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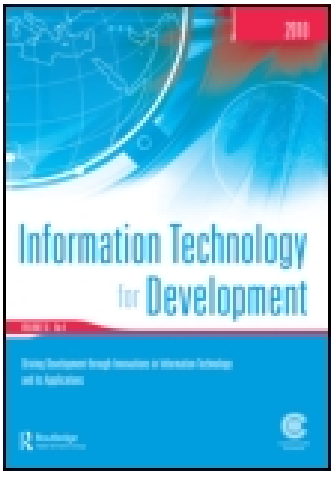

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The Impact of Information and Communication Technology Adoption and Diffusion on Technology Entrepreneurship in Developing Countries: The Case of Kenya

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The Impact of Information and Communication Technology Adoption and Diffusion on Technology Entrepreneurship in Developing Countries: The Case of Kenya

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ICT-based enterprises (ICT-BEs) are businesses that produce ICT products, provide ICT processing technologies, or offer ICT support services. Most ICT-BEs grow in particular niche fields of ICT use by offering services that are well tailored to meet the needs of a specific target market. This however is usually short lived, as alternative technologies are developed each day and availed globally within a few months, while the rate of adoption and diffusion of technology is dependent on other factors other than the ICT itself. In most cases technology diffusion is rather slow and uneven at first, but accelerates rapidly once a critical mass of individuals has adopted the technology. This raises the question of how ICT-BEs can cushion themselves against sudden and unpredictable ICT trends, which may lead to existing customers abandoning a technology for any new alternative technology. The study examines the impact of rapid ICT trends on ICT entrepreneurship in the liberalized and globalized Kenyan ICT market. The study is based on qualitative data, collected through four descriptive case studies selected from micro and small enterprises offering ICT solutions. Findings reveal that rapid changes in ICT trends and early adopters' switching behavior negatively affect the survival of an ICT-BE, while customer satisfaction and entrepreneurial creativity positively influence the survival and success of an ICT-BE. The study provides practitioners, budding ICT entrepreneurs, and policy-makers with essential lessons on how ICT trends affect the growth and survival of ICT-BEs and how to mitigate these negative effects and therefore remain in business.

Keywords: micro and small enterprises; ICT-based enterprises; ICT trends; ICT diffusion; ICT adoption; ICT entrepreneurship; ICT dynamism; service quality; exploratory; interpretive; qualitative; case studies

1. Introduction and problem statement

ICT trends seem universal, while user acceptance and use of ICT vary, depending on the local business environment, the type of ICT, and the way local marketers anticipate and grab the opportunities to supply and support the new ICT solution within their respective environments. New ICTs always create an opportunity and platforms for new entrepreneurial ventures. A firm specializing in offering a particular ICT product or service can make huge profits for a season, or make marginal profits but cautiously survive for a number of years, or even make no profits but die before getting off the ground. The availability of alternative ICT products places the power of making purchase decisions on the users. The only option left for the enterprises is to deliver superior customer service, offer a better product, or supplement the product offering.

With the successful liberalization of Kenyan ICT market in 1998 through the Kenya Communications Act of 1998 (KCA, 1998), there was an upsurge of local and international

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investors offering a wide range of telecommunication services. Local investors started ICT-based micro and small enterprises (MSEs), while international investors either invested in small and medium enterprises or bought stakes in huge government corporations. The locally owned ICT-based MSEs became vehicles for employment creation and poverty reduction (Wamuyu & Maharaj, 2011), as thousands of jobs were created within a short period of time. The MSEs aimed at providing services that were in great demand, such as mobile and landline telephone services, fixed wireless telephone services, and the Internet access services. However, over the years, the locally owned MSEs have either folded up or are surviving by juggling ICT services with non-ICT services, leaving the Kenyan telecommunications sector dominated by large multinationals of which most are fully or partially foreign-owned and managed.

ICTs evolve very fast, and there are new alternative technologies and other emerging technologies being released to the market in quick succession. This makes changes in ICT trends either good or bad for any given ICT-Based Enterprise (ICT-BE). When a new ICT product is introduced in the market, most consumers take a "wait-and-see" approach until there are more adopters (Peres, Muller, & Mahajan, 2010). This wait-and-see attitude causes "slow ICT adoption," which refers to a relatively slow uptake of the new ICT product. This is exacerbated by the fact that most of the ICT products require co-adoption and their usefulness only increases as the number of adopters increase. Despite the exponential growth of ICT-BE in Kenya, literature indicates, to the author's knowledge, that no research study on the impact of ICT trends on microenterprises in Kenya has been done. This study sought to investigate and fill this research gap by evaluating how rapid changes in technologies have impacted on the growth and survival of the ICT-BEs. Using four descriptive case studies, the study explores why some enterprises fail to survive pressures of a changing ICT business environment caused by capricious ICT trends, while others thrive and flourish. The case study enterprises are in Local Loop Operator (LLO)[1] services and Internet Access Services.[2] The study is guided by the following research objectives:

(1) To determine how unpredictable ICT trends and slow ICT adoption affect the growth of ICT-BEs.
(2) To determine how ICT-BEs can overcome the challenges brought about by the unpredictable ICT trends and slow ICT adoption to satisfy their customers' needs and succeed in doing business.

2. Literature review

ICT-BEs have continued to thrive in Kenya since the successive liberalization of the telecommunication industry in 1998. Kenya also has a growing technology-conscious adult population, which has resulted in an increase in demand for ICT services at home, the office, and learning institutions. Most ICT-BEs identify ICT business opportunities by recognizing ICT needs within the economy. In the past, one such kind of in-demand service was the availability of landline telephone services and the expansion of the last mile access. Before the liberalization of Kenyan ICT market in 1998 through the Kenya Communications Act of 1998 (KCA, 1998), a landline was a privilege reserved for the wealthy, government offices, huge organizations, and multinationals. People were forced to walk long distances or take bus rides to get to townships in order to use telephone booths that were operated by the now-defunct Kenya Posts and Telecommunications (Wamuyu & Maharaj, 2011). The individual would be lucky to find the telephone working if not vandalized or dysfunctional. Kenya Posts and Telecommunications services were characterized by poor service, limited choices, and high costs of installation and use

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(Wamuyu & Maharaj, 2011). Most developing countries have ICT entrepreneurs forming companies to avail the much needed ICT infrastructure, devices, and service. Statistics indicate that most ICT start-ups fail. A study conducted by Best and Kumar (2008) in the Indian state of Tamil Nadu indicates that 32 out of 36 private telecenters which were opened at various times between November 2001 and February 2004 had closed down by 2005. It is also noted that in Rwanda most of new ICT-BEs fail.[3] The ICT start-ups' failure in Rwanda is attributed to lack of business skills, as most of the entrepreneurs are new ICT graduates. The irony is that some of the successful ICT start-ups in Kenya are usually bought by multinationals after being in business for several years. Such a case is the acquisition of AccessKenya by Dimension Data through its subsidiary Internet Solutions in 2013.[4]

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2.1. *Rapid technological developments in ICTs and their impact on ICT-BEs*

Rapid advancement in ICTs and their usage in all Kenyan economic sectors have seen many new ICT-BEs start up over the last 15 years by attracting investments from within and outside the country. While some ICT-BEs have successfully navigated the business environment to continue their operations, others have not. This could be attributed to continuous technology changes in ICTs (ICT dynamism). The rapid changes in ICT products and services always render the earlier technology inadequate or in some instances useless, while users of any ICTs will always go for the presumed best technology available. Danida (2006) indicates that there were more than 4000 companies in Kenya by 2005 which were primarily dealing with ICTs and there were many shops operating as resellers of ICT-related services. Statistics from Communications Commission of Kenya (CCK) show that Kenya had 17,000 mobile subscribers in 1999. These subscribers could only make voice calls, unlike today's 30.5 million subscribers (June 2013) who have voice and video call, SMS and MMS, Internet access, mobile money, mobile health, mobile agriculture, m-commerce, and mobile banking – a picture of real technological advancement within 10 years. The application of ICTs currently spans from clerical to manufacturing jobs, and new technologies are made available on a daily basis. Even though a good number of innovative technologies are in new application domain areas such as agriculture, others are improvements of the existing technologies. The uniqueness of the improvements always makes the new technology attractive to both the old and the new users especially when the new features include performance, size, and location of the services.

2.2. *Strategies to counter the impact of rapid technological developments in ICTs on ICT-BEs*

Over the years most ICT-BEs have used price incentives to gain competitive advantage over their competitors. But over the years as new ICT products are unveiled globally and made available quickly to the Kenyan market, price ceases to be the only differentiating factor. In Dutta (2001), network performance is just as important as low price for many customers when considering network services. Most ICT-BEs have sought to use value-added activities to avoid competition that is based solely on price in the Kenyan business environment, where market offerings are relatively similar. To do this most enterprises develop strategies to increase customer retention through customer satisfaction. In such a dynamic business environment as the Kenyan ICT products' market, customer satisfaction can be achieved through Service Quality, affordability, and entrepreneurial creativity and innovation. But in most cases, affordability does not influence purchase and usage decisions (Wamuyu & Maharaj, 2011).

