharmacies three. Nursing homes did not have computers.

Figure 6.5 - Staff-to-computer ratio by number of computers (for health facilities with computers)



Close to three quarters of the health facilities with computers regularly used computers for electronic storage of patient records and 40 percent used them to process bills and payments. Ninety two percent of these health facilities used computers for word processing (i.e. to write memorandums, circular notices, reference letters, etc). Twenty nine percent used them for other purposes, such as sonogram.

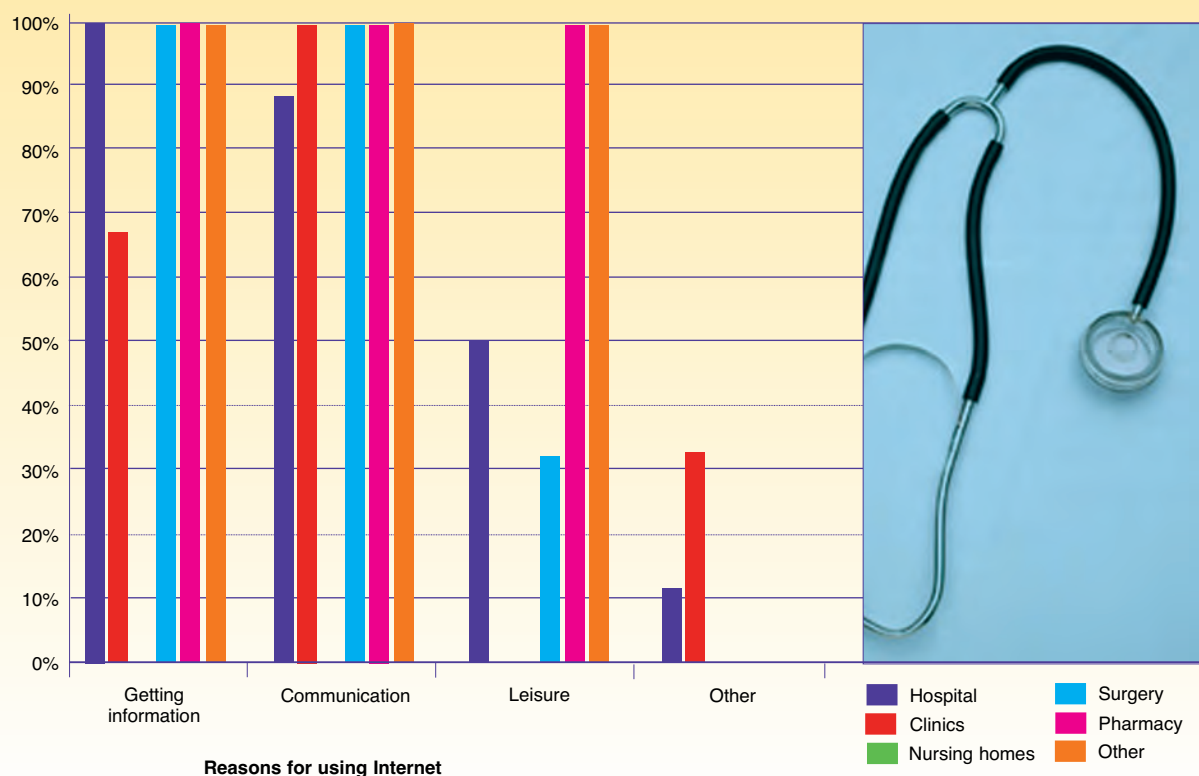


### 6.5.2 Internet connectivity

The bulk of health facilities that owned computers did not have access to the Internet. For instance, only one third of the health services with computers had Internet connection with an average of five computers connected to Internet.

Almost all health facilities (94%) with Internet access reported using it to get information, and exactly the same number used it for communication which included e-medicine. Forty four percent used Internet for leisure activities (such as playing games, music etc). Figure 6.7 shows the proportion of health services (by type) using Internet for different purposes.

