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Digitization of services for the unserved in East Africa through mobile phone

A Master's Thesis submitted for the degree of
"Master of Business Administration"

Supervised by
Dr. Marc Gruber

Belgacem Chriti

1227982

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AFFIDAVIT

I, Belgacem Chriti, hereby declare,

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ABSTRACT

To serve better customers and to ameliorate the interactivity with them, companies started digitizing their products and services to expand their performance, effectiveness and efficiency. Digitization of services and products permits a better delivery, as it transformed and mechanized the customer relation and marketplace by settling the customers' desires and shifting from time and location based activities to non-location and non-temporal behaviours.

The digitization of services offered cost reduction in any commercial transaction through minimizing labour intensive activities from the provider to the consumer.

The digitization of services is called the Electronic Services (E-service) and is mainly an internet based service. The ratio of internet penetration remains to be the major obstacle for the E-service. This ratio is still very weak –in the so-called developing countries, especially in the East African countries such as Tanzania, Uganda and Burundi, where it doesn't exceed 8%.

Nevertheless a channel like the mobile network is in a progressive growth each year.It can be used to spread the digitization of services and can be a good alternative to the internet.

The digitized service offered through the mobile network doesn't require any access to the internet or mobile internet. It is called mobile service or in short M-service.

The aim of this master thesis is to present the importance and the value created by the digitization of the services on both the providers and the consumers in one of the less served environment in the world.

ABBREVIATIONS

E-service   Electronic Service

M-service   Mobile Service

MSC   Mains Switch Centre

USSD   Unstructured Supplementary Service Data

IVR   Interactive Voice Response

CRBT   Caller Ring Back Tones

SMS   Short Message Service

VAS   Value Added Service

M-Pesa   Mobile Money (In Swahili)

B2C   Business-to-consumer

B2B   Business-to-business

C2C   Consumer-to-consumer

CRM   Customer Relation Management

E-CRM   Electronic Customer Relationship Management

E-Business   Electronic Business

IPTV   Internet protocol TV

ASP   Application Service Provider

ISP   Internet Service Provider

IS   Information System

ERP   Enterprise Resources Planning

E-WOM   Electronic Word of Mouth

E-Governance	Electronic Governance
ICT	Information and Communication Technology
G2C	Government-to-customer
G2G	Government-to-Government
G2B	Government-to-Business
TCRA	Tanzania Communications Regulatory Authority
UCC	Uganda Communication Commission
ARCTB	Agence de Régulation et de Contrôle des Télécommunications de Burundi
GDP	Gross Domestic Product
TCP	Transmission Control Protocol
IP	Internet protocol
HTTP	Hypertext Transfer Protocol
HTML	Hypertext Mark-up Language
XML	Extended Mark-up Language
RTT	Round-trip Time
BTS	Base Transceiver Station
BSC	Base Station Controller
MSC	Mobile Switching Centre
GSM	Global System for mobile communication
CDMA	Code Division Multiple Access
MS	Mobile Station
UE	User Equipment

SIM	Subscriber Identity Module
IMSI	International mobile subscriber identity
FDMA	Frequency Division Multiple Accesses
TDMA	Time Division Multiple Accesses
MAC	Medium Access Control
IWF	Interworking Function
HLR	Home Location Register
VLR	Visitor Location Register
PSTN	Public Switched Telephone Network
BSS	Base Station Subsystem
NSS	Network and Switch Subsystem
OSS	Operation and Support System
VoIP	Voice over Internet Protocol
LTE	Long Term Evolution Technology
CAPEX	Capital Expenditure
NGO	Non-Governmental organization
GDP	Gross Domestic Product
UNDP	United Nations Development Program
VPP	Village Phone Project
OAP	Opportunity Analysis Plan
AKDN	Aga Khan Development Network
IWF	Interworking Function
PCO	Public Call Office

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Problems and aims of the Master Thesis

Digitization of service has been an emergent phenomenon since the internet bubble, companies all over the world are continuously developing and implementing strategies for E-services to create transactional efficiencies and improve the customer's satisfaction[1]. Despite of their common and frequent use in the so-called developed countries[2], the digitized services or E-service are still facing big challenges in developing country where access to internet is limited due to either the high prices and/or to the lack of infrastructure.

The main questions are: Will these obstacles limit the growth of the E-service in these developing countries especially in East African countries, such as Tanzania, Uganda and Burundi? What is the actual situation in regards of the digitization of services? Do E-services incorporate any opportunity? What kinds of E-services are mostly needed by the unserved? Who are the unserved? And the most important question is: How can the mobile network be an alternative channel to the internet and offer digitized service as an innovative mean with a high penetration and coverage?