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2.2.1. *Service quality*

Ladhari (2009) and Negi (2009) indicate that good service quality to customers retains them, attracts new ones, and enhances the corporate image. Even though it is not possible to measure service quality objectively, customers normally compare the services provided by ICT-BEs with their expected service delivery levels. This results in a number of gaps between the customers' expected service, what they actually receive, and their perception of the desired quality of service (QoS). Douglas and Connor (2003) point out that the customers' perceptions are based solely on what they receive from the service encounter. Parasuraman, Zeithaml, and Berry (1985, 1988) describe service quality as the discrepancy between customer's expectations and their perceptions. It is the extent to which services offered meet customers' expectations (Lewis & Mitchell, 1990; Wisniewski & Donnelly, 1996).

Intense competition has made service quality a pillar for many companies' marketing strategy (Asubonteng, McCleary, & Swan, 1996). This implies that for the ICT-BEs to achieve customer satisfaction, they must provide services superior to their competitors. McDougall and Levesque (2000) point out that service quality leads to customer satisfaction while Lee, Lee, and Yoo (2000) suggest that customer satisfaction leads to service quality. Bruhn and Georgi (2006) indicate that satisfaction with a product is the customer's evaluation of whether the product or service has met the customer's needs and expectations. It is the extent to which the customers believe the product or service surpasses their expectations (Gitlow, Gitlow, Oppenheim, & Oppenheim, 1989). Therefore, customer satisfaction takes place when a product or service meets the customer's expectations or when it exceeds the expectations (Truong & Foster, 2006). Brady, Cronin, and Brand (2002) indicate that service quality is seen as an antecedent of customer satisfaction. Gronroos (1982) identified three components of service quality; the technical quality (what is delivered), the functional quality (the process of service delivery), and the image quality (the corporate image of company resulting from both technical and functional qualities). These three components of service quality provide the five dimensions of service quality, namely tangibles, reliability, responsiveness, assurance, and empathy, as identified by Parasuraman et al. (1988), Van Iwaarden, van der Wiele, Ball, and Millen (2003) and Reimer and Kuehn (2005). The definitions of these five characteristics are given in Table 1.

This study uses these five dimensions to evaluate customers' perception on QoSs provided by ICT-BEs and the impact these perceptions have on technology adoption and growth of ICT-BEs.

2.2.2. *Creativity and innovation in entrepreneurship*

Bolton (1998) indicates that though price and service quality are important variables which affect customer dynamics, they are not the only ones. This paper suggests Entrepreneurial Creativity as an important factor affecting customer dynamics. Tu and Yang (2013, p. 1) define entrepreneurial creativity as "entrepreneurs employ their idea to create new firms, and continue this

Table 1. Service quality dimensions.

Dimension	Definition
Tangibles	Appearance of physical facilities, equipment, personnel, and written materials
Reliability	Ability to perform the promised service dependably and accurately
Responsiveness	Willingness to help customers and provide prompt service
Assurance	Employees' knowledge and courtesy and their ability to inspire trust and confidence
Empathy	Caring, easy access, good/communication, customer understanding, and individualized attention given to customers

Source: Parasuraman et al. (1988).

idea to develop new products and services for the market need." Entrepreneurial creativity is a continuous process of identifying business opportunities throughout the enterprise's life. It is the desire to create new businesses by developing new products or new services (Ross, 1997). It involves adaptation to the changing market needs through development and provision of new products and services. Therefore, entrepreneurial creativity involves the ability to identify and seize any given entrepreneurial opportunity that has positive impact on the enterprise's continuous operation through profit making by offering new products and services. It involves taking advantage of any entrepreneurial opportunities available in the environment. Eckhardt and Shane (2003, p. 336) define entrepreneurial opportunities as "situations in which new goods, services, raw materials, markets and organizing methods can be introduced through the formation of new means, ends, or means-ends relationships."

Fillis and Rentschler (2006) indicate that entrepreneurial creativity exists before, during, and after the lifetime of a particular business since it is shaped in part by the individual decision-maker. This implies that individual entrepreneur creativity gives the enterprise a competitive advantage in the marketplace and determines the survival of the ICT-BEs. In most instances individual entrepreneur creativity is guided by intuition, commitment, and anticipation in making business decisions. New entrepreneurial practice, such as ICT product bundling, where enterprises bundle products and services together in one package at a bargain price to entice consumers, is a unique way in which entrepreneurs respond to market demands to stay competitive. Most of the price-sensitive customers choose the ICT products bundle as a single, value-oriented purchase of complementary offerings even though in most cases the consumer has the option of buying the same products separately. In most cases this could be an individual decision-maker's entrepreneurial creativity in an ICT-BE. This in turn maximizes the ICT-BEs' profit through increased sales volume, as the enterprise customers have one single source for several ICT products.

2.3. *Early adopter switching behavior*

Media and interpersonal contacts provide information that influences individual's opinion and judgment on any new ICT innovation (Rogers, 1995). In his Diffusion of Innovation theory, Rogers (1995) categorizes technology innovation adopters into five groups. These include the innovators who adopt the technology at its launch and who constitute 2.5% of the users, early adopters constituting 13.5%, the early majority constituting 34%, the late majority constituting 34%, and the laggards who constitute 16%. The adoption of most ICTs such as the LLO services is usually communicated mostly through the interpersonal channel, as its usage is at the district level and also requires co-adoption. The early adopters, who are the people willing to take the risk by using the ICT product for their personal needs, are known to spread the word about the new ICT product, its features, functionalities, and benefits, hence drawing the majority of new users to the ICT product. The ICT-BEs also use the early adopters' feedback to optimize their products and product offering to meet the needs of their clientele. The same group of early adopters, if dissatisfied with the current ICT product, tends to switch to another new product, in most cases taking with them the majority of the users they had influenced in making the decision to adopt the ICT product. Switching is defined as changing the provider of a service or product by a user to the service or product of another provider in order to maximize the satisfaction derived from the consumption of the product (Bansal & Taylor, 1999; Tähtinen & Halinen, 2002). In the telecommunication industry, wide network coverage, low call charges, and monetary incentives influence customer switching behavior (Hasan, Yeasmin, & Dey, 2013). The majority of users of the ICT products, such as the users of LLO services, have no contractual obligations and are predominantly users of prepaid services. This makes it easier for a user to switch from the LLO

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service provider to an alternative service provider, as there are minimal switching costs involved. This could be disastrous to an ICT-BE if the ICT product in question is left without the minimum numbers of users to be self-sustaining.

Over the last few years affordable mobile Internet technologies have been made available for home and office users in Kenya. Statistics from CCK indicate that Kenya had 12.3 million Mobile data/Internet subscriptions by June 2013 (CCK, Quarterly Sector Statistics Report, Second Quarter of the Financial Year 2012/2013, (April–June 2013)).[5] Most of the users of these new mobile Internet technologies have over the years depended on cyber cafés for affordable Internet access. The service providers for mobile Internet technologies have a wide range of devices and cost offerings that could move people out of the cyber café as they start to access Internet at home and office. This is possible if the mobile Internet technologies are coupled with cheaper Internet access rates and affordable desktop and laptop computers for home users. When the early adopters of the mobile Internet technologies compare public Internet access and Internet access over mobile Internet technologies, chances are that they abandon entirely public Internet access for private Internet access. They then influence others to adopt the new mobile Internet technologies through the word-of-mouth recommendations. This could be catastrophic to an ICT-BE offering public Internet access in its premises if most of its clientele are early adopters and the people they had influenced to adopt public Internet access, as they have a tendency to move to the latest technology. Therefore, rapid ICT trends coupled with early adopter switching behavior may have a negative influence on the growth of ICT-BEs.

2.4. *Slow adoption of ICT*

Slow ICT adoption has been studied at the consumer level by Peres et al. (2010) and at the MSEs' level by Lawson, Alcock, Cooper, and Burgess (2003) and Houghton and Winklhofer (2004). Most MSEs are generally unaware of the ICT products' benefits for their organization or they consider them to be expensive. A low level of organizational readiness in most MSEs is also considered a key reason for slow adoption of ICT products (Cragg, Caldeira, & Ward, 2011). Uzoka, Seleka, and Shemi (2007) attribute slow pace of adopting ICT in MSEs to social and cultural behaviors, as managers feel more comfortable with face-to-face interactions. Rosenberg (1972) observed that the diffusion of innovations is characterized by its apparent overall slowness on the one hand, and the wide variations in the rates of acceptance on the other. At the individual consumer level, slow ICT adoption could be attributed to the ability of the user to recognize the ICTs' usefulness, as most consumers are not aware of the efficacy of a product unless they are early adopters or they can see the benefits other adopters are enjoying. The study enterprises targeted their product offerings to both the MSEs and individual home users. This makes it necessary to consider the impact of rapid ICT trends and slow ICT adoption on ICT entrepreneurship.