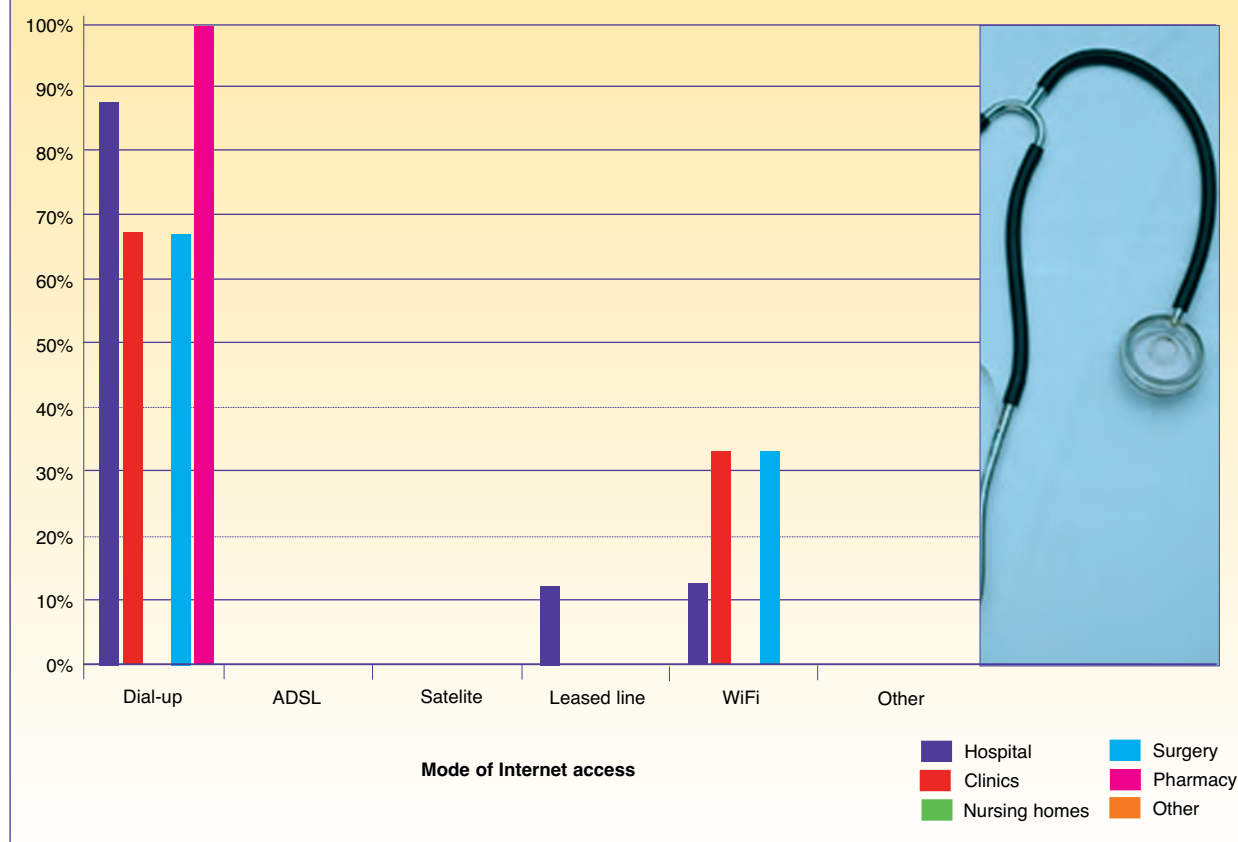
**Figure 6.7 - Health facilities with Internet connection by type of usage**



The three quarters of the health services with Internet connection were connected via Dial-up, and one quarter was connected through WiFi service. Only six percent reported to be connected through leased line mode of Internet connection. No health service facility used satellite, ADSL or any other mode for Internet connection other than the above stipulated modes. Figure 6.8 shows the proportion of health services by mode of Internet connection across the health service types.



**Figure 6.8 - Health facilities with Internet connection by mode of access**



### 6.5.3 Web presence

Only five percent of the health facilities had websites. Of these, 67 percent of the hospitals had monthly website updates while a third updated their websites semi-annually. All surgeries updated theirs annually. Table 6.4 presents a summary of the website updates by type of health facility.

**Table 6.4 - Website updates by type of the health facility (percentages)**

Frequency of website update	Hospital	Clinics	Nursing home	Surgery	Pharmacy	Other
Monthly	67	0	No website	0	No website	0
Semi-annually	33	0	No website	0	No website	0
Annually	0	0	No website	100	No website	0
Do not know	0	100	No website	0	No website	100

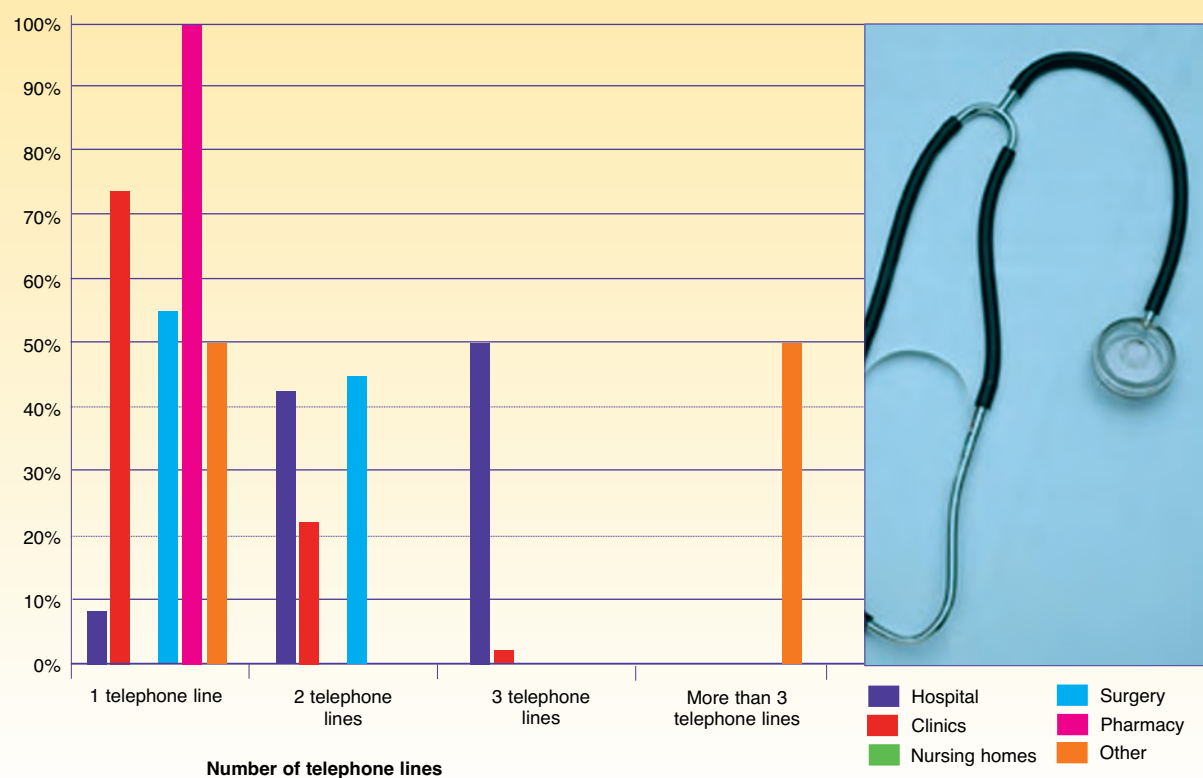
### 6.5.4 Onsite presence of communication facilities and CPE

More than a quarter of the health facilities (29%) had wards or rooms with beds for in-patients. For information and communication facilities, only eight percent had telephone extensions in the wards; 11 percent had alarms for emergencies in the wards and seven percent used two-way-radios in the wards. Eleven percent of the health facilities had radio sets in the wards and the same ratio had television sets. Almost half of the health services had fixed telephones in the offices. Close to 30 percent, mostly rural health services used two-way radios for communication. Twenty three percent had fax machines and 10 percent used electronic cash register for cash receipts and payments. Table 6.5 provides the proportion of health services with information and communication facilities by type of health facility.

**Table 6.5 - Health service providers with ICT facilities (percentages)**

Health services with information and communication facilities		Hospital	Clinic	Nursing home	Surgery	Pharmacy	Other
Fixed telephone line in the	Wards	0	0	0	0	-	0
	Offices	80	39	0	90	86	100
Fixed telephone extension in the	Wards	47	9	0	100	-	0
	Offices	80	39	0	33	0	0
Electric bell/alarm in the	Wards	60	27	0	0	-	0
	Offices	-	-	-	-	-	-
Two-way radios in the	Wards	33	32	100	0	-	0
	Offices	53	30	0	10	0	0
Radio sets in the	Wards	33	46	0	50	-	0
	Offices	-	-	-	-	-	-
Television sets in the	Wards	67	23	0	0	-	0
	Offices	-	-	-	-	-	-
Electronic cash register in the	Wards	-	-	-	-	-	-
	Offices	33	5	0	0	57	0
Fax machines in the	Wards	-	-	-	-	-	-
	Offices	67	15	0	60	0	50


As indicated earlier, close to half of the health facilities had a fixed telephone line and of those, 30 percent had only one line, 13 percent had two telephone lines and five percent had three telephone lines. Only 0.7 percent had more than three fixed telephone lines. See Figure 6.9 for a breakdown by health service category.

**Figure 6.9 - Health facilities with fixed telephone lines by number of lines**


While half of the health services did not have a direct fixed line, most (84%) had access to a public payphone located in the vicinity of or in the health facility premises. On the average, it took seven minutes to access the nearest public payphone. Access to Internet cafés varied by geographical locations of the health services. About 20 percent of the health service facilities had an Internet café in their locality, accessible within an average walking time of 11 minutes. Table 6.6 shows the proportion of health services (by category) with Internet or public phone access and the average walking time to reach them.

**Table 6.6 - Health facilities with access to public payphones, Internet cafés and the mean access time**

Type of health service	Access in percentages		Average time in minutes	
	Public payphone	Internet café	Public payphone	Internet café
Hospital	80	47	4	17
Clinic	81	11	9	11
Nursing home	100	0	3	0
Surgery	100	50	2	7
Pharmacy	100	57	2	6
Other	100	50	12	1




### 6.5.5 ICT Support

Close to 15 percent of the health facilities owning computers had some of their staff members who support the deployment and maintenance of computer services while 85 percent of the health services with computers reported to fully out-source the ICT support. Table 6.7 shows the espousal of the ICT support by health service category.