2.5. *ICT-based enterprises*

ICT-BEs play an important role in the Kenyan economy by creating employment, contributing to the Gross Domestic Product (GDP), and promoting use of ICTs. Heeks (2008) categorizes ICT-BEs into three distinct categories. These are:

(1) ICTs as an enterprise output. These are the enterprises involved in the production of hardware, software, and telecommunications products.
(2) ICTs as a primary, processing technology. These types of ICT-BEs are involved in provision of data entry services, ICT-based business services, sale of mobile phone calls, software customization, ICT-based distance learning, etc.

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(3) Other ICT-related support activities. These types of ICT-BEs are involved in provision of computer training, consultancy, and other services.

The ICT-BEs in this study belong to the Heeks (2008) second category which has ICT-BEs offering ICTs as a primary processing technology. Two of the ICT-BEs are in public Internet access (Cyber Cafés) while the other two are LLOs (Last mile Access). In Kenya the number of various types ICT-BEs is quite big. This makes competition very high and therefore most of the ICT-BEs employs the low-cost strategy to retain their customers.

2.5.1. *Local loop operators*

LLOs in Kenya are enterprises issued with regional licenses to provide fixed line voice and data transmission services to expand the last mile access. Their licenses limit their on-net traffic within a geographic district while traffic between designated districts is routed through any of the country's major fixed or mobile operators. The licensing of the LLOs by CCK in 2003 offered a deserved relief, as the then telephony service providers were not quick in identifying and focusing on the growing and emerging needs of the local telecommunication industry (infrastructure and services). The first LLO was registered in the year 2002/2003, and by the year 2006, the number of registered LLOs had risen to 19 (CCK, 2007). The LLOs were to provide affordable and reliable voice and Internet Access Services. The licensed LLOs were using Wireless Local Loop (WLL) to connect subscribers to the public switched telephone network (PSTN) using radio signals as a substitute for copper for all or part of the connection between the subscriber and the PSTN. By 2007 eight LLOs had rolled out their operations using Code Division Multiple Access (CDMA) technologies offering both the infrastructure and services. Some of the LLOs in operations included Flashcom, Popote Wireless, Adtel, Rapid Communications, (Danida, 2006) and Skyband Africa Communications. Table 2 gives a list of the services that were being offered by the two LLOs in the study, including theoretical speeds, technology used, and service costs as of August 2007. The table also includes data from Telkom Kenya, who by then was offering similar services based on CDMA technologies for comparison purposes. The data were compiled from the respective service providers and service users.

2.5.1.1. *CDMA technologies*. CDMA was developed as a digital standard by Qualcomm (http://www.qualcomm.com). As a digital scheme, it is titled Interim Standard 95(IS-95), (Bedell, 2002). It is a wideband, spread spectrum technology, allowing numerous telephone calls to be simultaneously transmitted on one radio frequency, allowing CDMA to handle between 10 and 20 times the calling capacities of conventional cellular systems, (Bedell,

Table 2. LLOs services and rates in Kenya Shillings.

Enterprise	Internet bandwidth	Cost per month in Kenya Shillings (exchange rate @65 Shillings to one US dollar)	Voice calls per minute	SMS
Popote Wireless	128 K CDMA	3950	4 Shillings	3.00
Flashcom Ltd.	115 K CDMA	5000	1 Shilling	2.50
Telkom Kenya	128 K CDMA	1 Shilling per minute online between 7 pm and 7 am 2 Shillings per minute online between 7 am and 7 pm	7 Shillings	2.50

Source: Author compilation from vendors' marketing leaflets.

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2002). In Kenya, CDMA technologies have been deployed by companies listed in Table 3. The data were compiled from the CDMA development group (http://www.cdg.org). CDMA development group statistics also indicate that the CDMA technologies have been deployed in 38 countries in Africa by the end of 2011.

The evolution of CDMA started with the 2G standard known as IS-95A and 2.5G mobile cellular standard (IS-95B), (Bedell, 2002). Wideband CDMA (W-CDMA), or CDMA2000 1x is a newer version of CDMA based on 3G technologies and in Europe, this third-generation mobile cellular system based on the W-CDMA standard is known as Universal Mobile Telecommunications System, (http://www.qualcomm.com). Orange mobile (http://www.orange.co.ke) in partnership with Telkom Kenya (http://www.telkom.co.ke) offers advanced high-speed Internet services-based EVDO (Evolution Data Optimized or Evolution Data) 3G+ mobile broadband technology. EVDO is CDMA2000 1XEV-DO (1X Evolution-Data Only) which is part of the CDMA2000 1X mobile data specifications that has a theoretical speed of about offers 2.4 Mbps peak rate. The EVDO 3G+ technology provided by Orange mobile in partnership with Telkom Kenya in practice provides speeds of about 1.8 Mbps.The spectrum allocated to LLOs was 1900 MHz while Telkom Kenya was allocated 800 MHz. The lower frequency allocated to Telkom Kenya means longer wavelength which translates to better signal propagation, building penetration, and lower number of base station installations in a given area.

2.5.2. *Cyber cafés*

Cyber cafés in Kenya offer a wide range of ICT-related services, which include Internet access, data processing services, photocopy services, and documentation. Some of them also offer sale of computer accessories and cheaper local and international telephone and fax services. Legitimately, a cyber café is a place where people relax and snack while they surf the Internet (Mbarika, Jenson, & Meso, 2002). It is also a business that offers access to computers and the Internet on a drop-in basis for hourly fees Cilesiz (2009). In this study, a cyber cafe is an ICT-BE that offers Internet access and related services directly to the public within its premises for a fee. During the initial days of the Internet debut in Kenya, the cyber cafés were offering Internet and e-mail access services at very high rates. Most of the cyber cafés would charge as much as Kenya Shillings 20 per minute. But this did not deter technology-enthusiastic Internet users. Ambience was also not an issue as some cyber cafés were housed in very small rooms with all equipment and furniture squeezed in. Webcam, scanners, and printers were readily available at the cyber cafés. Africa Online e-touch bureaux that operated cyber café services were a success for some time, as the cost of personal computers and Internet access at homes and offices was very high. But this did not last for a year, as new competitors entered the market, offering better and cheaper services. Licensing of more Internet Service Providers led to cheaper prices for Internet connectivity. There was also an influx of cheaper second-hand

Table 3. CDMA technologies deployment in Kenya.

Operator	Technology	Type of system	Coverage
E.M. Communications Ltd. (Popote wireless)	1X	WLL, 1900 MHz	Nairobi
Flashcom Ltd.	1X	WLL, 1900 MHz	Nairobi
Telkom Kenya Limited	IS-95A	WLL, 800 MHz	Countrywide
Telkom Kenya Limited	1xEV-DO Rev. A	WLL, 800 MHz	Countrywide
Telkom Kenya Limited	1X	WLL, 800 MHz	Countrywide

Source: CDMA development group (http://www.cdg.org).

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computers in the market. By the year 2003 the rates of Internet access in cyber cafés had tumbled to between 50 cents and 1 shilling per minute from the previous 10 Shillings per minute in the year 2000.

Cyber cafés in Kenya over the years have been very helpful to many users as Mbarika et al. (2002) put it: cyber cafés reduce the constraints faced by users in terms of infrastructure, access to personal computers, and related information technology devices as well as affordability. Adetoro (2010) indicates that cyber cafés do offer opportunities for low-income people to access the Internet. Similarly Mwesige (2003) shows that customers who use cyber cafés in East Africa are those who cannot afford computers at home, or do not have access in school or at work. Before the onset of smartphones and dongles for mobile Internet access, cyber cafés were the only way for most people to access Internet in Nairobi. Novatech (2008) indicates that there were 1050 cyber cafés in Kenya by 2007 and that most of them were located in the five biggest cities. Accessing Internet in cyber cafés is probably still more economical than acquiring domestic facilities for some people, as Internet access at cyber cafés is a way of sharing the cost of Internet access among several users. Cilesiz (2009) indicates that cyber cafés exist in many countries and are especially prevalent where Internet subscription rates are not affordable for large parts of the population. By 2003, Kenya had an estimated 500,000 (less than 2% of the population) Internet users, most of whom were accessing the Internet through cyber cafés (Central Bank of Kenya, 2003). The current trend in Internet access and other telecommunication services usage is given in Table 4.