**Table 6.7 - Health facilities with access to ICT support**

Type of health centre	In-house	Out-source
Hospital	21	79
Clinic	5	95
Nursing home	-	-
Surgery	14	86
Pharmacy	25	75
Other	50	50



**Table 6.8 - Integration of ICTs in health services**

	Type of the health centre	Percentage of Health services owning computers	Percentage of Health services with a network server	Average number of computers connected to the server (Health services with a functional network server)	Average number of computers connected to Internet (Health services with Internet connection)	Number of Health services with network points in the wards
Health services with 1 to 10 computers	Hospital	47	7	6	1	0
	Clinic	19	2	3	2	0
	Nursing home	0	0	0	0	0
	Surgery	70	10	8	1	0
	Pharmacy	57	0	0	1	0
	Other	50	0	0	0	0
Health services with 11 to 20 computers	Hospital	40	13	11	2	8
	Clinic	0	0	0	0	0
	Nursing home	0	0	0	0	0
	Surgery	0	0	0	0	0
	Pharmacy	0	0	0	0	0
	Other	0	0	0	0	0
Health services with More than 20 computers	Hospital	13	7	20	8	0
	Clinic	0	0	0	0	0
	Nursing home	0	0	0	0	0
	Surgery	0	0	0	0	0
	Pharmacy	0	0	0	0	0
	Other	50	50	0	50	50

## Chapter 7: Comparative Statistics

*This chapter provides a brief account of the relative usage of selected key indicators across the business, education, health and tourism sectors. The specific statistics are represented by simple pie charts that follow.*

### 7.1 Electricity connection

*Overall, 85 percent of the businesses were connected to the power grid, 80 percent of the hospitality business also had electricity connection, the connected health facilities accounted for 63 percent, and schools had 40 percent.*

### 7.2 Computers

*The prevalence of computers was higher in the hospitality business/accommodation establishments (56%) followed by 38 percent in schools, then 34 percent in health facilities and 31 percent in businesses.*

### 7.3 Network server

*The presence of network servers was dominant in businesses (12% of the businesses had network servers) followed by accommodation establishments (10%) then schools (8%) and lastly health facilities (6%).*

### 7.4 Internet connectivity

*Overall, Internet connectivity was low across all four sub-sectors. Thirty five percent of the accommodation establishments had Internet connection followed by businesses with 14 percent, health facilities 11 percent, immediately followed by schools with 10 percent.*

### 7.5 Mode of Internet access

*The dominant mode of Internet access across the four sub-sectors was dial-up. ADSL was not common to all sectors. Only a few entities had connected via ADSL, mostly the businesses. Leased line mode of Internet connection was found mostly in businesses, then accommodation establishments followed by schools. No health facility reported to have used leased line service for Internet connection. WiFi connection was comparatively common in health facilities, then schools. Businesses and accommodation establishments reported the same percentage for leased line mode of Internet connection. A very limited number of entities used satellite for Internet connection.*

### 7.6 Web presence

*A somewhat high percentage (30%) of the hospitality business/accommodation establishments had a website, (designed specifically for a certain accommodation service provider or as a group). About the same percentage of businesses and health facilities had websites.*

### 7.7 Fixed telephones

*More than 70 percent of the hospitality businesses had a fixed telephone. Close to a half of health facilities and businesses also had fixed telephone lines. Only about a third of schools had a fixed telephone line.*

### 7.8 Fax machine

*Slightly less than a half of the hospitality businesses had a fax machine, 26 percent of businesses also had fax and 23 percent of health facilities had fax, only 10 percent of the schools own a fax machine.*

### 7.9 Two-way-radios

*The prevalence of two-way-radios was relatively high in health facilities by nine percent, followed by businesses (8%), then three percent of accommodation establishments and lastly one percent of schools.*

### 7.10 Television

*The presence of TV sets was higher (55%) in accommodation establishments, then 23 percent in schools followed immediately by 19 percent in businesses and lastly 11 percent in health facilities.*

### 7.11 Radio

*The entities with relatively high presence of radio sets were businesses (73 %), then schools (58%), 11 percent for health facilities and lastly 10 percent for accommodation establishments.*

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Figure 7.1 - Electricity connection (LEC power grid)

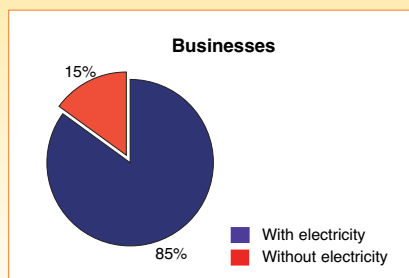


Figure 7.1 - Electricity connection (LEC power grid)

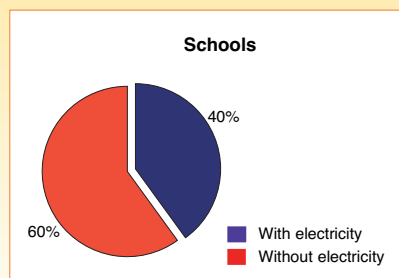


Figure 7.1 - Electricity connection (LEC power grid)