3. Research methods

The study employed an exploratory, qualitative approach to interrogate the problem. This was achieved through four descriptive case studies. The case study method is an approach to studying a social phenomenon through a thorough analysis of an individual case (Kumar, 2005). This seeks to get an in-depth understanding of the subject of the study. Case studies are appropriate research strategies when "how" or "why" questions are being asked about current set of events in their natural setting and when no experimental controls are involved (Yin, 2003). This is what the study aimed to achieve.

Table 4. Data on Internet users in Kenya.

Various statistics (*latest data available*: *October*, 2013)	
Mobile subscribers	30.5 million subscriptions (99.0% pre-paid)
Mobile money transfer subscriptions	24.8 million subscriptions
Mobile money transfer agents	88,466 agents
Fixed line subscriptions	216,469 subscriptions
Broadband subscriptions	1.39 million
International Internet bandwidth available	862,850 Mbps utilization level of 41.3%
Internet subscriptions and Internet users	
Mobile data/Internet subscriptions	12,340,005
Terrestrial wireless data/Internet subscriptions	21,282
Satellite data/Internet subscriptions	1278
Fixed digital subscriber line (DSL) data/Internet subscriptions	11,512
Fixed fiber optic data/Internet subscriptions	58,197
Fixed cable modem subscriptions	25

Source: CCK quarterly sector statistics report (April–June 2013), September, 2013.

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Table 5. Case study enterprises.

Enterprise	Type of business	Services offered	Number interviewed
Enterprise A	Telecommunication	LLO	3 former managers, 15 former customers
Enterprise B	Telecommunication	LLO	2 managers, 10 former customers, 4 customers
Enterprise C	Cyber/Internet Café	Cyber cafe, browsing, printing, scanning, local and international calls	1 manager, 2 employees, 20 customers
Enterprise D	Cyber/Internet Café	Cyber cafe, browsing, printing, scanning, photocopying, documentation	1 manager, 2 employees, 10 customers

Source: Author's own data.

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Table 5 gives the four enterprises selected as case studies. The enterprises were selected based on their success and the number of years in operation (at least 3 years). This is due to the widely held assumption that most microenterprises start-ups in Kenya die within 3 years (ICEG, 1999) and in Nigeria, microenterprises start-ups are expected to die within 5 years (Ayanda & Laraba, 2011). For each of the enterprises, data were collected using semi-structured interviews with employees, managers, and customers. The interview schedules are presented in Appendixes 1 and 2. Myers (1997) suggests that a good piece of interpretive research should represent multiple viewpoints and alternative perspectives. This was achieved through the inclusion of managers, customers, and former customers. For the enterprise that is no longer in operations, data were collected based on interviews with former managers who now work in other firms and former customers who were identified with the assistance of the former managers. A total of 70 respondents were interviewed (Table 5) using a pre-tested, semi-structured guideline with open-ended questions (Myers & Newman, 2007).

The case study design for this study includes four descriptive, in-depth studies on provision of last mile access through CDMA services and public Internet access services. Eisenhardt (1989) indicates that multiple case designs are appropriate when the intent of the research is description, theory testing, or theory building. Table 6 presents details of the case study design. Data were collected using face-to-face interviews. The interviews were tape-recorded and then transcribed. Theme identification was used to analyze and present data collected from each of the four case studies. Thematic analysis is a method for identifying, analyzing, and reporting patterns (themes) within data (Braun & Clarke, 2006). It is a comprehensive process used in identifying cross-references between evolving themes and the data (Hayes, 1997). The study thematic analysis was guided by six the steps defined by Braun and Clarke (2006). Documents such as the marketing leaflets (used to generate Table 2), service description brochures, and administrative documents were also collected to assist as evidence and to support the derivation of the study conclusions.

Table 6. Case study design.

Characteristics	Multiple cases
Number of cases	Four
Unit of analysis	Managers, employees and customers
Study objectives	Conceptualization, identifying themes, interpretation
Method of analysis	Thematic analysis

The study enterprises will be referred to as Enterprises A, B, C, and D, respectively, as some of the participating enterprises and respondents expressed their desire to stay anonymous.

3.1. *Enterprise A*

The enterprise started in the first quarter of the year 2006 with an initial rollout of wireless landlines using CDMA 2000. CDMA provided voice and 1x data rates (115 Kbps) Internet connection which was quite decent at that time. During its first phase rollout, the enterprise had seven base transmission system (BTS) sites within Nairobi City Centre and a few suburbs with the intention of expanding later. The enterprise offered lower voice calling rates of 3 Kenya Shillings per minute (about 0.04 US dollars), as compared to 5.50 Kenya Shillings (about 0.09 US dollars) per minute offered by Telkom. It also offered unlimited Internet subscription at Kenya Shillings 3500 (about 54 US dollars) plus VAT for a month. The enterprise was also offering Voice over Internet Protocol (VoIP) dialing for international calls and call conferencing services. The LLO made acquisition of landlines easier and faster, as there was no need to lay underground conduits and cables or pull wires through walls to the customer premises, which drastically reduced the waiting period. One just needed to buy a Removable User Identity Module (R-UIM or RUIM) card and a wireless desktop telephone for instant connection. Before then, people had to wait for months to get a landline installed by the only provider then, Telkom Kenya. In 2007, the enterprise added Integrated Services Digital Network services to its range of services. The new service targeted medium and large enterprises to complement its existing customers, who were mainly home users and small and medium enterprises. At its peak the enterprise had close to 10,000 subscribers, 80 company employees, and over 300 employees in its distribution network. The enterprise closed its operations on 20 December 2009, as it could not meet its financial obligations.

3.2. *Enterprise B*

The enterprise started its operations in 2005, offering telephone services, data services, and fax services based on CDMA. The enterprise charged 4 Kenya Shillings per minute for calls within its network, 5.50 Kenya Shillings per minute to Telkom landline, and 16 Kenya Shillings per minute to mobile telephone operated services. At its peak the enterprise had close to 6000 subscribers, 52 company employees and over 100 employees in its distribution network. Even with dwindling business fortunes, the enterprise continued to operate by juggling ICT services and non-ICT business consultancy services but this could not support its operations for long. To avoid failure and closure, on 1 March 2012, the company stopped operating as Enterprise B and started operating as a distributor and leading supplier of branded telephone handsets and accessories, a case of entrepreneur creativity.

3.3. *Enterprise C*

The enterprise started in the Nairobi central business district in 1998, with 12 computers charging 30 Kenya Shillings for three minutes of Internet access. At its peak the enterprise had over 150 computers, a scanner, and a printer on the internet access side, and IP telephone and PABX for VoIP services, with a working force of 20 employees. By the year 2007, the computers had reduced to 74, while as at January 2012 the computers were 26. This meant that there was extra office space, which the enterprise did sub-rent to a computer accessories dealer. The Internet access rates the enterprise was charging also continued to decrease over the years from the initial 30 Kenya Shillings for three minutes in 1998, to seven Kenya Shillings for three

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minutes in 2001, to one Kenya Shilling per minute of Internet access in January 2012. A continued decline in customer numbers led to the enterprise moving its operations on 29 February 2012 to a different location outside Nairobi central business district, another case of entrepreneur creativity.

3.4. *Enterprise D*

The enterprise started in April 2002 with 12 computers, a scanner, and a photocopy machine within Kariobangi estate, about 10 kilometers from the Nairobi central business district. The enterprise was offering Internet access at 3 Kenya Shillings per minute or Kenya Shillings 180 per hour with a minimum of initial complementary usage of 10 Kenya Shillings. The enterprise had two employees at that time. In 2004, the enterprise started charging one Kenya Shilling per minute as per the market rates then. The enterprise is still in operation with a good customer base and regular income from the Internet access services.

4. Findings

The users of any ICT infrastructure have a set of parameters that they look for in order to continue using that particular ICT service. Most of the study respondents indicated that Service Quality, Usage Cost (Affordability), and Customer Service play an important role in Customer Satisfaction and hence continued use of the technology and service. In the absence of these characteristics and with the availability of an alternative product, the customer may tend to switch to the alternative technology or service.

4.1. *Enterprises A and B*

The LLO entrance to the local telecommunication market was characterized by splendor and promises. Publicity and marketing activities, including major product launch cocktails, full-page newspaper advertisements, radio advertisements, and commercial television advertisements, went on and on for months of the product launch. This was complimented by publicity through huge roadside billboards and branded public transport vehicles. The LLOs were offering prepaid and post-paid voice, Internet, and VoIP services, as well as reselling handsets, fixed wireless desktop telephones, and other related telecommunication equipment. After months of successful commercial operations the LLO started experiencing hiccups its business operations. The study found out that a number of unexpected challenges surfaced despite the LLO enjoying high customer numbers and making huge financial profits. The challenges can be categorized as both technical and business issues.

4.1.1. *Technical issues*

The initial rollout of the network using CDMA 2000 offered decent data rates of 115Kbps and affordable voice rates of less than four Kenya Shillings per minute as of 2006 and 2007. But other technical setbacks did emerge. The challenges included:

4.1.1.1. *Network capacity*. The customer base started to grow at a very fast rate while the network capacity was not expanding at the same rate, as the LLOs had limited base transceiver station (BTS) sites within Nairobi and its environs. By June 2006, the two LLOs had 3995 subscribers (Waema, 2007), a number that was growing exponentially, such that by the first quarter of 2007, the LLO had a customer base of over 7000 subscribers. This resulted in congestion on

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its network leading to QoS issues, such as slow download speeds, dropped voice calls ("Choppy" calls), and loss of the network signal. This was contrary to customer expectations, as they anticipated an infrastructure that delivers the best possible user experience. This demanded network expansion necessary to meet the requirements of the increased customer numbers. This required extra capital investments, as more base stations needed to be installed. In most cases, customers have pre-service expectations, based on the service providers promises, and advertised services. Parasuraman et al. (1985) indicate that promising more than what can be delivered usually has negative effects on customers, as it raises their initial expectations. At the beginning of the second quarter of 2008, the study respondents indicated that they started realizing that they could no longer get what they were promised, and they started to abandon the services of the two LLO's for emerging and alternative technologies. This challenge was also experienced by Enterprise B.

4.1.1.2. *Equipment*. For voice calls, the LLO provided CDMA handsets and fixed wireless terminals. The study respondents (former customers) indicated that the handsets were very basic and that they found them to be really rudimental as compared to what other service providers using the global system for mobile communications (GSM) networks were offering. They pointed out that the handsets made them feel as if the services they were using were inferior.

The respondent managers indicated that the LLO had a single source for the supply of the handsets, accessories, and terminals. This made the handsets, accessories, and other terminals rare and very expensive. The handsets and terminals supplied were of poor quality, yet the supplier was selling them at very high prices which the LLOs were passing on to their customers. Because of their poor quality, handsets and terminals would breakdown frequently. There were no spare parts locally for these handsets and the customers ended up with scraps. This challenge was specific to Enterprise A.

4.1.1.3. *Data billing problems*. The respondents who were former managers gave an indication that the data usage billing systems were incorrectly billing customer's data usage, which resulted in loss of revenue. The managers attributed this to the fact that the LLO implemented low-end data billing systems which did not support features that could ensure revenue was not lost. This challenge was also experienced by Enterprise B.

4.1.1.4. *Equipment vendor relationship breakdown*. The managers indicated that the suppliers were not willing to offer after-sales technical support after a breakdown in the relationship between LLO and equipment suppliers. They asserted that this is the main reason why technical issues could not be easily resolved while network upgrade and expansion became difficulty. This challenge was specific to Enterprise A.

4.1.2. *Business issues*

4.1.2.1. *Limited distribution chain*. The participating customers indicated that they were required to travel long distances to get airtime to load their accounts as the LLO had only limited distributers from where their customers could purchase handsets and airtime. They pointed out that sometimes the distributors stocks would run out and could not be supplied by the LLO for days, which was extremely frustrating for the distributers and customers. This prompted the customers to look for alternative service providers. One respondent said

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> . . . I would go long distances trying to get the Prepaid Recharge vouchers . . . I once had to move from Ongata Rongai to the shopping mall near the Carnivore Restaurant, a distance of 15 kilometres . . . this is when I decided enough is enough and opted for another service provider.

This challenge was specific to Enterprise A.

4.1.2.2. *Interconnection rates*. The customers indicated that the LLOs were offering very competitive data and voice rates for their on-net traffic. This was because the charges were merely dependent on the LLOs, hence very cheap. But the charges for off-net calls were very expensive, as the LLO had to rely on Telkom Kenya's infrastructures and services for interconnections. The managers felt that this complicated the LLO's voice business, as the charges levied by Telkom Kenya were very high which made the LLO's off-net voice business unviable. The process of negotiating interconnection rates with Telkom Kenya also would drag on for months without conclusion. This did not allow the LLO to give the best rates that could allow the LLO's voice services to be profitable. Telkom Kenya had also become a competitor and was now offering similar services and also had the advantage of a nationwide coverage. This challenge was experienced by both Enterprises A and B.

4.1.2.3. *Network coverage*. The managers pointed out that the LLOs marketing strategy amplified demand for their services beyond their geographic coverage. The LLOs launched their services with limited geographic coverage which included Nairobi and a few of its suburbs such as Athi River. But their marketing was done using audio and print media to the entire Kenyan market. After launching their services, potential customers from all over the country would call to inquire about the services, only for the customers to realize that the services were only available in certain parts of Nairobi. Many enterprises with branches outside Nairobi could not take up the service, as they would have preferred to have one service provider for all their communication needs. This was an indication that there was a huge market for the LLO voice and data services outside Nairobi, but the LLO services were not available. This challenge was also experienced by Enterprise B.

4.1.2.4. *Employee drain*. The managers indicated that LLO had managed to source some of the best engineers in the country and went ahead to train them locally and internationally. "I had a one month Huawei equipment Core Network infrastructure training in China," one study participant who was a beneficiary of the international trainings organized by the ICT-BE for its employees said. But by the first quarter of 2008, the LLO was not able to pay their remuneration on time which resulted to a mass exodus of staff. Another respondent, who was also a beneficiary of the ICT-BE sponsored training said " . . . I was more marketable due to the skills and certification I got through the training and therefore I was able to quickly got a new job." This was too much for the LLO, as it could only afford a skeleton staff. The customer care service team became overwhelmed by service queries and complaints and could only give the customers a run-around and not reply their emails in time or address their grievances. This challenge was specific to Enterprise A.

4.1.2.5. *Introduction of excise tax*. The managers indicated that the introduction of excise duty on the LLOs services was mischievous, as it was prompted by the competition. In June 2008, the government through the annual budget introduced 10% excise duty on CDMA networks. The tax incentive was initially thought as a price subsidy by the government to the CDMA operators who included the LLOs and Telkom Kenya. This was prompted by continued complaints by the

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operators of the GSM services Safaricom and BhartiAirtel (then Celtel) as the CDMA services were retailing cheaper than the GSM services. The GSM operators were already paying the 10% excise duty. This resulted in reduction in profitability of the two LLOs as the only alternatives were to either pass the tax to their customers or absorb it. The option of passing this to the customers could result in reduction in usage, while absorbing it could eat into the LLOs profits. This challenge was experienced by both Enterprises A and B.

4.2. *Enterprises C and D*

The two enterprises had invested in huge number of computers for individual use and had special carrels for users who preferred privacy. They also had open network connections for users of Laptops. This allowed the enterprises to maximize terminal usage per minute. By 2005, in most times of the day, there were queues of customers waiting for their turn to use the computer terminals as the demand for public Internet access was high in Nairobi. But the situation was different in 2012, with few people using cyber cafés in the Nairobi's central business district even though the cyber cafés in the residential areas and outlying shopping centers were still enjoying thriving business.

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4.2.1. *Cheaper alternatives*

The study found that the main factor affecting the use of public Internet access in Nairobi Central Business District was a result of the changes in Internet access trends by the majority of early technology adopters. The study respondents indicated that over the last 6 years, telecommunications enterprises have made available new and cheaper Internet access technologies. At the same time, the prices of desktop computers, laptops, and other handheld devices have also continued to decrease, making these devices affordable to most people. With the availability of cheap handheld devices and Internet connections, early adopters who have disposable income are likely to switch as they can afford to acquire the devices and Internet connectivity.

The manager and the employees of enterprise C pointed out that most users of cyber cafés in the Nairobi Central Business District (especially the customers who were their regular customers) were business people who could not afford computers and Internet connectivity. But when these two items became affordable, most users of the cyber cafés could now access Internet from their offices and homes. The importation of second-hand desktop computers offered alternative and affordable computers in the market. By 2007 there was a significant increase in imported second-hand computers after the government zero-rated their duty in 2006. One study participant revealed that he no longer uses cyber café as he had acquired " . . . a second hand Compaq computer and a Safaricom modem."

Enterprises C and D had network points where people would plug-in their laptops for Internet access, but with the arrival of Internet dongles or the USB modem devices, the respondents who now have a laptop no longer visit cyber cafés unless they are doing huge downloads. A participant indicated that she no longer had to access Internet using her laptop at enterprise C premises as she had " . . . a wireless desktop telephone for the office which she uses to access her emails."