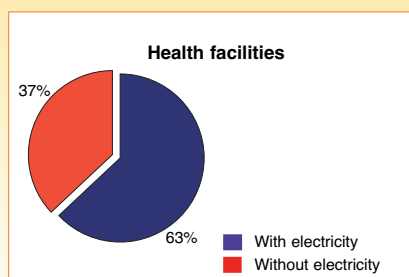


Figure 7.1 - Electricity connection (LEC power grid)

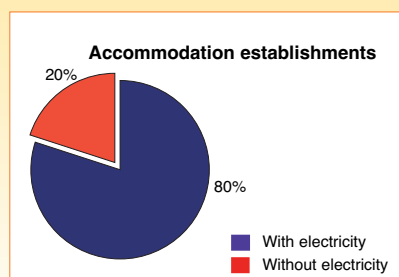


Figure 7.2 - Computers

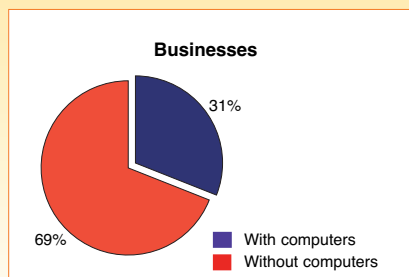


Figure 7.2 - Computers

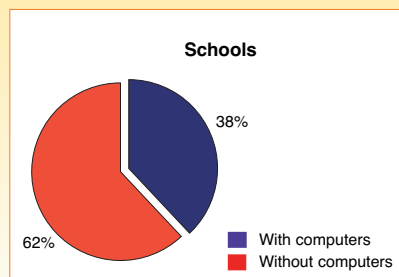


Figure 7.2 - Computers

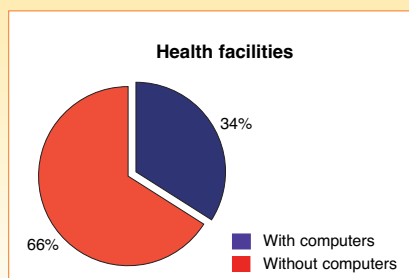


Figure 7.2 - Computers

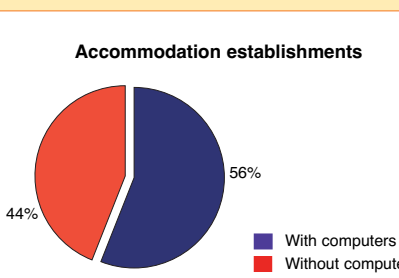


Figure 7.3 - Network server - Business

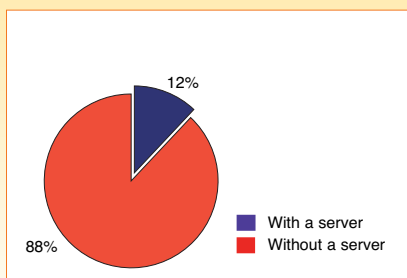


Figure 7.3 - Network server - Schools

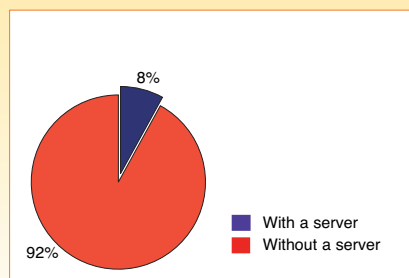


Figure 7.3 - Network server - Health Facilities

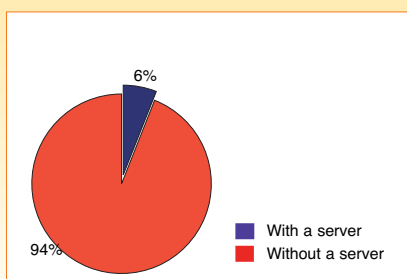


Figure 7.3 - Network server - Accom. establishments

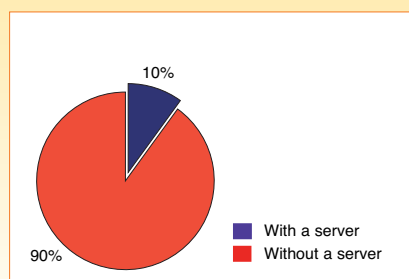


Figure 7.4 - Internet connectivity - Businesses

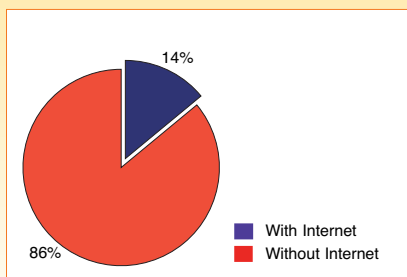


Figure 7.4 - Internet connectivity - Schools

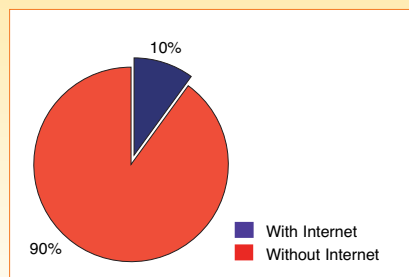


Figure 7.4 - Internet connectivity - Health facilities

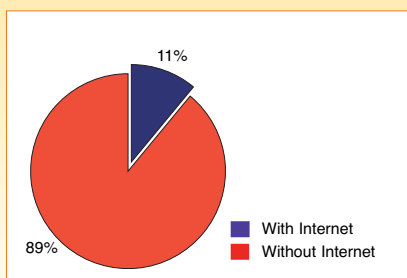


Figure 7.4 - Network server - Accom. establishments

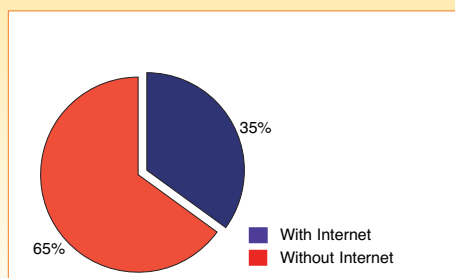


Figure 7.5 - Mode of Internet access

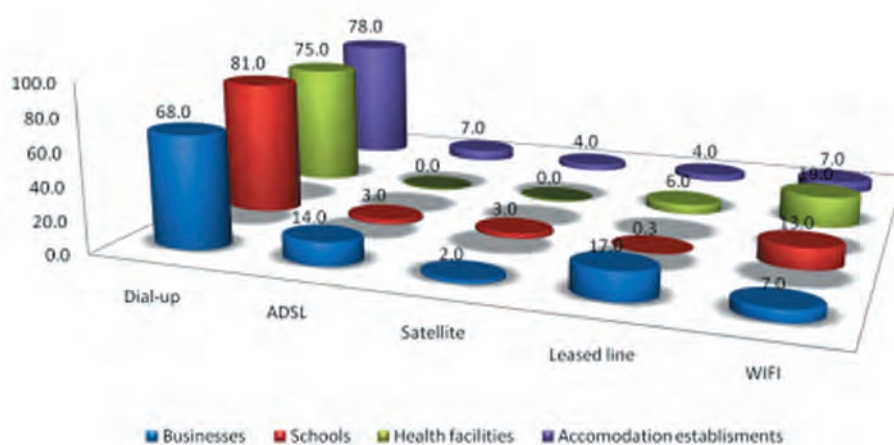


Figure 7.6 - Web presence - Business

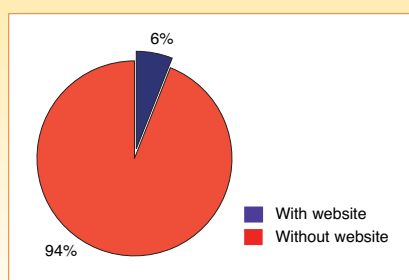


Figure 7.6 - Web presence - Schools

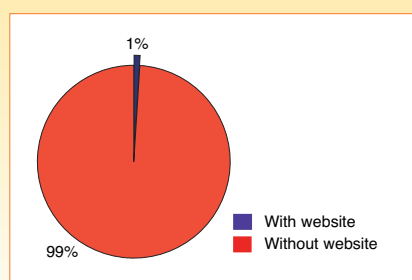


Figure 7.6 - Web presence - Health facilities

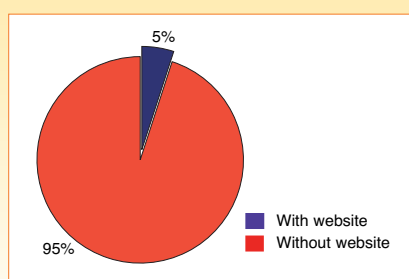


Figure 7.6 - Web presence - Accom. establishments

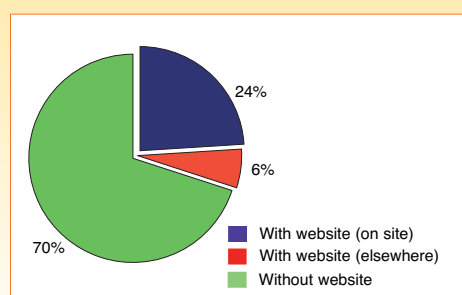


Figure 7.7 - Fixed telephones - Business

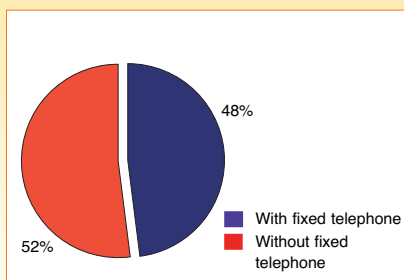


Figure 7.7 - Fixed telephones - Schools

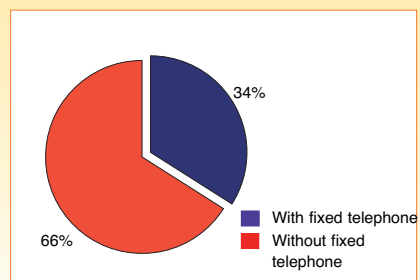


Figure 7.7 - Fixed telephones - Health facilities

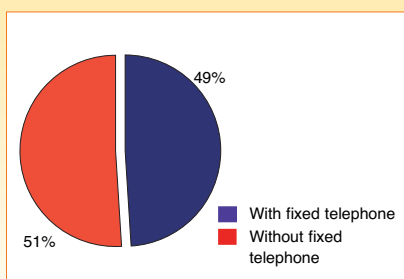


Figure 7.7 - Fixed telephones - Accom. establishments

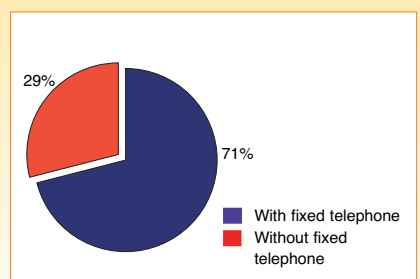


Figure 7.8 - Fax machine - Business

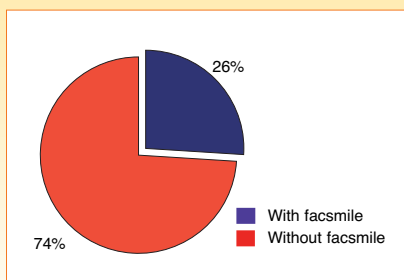


Figure 7.8 - Fax machine - Schools

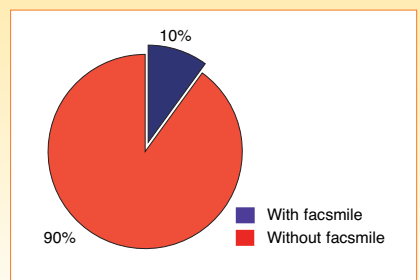


Figure 7.8 - Fax machine - Health facilities

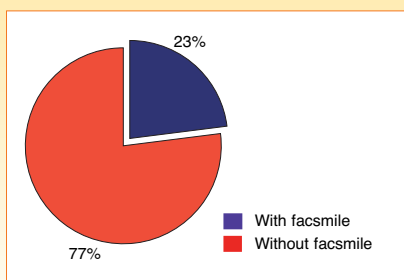


Figure 7.8 - Fax machine - Accom. establishments