4.2.2. *Change in user content demands*

The study respondents indicated that in the late 1990s, most of the cyber café users were mostly accessing their emails for business, interpersonal communications, and searching for jobs. A few people were also using them for research while the other majority was in cyber cafés for love,

romance, or pornographic materials, most of which are now readily available in social networking websites. With availability of Internet on mobile devices, most users can now access their emails through their mobile devices. Mobile telephone service providers are also now offering Internet-free Facebook, email, and online chat on all kinds of phones from first-generation mobile phones to the latest smartphones. The respondents gave the example of student researchers who can now benefit from Orange Kenya free Internet access as it has waived data charges for its customers who have Internet-enabled mobile phones and would like to access Wikipedia through their mobile browsers. All that the user requires is an Orange SIM and mobile Internet-enabled telephone.

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5. Discussion

From the study results, four key themes relating to the impact of ICTs adoption on ICT entrepreneurship were identified from the data. These are service quality, slow ICT adoption, entrepreneur creativity, and ICT dynamism coupled with the switching behavior of the early adopters.

5.1. *Interpretation of case studies: a service quality perspective*

In today's ICTs market, there is intense competition on products and service offering. Ladhari (2009) points out that service quality is an important tool for a firm's struggle to differentiate itself from its competitors. Most ICT-BEs' management normally think of what is important to their customers and try to fulfill it through service delivery. But to have a competitive edge and satisfied customers, the study respondents proposed that the ICT-BEs must meet customer expectations of making available cheaper but quality products and services. Parasuraman et al. (1985) advanced that the key to service quality is for the enterprise to meet or exceed its customers' expectations. Saravanan and Rao (2007) indicate that customer satisfaction is based on the level of service quality provided. Parasuraman et al. (1988) came up with five dimensions of service quality, namely tangibles, reliability, responsiveness, assurance, and empathy. The technical and business challenges experienced by the ICT-BEs product and service offerings relate to these five dimensions.

5.1.1. *Poor-quality equipment as a failure in Tangibles*

ICT users have the tendency to attach the value of the quality delivery to the devices used in the service provision. Robledo (2001) attributes tangibles to the impression that can be expressed by the appearance and evidence of physical facilities, equipment, personnel, and communication materials. Devices that do not give the right image may provoke the customer to switch from one service provider to the other. Parasuraman et al. (1985) defines tangibles as the physical evidence of the service. This includes the physical facilities and equipment used to provide the service. The appearance of the telephones, their quality, and functionalities were poor and the customers used this to interpret the quality of the services offered as inferior to the available alternative technologies. This made it easy for the customers to switch. Therefore, this paper makes the following theoretical proposition.

PROPOSITION 1 *Customers use the appearance and functionalities of the service delivery equipment to judge the quality of an ICT-BE service.*

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5.1.2. *Network capacity and data billing problems as a reliability failure*

Dutta (2001) indicates that network performance is dependent on the size of the customer base. This implies that when the number of customers increase there is an increase in usage of network resources, which then leads to higher network traffic, hence network performance degradation. If the ICT-BE has no prior planning on how to provide the required network capacity due to a sudden increase in the number of customers, this leads to network reliability problems. Parasuraman et al. (1985) defines reliability as consistence of performance and dependability, including the enterprise's ability to honor its promises. This is equally reflected by Bebco (2000), who defines reliability as the ability to perform the promised service dependably and accurately. Reliability as a factor helps the ICT-BEs in evaluating the promised services against the delivered services which are the bases for customer satisfaction and loyalty. Satisfied customers do repeat purchases and recommend the ICT-BEs products and services to other consumers, while unsatisfied customers tend to switch to competitors. With the reliability problems experienced by customers of enterprises A and B, they could not renew their service contracts or recommend the enterprises' products. This had a negative effect on the profitability of the two enterprises. Therefore, this paper makes the following theoretical proposition.

PROPOSITION 2 *Poor network performance due to lack of network capacity planning leads to customers' abandonment of an ICT service, which has a negative impact on ICT-BE.*

Parasuraman et al. (1985) also include accuracy in billing as a facet of reliability, therefore when enterprises A and B failed to acquire a reliable customer billing system to correctly bill their customers; it was an indication of failure in their service delivery reliability. Without proper customer data usage billing, the enterprises were losing revenue and hence reduced profitability. Therefore, this paper makes the following theoretical proposition.

PROPOSITION 3 *Unreliable collection of an ICT service revenue leads to reduced ICT-BE profitability and probable closure of the ICT-BE.*

5.1.3. *Customer care as responsiveness, assurance, and empathy failures*

Customer care is the provision of efficient and personalized services to the enterprises customers. Dutta (2001) indicates that good customer relationship reduces the number of customers abandoning the use of an enterprise's network services. There were a number of failures in customer care services in enterprises A and B.

- *Assurance*: Assurance is the knowledge and courtesy of the employees and their ability to inspire trust and confidence (Parasuraman et al., 1988) on the enterprise's product and services.
  - o Due to the employee drain, they were not able to be courteous and efficient in their duties and therefore they could not inspire trust and confidence on enterprises' products to the customers.
  - o The enterprises also lost credibility with the equipment vendors who refused to offer systems support and upgrades.
- *Responsiveness*: Service providers should be active and prompt in the provision of services (Zeithaml, Bitner, & Gremler, 2006).
  - o The employee drain meant that the employees were not prompt in solving customers' problems and handling customers' requests and queries.
- *Empathy*: Curry and Sinclair (2002) suggest that the empathy is the caring, individualized attention that an organization provides its customers.

- The enterprises did not seek to understand their customers' needs and appropriately look for ways to address them. A limited distribution chain meant that the customers had to walk for distance to get airtime cards. The enterprises should have devised ways of making the airtime cards available in a location closer to the customer's residence or propose a new mode of recharging the customer's account. The off-net calls were also expensive and the enterprises should have made efforts to share the interconnection costs with the customers so as to offer cheaper rates to the customers. As the network coverage was limited, the enterprises should have looked for partnerships in other regions to provide alternative services to their customers who required connectivity outside their areas of network coverage.

Therefore, this paper makes the following theoretical proposition.

PROPOSITION 4 *Poor customer care services leads to customers abandoning ICT services.*

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5.2. *Interpretation of case studies: ICT dynamism coupled with the switching behavior of the early adopters perspective*

Any new user of a technology evaluates the service quality based on its performance and will only continue to use it if it meets the user's perceived service quality expectations. If the quality is not good enough, the user has no choice but to switch to the available alternative technology. Enterprise C was offering cheap and reliable Internet services in Nairobi central business district. But over the years, the Kenyan ICT sector has experienced rapid changes with the influx of alternative Internet access technologies through wireless devices and metropolitan fiber cable connectivity in Nairobi. With the availability of affordable computers, mobile devices, and wireless Internet connectivity, the majority of earlier adopters were quick to try the new technologies, whereas the late adopters and those who could not afford the new technologies continued using the cyber café services. While there was a substantial decline in customer numbers in the Nairobi central business district, the number of customers in residential areas continued to grow. The proprietor of Enterprise C opted to change the enterprise operations base from the Nairobi central business district to a semi-residential area 7 kilometers away. The enterprise has continued to thrive, over the last 2 years. Enterprise D is still enjoying good income and good customer numbers. It is located in a residential area where most people are poor and do not have Internet access facilities at home. The early adopters could access Internet from their offices and the comfort of their houses with the availability of new mobile Internet access ICTs. This led to the number of customers visiting enterprises C and D to continue dwindling. This is even more evident as the cyber cafés in Nairobi city center have either closed down or scaled their operations while the ones in the residential areas and rural areas still attract good numbers of customers.

The introduction of 3G, 3.75G, and CDMA-2000 by the competitors of Enterprises A and B offered alternative Internet access and voice technologies. The majority of the early adopters are usually demanding customers and therefore their loyalty is dependent on the level of the customer care provided. If the customer care is failing and the competition is promising a better offer these customers will quickly switch to the new product. Enterprises A and C could have used the early adopters' feedback to optimize their products and product offering to meet the needs of their existing customers who included the early majority, late majority, and laggards. Providing the late adopters with their desired level of service could retain them as customers since late adopters will only try the ICT if it can meet a personal and specific need that they have. Therefore, Enterprise A needed to increase the convenience of how the customers access the recharge vouchers, reduce interconnection costs, and respond promptly to criticisms from late adopters. The Enterprises C and D are beneficiaries of this group of late

adopters which is composed of late majority and laggards. They have continued to use the old ICT as it is adequate for most of their needs and they are sceptical of the new technology. One late adopter commented: " . . . I do not think it is time to spend my money on a wireless modem at the moment when the service at the cyber cafe is sufficient." Therefore, this paper makes the following theoretical propositions.

PROPOSITION 5a *Rapid changes in ICT products and services provide opportunities to the early adopters to switch to competitors, negatively affecting the ICT-BE.*

PROPOSITION 5b *Rapid changes in ICT products and services provide opportunities to ICT-BEs to target the late adopters with existing products and services.*

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5.3. *Interpretation of case studies: an entrepreneur creativity perspective*

Entrepreneur creativity is a continuous process from enterprise creation to overseeing its operations. It involves doing new things or doing old things in new ways. Entrepreneurial creativity consequently gives the entrepreneur the ability to discern new opportunities for a different business venture or a different service or improvements to existing product or service offerings or processes and practices within an existing enterprise. Entrepreneurs should be able to recognize good opportunities and to have the motivation to overcome any challenges in order to realize their desired results.

This can be seen in the case of the entrepreneur in Enterprise B where the entrepreneur changes the focus of the enterprise operations in terms of its business operations or in the case of Enterprise C which moves its business operations to a different location. Zacca and Selen (2011) suggest that the creativity skill of the entrepreneur and the innovation it spawns distinguish the entrepreneur from the administrator-type owner/manager who applies existing methods or techniques to solve current challenges. Probably this is what was lacking in Enterprise A. The entrepreneurs did not take the initiative to expand the network, as they lacked the necessary capital. This could have been solved through partnership deals that could have injected the much needed capital for expansion and improvement of the network. Enterprise A was also not prepared well to handle competition which is key to growth in such a dynamic industry as the telecommunication industry. The entrepreneur should have anticipated this in the initial stages and planned well on how to overcome the impending competition. The entrepreneur in Enterprise B recognized an alternative opportunity to move the enterprise in a new direction as a regional distributor of leading telecommunication devices and services and grabbed it. Now the enterprise is still a key player in the Kenyan telecommunications industry. The manager said " . . . we are a leading distributor of quality devices with a network of walk-in retail outlets across the country." Therefore, this paper makes the following theoretical proposition.

PROPOSITION 6 *Entrepreneur creativity leads to sustainability of ICT-BEs despite rapid changes in ICT products and services.*

5.4. *Interpretation of case studies: slow ICT adoption perspective*

Most ICT-BEs are faced with the problem of slow adoption in their product offerings. This slow adoption of new ICT products by individual consumers and MSEs negatively affected the operations of the study enterprises.

5.4.1. *Enterprise A*

By the end of 2006 there were new developments in the local ICT landscape. Safaricom started testing its GSM 3G Network in October 2006, with promises of higher data speeds, more security, and more services at competitive prices. During this period, Telkom Kenya was also preparing to launch its Telkom CDMA wireless services while Africa Online was also testing for its Wireless Infinity – a high-speed, secure, reliable and dedicated wireless connection targeting Small and Medium Enterprises. These emerging, competing, and alternative technologies were introduced in the market as Enterprise A was gaining new customers who were the enterprise's products offerings early adopters as the enterprise started the first quarter of 2006. This caused the LLO a lot of problems as the enterprise's products early adopters started moving to acquire the services of the competing enterprises. Enterprise A had not devised measures to counter the competition brought about by these emerging technologies product offerings.

In July 2009, Telkom introduced Internet Everywhere 3G+ services, offering 2.4 Mbps. The Telkom Kenya CDMA technology was better than the 1900 MHz allocated to the LLO. The frequency spectrum allocated to LLO was of higher frequencies but with a shorter reach than what was allocated to Telkom Kenya. The shorter wavelength meant poor signal propagation and building penetration. The LLO frequency spectrum also required more BTS in order to facilitate better service delivery which translates into more capital investment. The Telkom CDMA services also included VoIP, text messaging, audio streaming, and video streaming, in direct competition with what LLOs were offering. Telkom Kenya, with its partner France Telkom's Orange, also introduced 3G GSM services in September 2011, allowing its customers to access speeds of up to 21 Mbps. Telkom Kenya had started offering GSM services after its privatization in January 2008 while BhartiAirtel (formerly Zain – Celtel – KenCell) launched its 3G services in February 2012, based on 3.75G platform capabilities to offer higher data rates. BhartiAirtel started by offering a free seven-day trial period for its customers during the initial 15 days of launching the 3.75G services. The 3.75G platform offered high-speed mobile broadband and Internet access, including video calls and live TV streaming. This implies that the services offered by the Enterprise A competitors had much superior speeds, countrywide coverage and offered cheaper rates. This made it easier for the early adopters to move to these alternative products. Enterprise A saw a huge decline in customers as the late majority, and laggards were yet to adopt its product offerings due to slow adoption of ICTs.

5.4.2. *Enterprise B*

After large-scale testing in May 2007, Safaricom did commercially launch its 3G network in October 2007 offering 7.2 Mbps data rates. Safaricom upgraded this 3G service to 21 Mbps in 2011. Telkom Kenya also launched its fixed wireless services in July 2007. The services were based on CDMA-2000 1X EV-DO technology and the 800 MHz frequency band. By the end of 2007, this service alone had added to the Telkom Kenya more than 150,000 subscribers. These early adopters of Telkom's CDMA services were probably migrating from the enterprise B as 74% of the enterprise's study respondents indicated that they moved to acquire Telkom services with the decline of the LLO's service quality and with the availability of the alternative products. Slow adoption of ICTs affected Enterprise B, as it did not repackage its product offerings for its early adopters to fit its early majority requirements. With the early adopters leaving for the competitors' products, the early majority also followed thereafter, which negatively affected the enterprise profitability.

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5.4.3. *Enterprises C and D*

Early adopters are usually interested in any new product that offers significant advantages over the existing products. With the introduction of affordable mobile Internet technologies for home and office users, most of the consumers of public Internet access services in cyber cafés in Nairobi CBD, who are mainly MSEs owners and other professional employees, could afford to access mobile Internet from home and offices. This meant that Enterprise C, which was based in Nairobi's CBD lost most of its customers. With slow ICT adoption, Enterprise D, which is located within a residential area continue to enjoy huge numbers of customers, as the majority of people who are the late majority and laggards start to embrace use of public Internet access services. These late majority and laggards are yet to try mobile Internet technologies.

PROPOSITION 7 *Slow adoption of ICT products in an environment where the retailers make available new ICT products in quick succession negatively impact the operations of ICT-BEs.*

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6. Trustworthiness of the study

To ensure trustworthiness of this study, the study employs the four concepts of qualitative research trustworthiness as identified by Lincoln and Guba (1985). These four components are credibility, transferability, dependability, and confirmability.

Credibility of a study is the degree to which the findings represent the accurate meanings of the descriptions of the primary participants (Lincoln & Guba, 1985). To achieve credibility a qualitative study must manage the risk of either the researcher introducing his/her own bias or the procedures influencing the participants, hence changing the study findings (Padgett, 2008). Lietz, Langer, and Furman (2006) indicates that a researcher's bias involves preconceived ideas that may shape the way they design the study and engage in analysis and thereby potentially leading to misrepresentation of the data. To ensure the study's credibility, triangulation and member checks were used.

Lincoln and Guba (1985) indicate that triangulation is the corroboration of results with alternative sources of data or using multiple sources of data (Padgett, 2008). This study used multiple sources of data and perspectives to reduce any systematic bias. The study used four sources of data, the customers, the employee, the manager, and the former managers. Creswell and Miller (2000) indicate that triangulation could also be achieved by using varied data collection strategies such as interviews, focus groups, or observations. The study achieved this by using three methods of data collection, including individual interviews, observations, and use of document analysis. This also confirms the transferability of the study since using multiple informants and multiple data collection methods strengthens the study's usefulness for other settings.

Transferability is the readers' ability to transfer the findings to other similar settings. It is the extent to which the study findings can be useful to similar groups or situations (Parahoo, 2006). After the study results were analyzed, they were presented to two other ICT-BEs in Nairobi and their customers, employees and managers agreed with the study findings and analysis. This also confirms the dependability of the study as it is an indication that study findings can be replicated if undertaken with similar participants in a similar context.

Confirmability refers to strategies used in limiting biases by ensuring that the data represent the information participants provided. The study participants were given a summary of the study results, analysis, and discussions in an effort to confirm the study findings and to establish the trustworthiness of its conclusions. The participants agreed that there were no biases or subjectivity in the study results and their interpretation, which agrees with the suggestion by Polit and Beck (2010) that study findings must represent the study participants' voice. A bulleted

list of findings (major themes and sub-themes) which was presented to the managers of LLO A to validate the study findings is presented as Appendix 3.

7. Conclusion and further research

New ICTs always create an opportunity and platforms for new entrepreneurial ventures. But slow uptake of new technologies has resulted to new business ventures winding up even before they get off the ground. The Kenyan telecommunication sector has new applications and services emerging every month and creating stiff competition between the service providers. This increased competition has greatly benefited the consumers through accessibility to many new technologies and services, while enterprises are constantly losing and gaining customers. The study findings discussed in this paper indicate that survival and growth of any new ICT-BE is dependent on its ability to juggle business opportunities with unpredictable ICT trends. Customers demand convenience, better utility, and greater value for their money, which makes it necessary for the ICT-BE to keep on raising the QoSs offered and the level of customer care services. This means that if any ICT-BE provides affordable and reliable services, which is only possible through management's foresight and an understanding of customers' expectations, it can be a profitable venture. Any ICT-BE which is able to differentiate its product offerings through good customer care, reliable services, and enhancing its image through the service delivery, could thrive even with the rapid ICT changes, as these qualities make a customer find switching to other technologies unattractive. Based on these attributes, the ICT-BE could also attract new customers. Changing product or service line, such as enterprise B did through seeking new business activities, could also help an enterprise to continue operation.