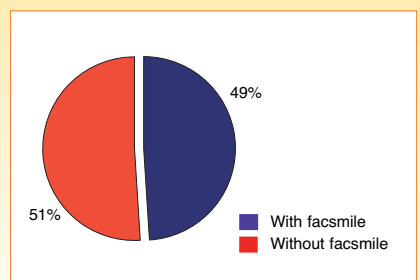


Figure 7.9 - Two-way radios - Business

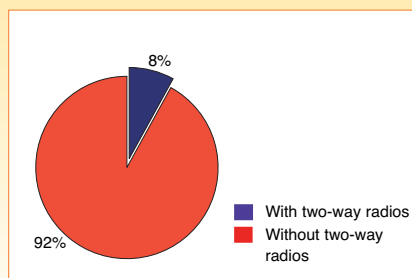


Figure 7.9 - Two-way radios - Schools

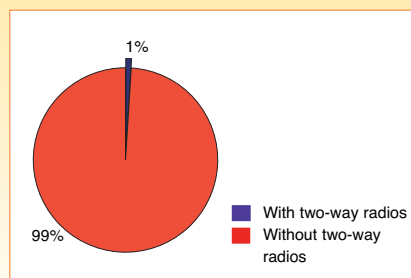


Figure 7.9 - Two-way radios - Health facilities

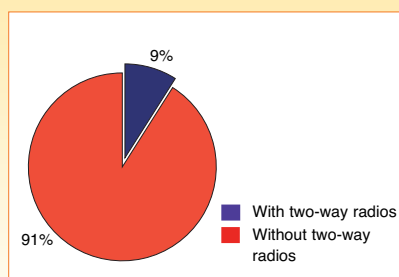


Figure 7.9 - Two-way radios - Accom. establishments

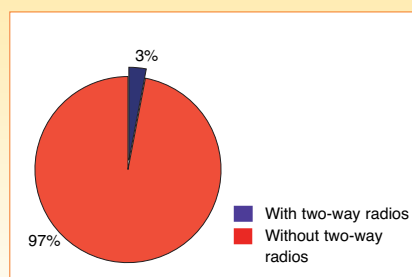


Figure 7.10 - Television sets - Business

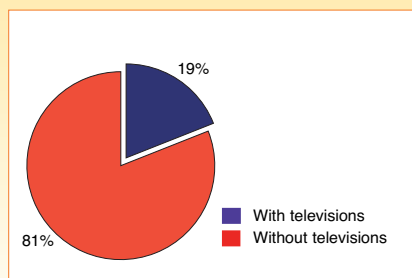


Figure 7.10 - Television sets - Schools

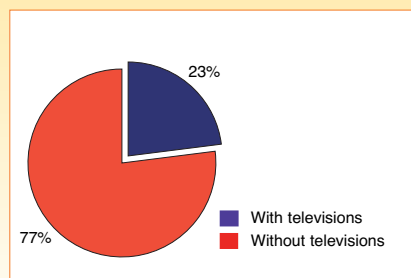


Figure 7.10 - Television sets - Health facilities

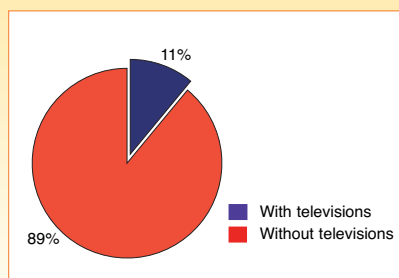


Figure 7.10 - Television sets - Accom. establishments

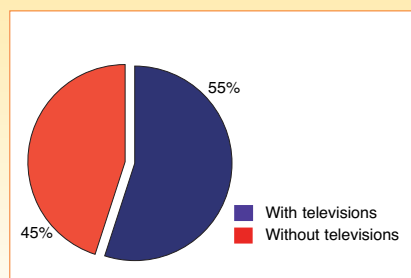


Figure 7.11 - Radio sets - Business

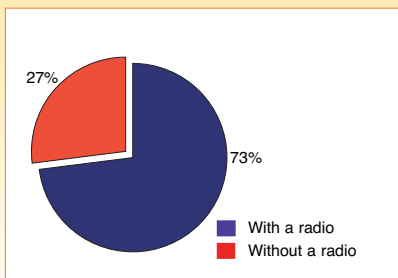


Figure 7.11 - Radio sets - Schools

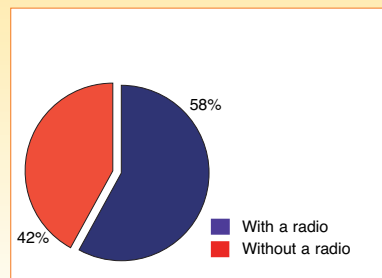


Figure 7.11 - Radio sets - Health facilities

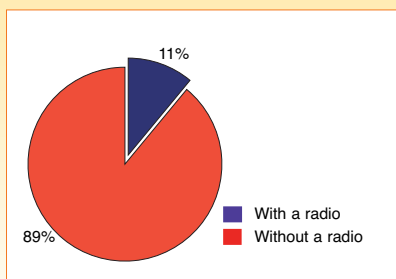
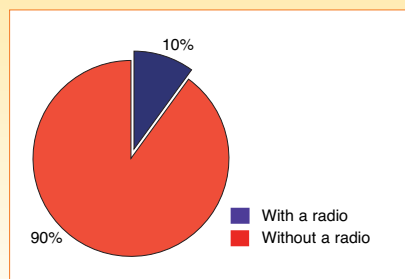


Figure 7.11 - Radio sets - Accom. establishments

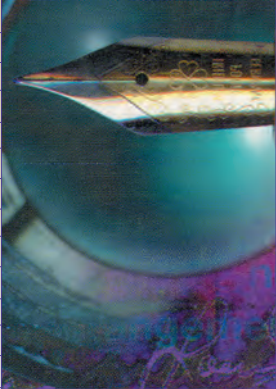