Most studies are expected to provide the evidence needed to aid the governments in policy formulation (Walsham, 2013). The policy implications for Kenya from this study are that there is need for the government to cushion ICT-BEs start-ups for the first 2 years of operation through tax exemptions. The government should also develop a government procurement policy which allocates a specific percentage of the government tenders to ICT-BEs, as it has done with the youth, women, and persons with disability.[6] This would give the ICT-BEs the desired platform for growth and stability. ICT-BEs make valuable contributions to the development of the Kenyan ICT sector and the entire economy. Therefore, this study fills a major gap in the literature by identifying some of the variables that hinder the growth of ICT-BEs in Kenya and which consequently tend to hurt the entirety of Kenya's economy. The suggested solutions could be incorporated in the MSEs development plans to assist in the growth of the MSEs sector in Kenya. Shaw (1999) suggests that there is a need to progress the current knowledge and understanding about small firms. The study provides an understanding of the ICT-BEs in Kenya.

The study achieved the research objectives as follows:

Research Objective 1: The study results revealed that unpredictable ICT trends coupled with slow ICT adoption and early adopters' switching behavior negatively affect the growth of ICT-BEs in Kenya. ICT solutions and services are released in the market in quick succession and it is not easy for the ICT-BEs to navigate this ICT dynamism when most users' uptake of a new technology is slow and the users who are quick to adopt a technology will in most cases swiftly abandon any old ICT for the new alternative product or service.

Research Objective 2: The results of the study show that the ICT-BEs can overcome the challenges brought about by the unpredictable ICT trends, slow ICT adoption and early adopters' switching behavior to satisfy their customers' needs and succeed in doing business by providing high levels of customer service and repackaging the products meant for early adopters to gratify the needs of the early and late majority adopters. This repacking of the ICT-BEs' product offering is only possible with creative and innovative entrepreneurship. High levels of customer

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service can boost customer satisfaction, build customer loyalty, and lead to customer retention and taking the competitors' market share.

Future research could be done to enhance the seven propositions given in this study by testing them in different environmental settings and ICT-BEs. An entrepreneurial activity requires both supportive and productive business climate Lee, Florida, and Acs (2004) as well as an environment where creativity and innovation can flourish. Future studies should explore whether provision of government subsidies such as special fiscal incentives and tax holidays for the first 2–5 years of ICT-BE operations could help the ICT-BE overcome the negative impact of rapid changes in ICTs by allowing the ICT-BE to compete effectively and to respond to changes in technology. Future research could test if ICT-BEs should always seek to satisfy the needs of all its current and future customers through individualized attention or concentrate on retaining particular group of adopters, such as the early majority or laggards over a period of product usage, before they introduce new products. ICT-BEs could also try to see whether it is possible to move their existing customers as a group to any new product offerings.

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Notes

1. LLOs are enterprises issued with regional licenses to provide fixed line voice and data transmission services and to expand the last mile access. Their licenses limit their on-net traffic within a geographic district while traffic between designated districts is through any of the country's major fixed or mobile operators.
2. Internet Access Services is the provision of Internet access and related services directly to the public within an enterprise's premises for a fee.
3. http://allafrica.com/stories/201309100315.html?page=3 (accessed 6 January 2014).
4. http://www.accesskenya.com/index.php/media-centre/news/188-dimension-data-offer-for-accesskenya-goes-unconditional-in-all-respects.html (accessed 5 May 2014).
5. Available from http://www.cck.go.ke/resc/downloads/Q4_201213_STATISTICS_final_25th_oct_2013.pdf
6. http://www.agpo.go.ke/ (accessed 20 May 2014).

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Appendix 1

Interview schedule for semi-structured interview (customer)

Interview length: 40–45 minutes

About the interviewee

About the interviewee
Gender:_____
Age:_____
Organization which the interviewee was a client:_____
The Organization product(s) or service(s) the interviewee purchased from the organization:
_____
Date:_____
Time:_____

Service Quality Attributes
Tangibles

1. Are you satisfied with the quality of equipment used by the organization to deliver its services?
2. Are you satisfied with the appearance of the physical facilities at the organization's offices?
3. Are you satisfied with the technological up-to-datedness of the equipment used by the company to deliver its services?

Reliability

1. Are you satisfied with the services provided by the organization as promised?
   a. Have you encountered any problems?
2. Are you satisfied with the delivery and accuracy of the bills provided by the organization?
   a. What are the problems encountered?
3. Are you satisfied with the speed of solving any problems encountered?

Customer Care

1. Are you satisfied with the employees' promptness in providing services in the organization?
2. Are you satisfied with the willingness of organization's employees to help?
3. Are you satisfied with the employee's eagerness of instilling confidence to you?
4. Is the organization providing the products that best suit you?
5. What are your feelings toward the organization's services?
6. Are you satisfied with the knowledge of the employees?

Overall quality

1. How would you rate the organization's overall service quality?
2. Do you intend to continue doing business with the organization?
3. Would you encourage friends and relatives to do business with organization?

Early adopters' switching behavior

How much you agree or disagree with each of the following

1. Do you like to be the first among your friends and family to try something new?
   a. I often try new brands because I like variety and get bored with the same old thing
2. How often do you move to a new technology in the market?
   a. I usually try new products before other people do
   b. When I shop I look for what is new
3. Do you like to tell others about new brands or technology?
4. How likely are you to influence other users to change to a new technology in the market when availed by competing organizations?

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Appendix 2

Interview schedule for semi-structured interview (manager/employee)

Interview length: 40–45 minutes

About the interviewee

About the interviewee

Position held in the Organization:_____

Duration of employment:_____

Date:_____

Time:_____

About the Organization

Location of the Enterprise:_____

Number of employees:_____

Type of business:_____

Business Issues

1. Marketing
2. Suppliers of Wireless Terminals
3. Distribution Chain
4. Employees
5. Competition
6. Enterprise Ownership structure

Entrepreneurial Creativity

1. How often does your organization introduce new technology for its customers?
2. How often does your organization introduce new marketing strategies to existing and new customers?

Rate your organization on the following concepts

1. Availability of entrepreneurial skills (creativity, risk-taking, opportunity identification)
2. The organization encourages employees to freely air any opportunity they identify which would be beneficial to the company
3. There is a lot of management support to secure any resource(s) needed to implement any new idea
4. Presence of organizational processes that explore and exploit innovative ideas
5. Availability of creative thinking skills (combining rather unrelated elements to develop new ideas)
6. The organization is persistently looking for new ways of improving its product or processes
7. I am always in the midst of launching a new project.
8. I am fairly curious and I am continually in search of discovery.

Closure

- Do you think there is anything we have missed out?
- Do you have any other comments about what we have discussed or about the research as a whole?
- A copy of the research findings will be provided to you.
- Thank you very much for your time and cooperation

Appendix 3

Member Checks

A bulleted list of the final findings (major themes and sub-themes) was provided to two managers of the LLO A, as the study respondents to validate the study findings and for clarification of the results.

- **Technical Issues;**
  - o Network Capacity: congestion on the network leads to QOS issues, customers would complain about slow speeds, dropped calls, loss of signal, etc.
  - o Billing System
    - ▪ The billing system (AAA) especially for data was very low end and did not support features of ensuring revenue was not lost. As a result there was revenue lost due to poor systems.
  - o Equipment Vendor Relationship Breakdown
    - ▪ This can be seen as a major reason why the technical issues could not be resolved.
- **Business Issues**
  - o Marketing Blunders
    - ▪ There was a huge market for the product but it was not available where the customers were.
  - o Wireless Terminals
    - ▪ The supplied terminals were being sold at a very high price, however they were of low quality and would break down frequently.
  - o Limited Distribution Chain
    - ▪ Extremely frustrating for the customers
  - o Employee Drain
    - ▪ Inability to pay remuneration on led to a mass exodus of staff
  - o Underestimating Competition
    - ▪ Being in such a dynamic industry the LLO should have been in the initial plans on how to stave off the impending competition
  - o Shareholder Wrangles
    - ▪ Boardroom wrangles could have prevented new partners injecting the much needed capital for expansion and improvement of the network.

The comments from the Managers

Manager 1: "The list provided outlines the mistakes I feel lead to the downfall of enterprise A and has been captured as I presented them"

Manager 2: "It is my conclusion that this list has the reasons for the demise of enterprise A"

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