## Appendix A


**Table A.1 - Licences and registration from 2000 to 2008**

Licence Issued	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08
1. Fixed line network	1	1	1	1	1	1	1	1
2. Mobile network	1	2	2	2	2	2	2	2
3. Data Communications	-	1	1	1	1	1	1	1
4. Television Broadcasting	2	2	2	2	2	2	2	2
5. Sound Broadcasting	6	6	7	7	8	9	10	10
6. ISPs	3	3	3	4	5	6	6	6
7. CPE	10	17	8	11	11	12	13	0
9. Two-way radios	-	-	-	8	14	16	20	59
10. Telemetry Stations	-	-	-	-	-	-	-	2
11. Amateur Radios	-	-	-	-	3	5	9	12
12. Radio Pagers	-	-	-	-	-	-	-	3
Sub-Total	21	28	20	32	43	50	60	94



**Table A.2 - Tele-density of Fixed and Mobile Subscribers**

Year	fixed tele-density	Mobiles tele-density	Sector tele-density
2000	1.0%	0.0%	1.0%
2001	1.0%	1.2%	2.2%
2002	1.3%	2.6%	3.9%
2003	1.5%	4.4%	5.9%
2004	1.6%	6.9%	8.6%
2005	1.9%	10.0%	11.9%
2006	3.0%	13.1%	16.1%
2007	3.0%	19.9%	22.8%
2008	2.6%	25.9%	28.5%



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## **The State of Communications Sector and ICT Indicators in Lesotho**

Published by Lesotho Communications Authority.

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