1.2 Goals and outline

The goals of the present thesis are to reveal the importance of the digitization of services for both companies and consumers, to demonstrate the opportunities it can create either as a new business model or the advantages it offers to offline and physical services as a complementary asset and to prove that in absence of internet due to different reasons such as high prices or lack of infrastructure as the case of the East Africa countries Tanzania, Burundi and Uganda, in the present thesis it will be demonstrated that the digitization of services can be spread successfully through mobile network and may in this way be used by the so-called unserved people in the countries mentioned above, facilitated by a progressive growth and a penetration ratio of more than 54%, compared to the internet penetration which doesn't exceed 8%.

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[1] Ruyter,Wetzels et al.2001

[2] Contrarily to the most frequent used term of the developing countries in the world. As per definition, developed countries have a high living standard and a high Human Development Index (HDI) relative to other countries.

1.3   Structure of the Thesis

This thesis contains five chapters. After a first introducing chapter, the second chapter deals with the digitization of services: Definition, different aspects of digitized services and the different channels for providing these services either by the internet network or the mobile network. It will be demonstrated that digitized services can be provided through other channels than internet and that it can be done in an effective manner, as shown by the mobile money example.

This second chapter will also deal with the classification of E-services either by their level of digitization and level of co-creation or by the business activity supported and their target market. Moreover it will deal with innovation opportunities offered by the E-services either as complementary assets or as a new business model, by stating the value created and the value captured. Another point, that will be discussed, is the impact of the customer relationship management and its importance in business prosperity. That's why the reader of this thesis will find a definition of Electronic Customer Relationship Management, in short ECRM. As the thesis is allocated to the East African markets of Tanzania, Burundi and Uganda, the situation of digitization of services in these developing markets through different environments, such as political, technological and economic environments will be resumed.

The third chapter will be dedicated to the mobile network, its impact and the opportunities offered to the base of the pyramid. The author will also define the base of the pyramid as well as the unserved customers in East Africa and the opportunities that both firms and the segment under discussion can afford mutually to increase the reciprocal value and benefits.

The empirical part in the fourth chapter will present two mobile services offered to the unserved and will demonstrate that this segment should be considered by telecommunication operators, as it presents business opportunities and win-win situations.

Finally the fifth chapter will be the conclusion of this thesis and will present the summary and discussion topics. It will also deal with future research in the field of digitization of services in developing countries like the East African region.

2 DIGITIZATION OF SERVICES

2.1 Definition

Digitization of services is the process of converting services to a digital format which accomplish service needs by flawlessly bringing together distributed, specialized resources to enable complex transaction often in real-time.

Digitizing a service offers the opportunities to outsource non-core IT functions (Information technology functions) without the traditional lock-ins and coordination overhead involved in outsourcing systems and electronic service. According to Hahn and Kauffman it is "… an act or performance that creates value and provides benefits for customers through a process that is stored as an algorithm and typically implemented by networked software"[3].

By digitizing a service, the relationship between the company and its customers is no longer location dependent. Moreover, the service doesn't require the participation of live firm personnel. The increase of technological innovation has contributed to the growth of the digitization of services; it's used to deliver products and services effectively. It can transform and mechanize the customers' relationship and marketplace.

The digitized service is also called Electronic Service or in short E-service.

2.2 E-service:

Electronic Service or E-service is a service that can be delivered electronically. It is also considered as a "provision of services over electronic networks"[4].E-services are interactive services which are delivered through internet or other communication channels such as mobile network using advanced telecommunication information and multimedia technologies. Currently E-services are used in different applications in order to facilitate the daily services usage of customers. We distinguish E-commerce, E-banking, E-ticketing, E-government, E-health, E-booking, E-education, entertainment, social networking communication services and information access.

Charles F. Hofacker, Ronald E. Goldsmith, Eileen Bridges and Esther Swilley (2007, p. 29) discuss three extant types of E-services: (1) complements to existing offline services and

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[3] Hahn and Kauffman (2002): Measuring the Effectiveness of E-Commerce Website Design

[4] Rust and Kannan 2003, p.38

goods, (2) substitutes for existing offline services, and (3) uniquely new core services[5], from which we can classify two main channels:

1) E-service *as a complementary asset:* It includes the E-services which support innovation or an existing offline service or good.
2) *E-service as business model* (including E-services substitutes for an existing offline service, a uniquely new core services or Innovation.

Table 1: Distinguish features of Goods, E-services and Services[6]

Goods	E-services	Services
1. Tangible	1. Intangible, but need tangible media	1. Intangible
2. Can be inventoried	2. Can be inventoried	2. Can be inventoried
3. Separable consumption	3. Separable consumption	3. Inseparable consumption
4. Can be patented	4. Can be copyrighted, patented	4. Cannot be patented
5. Homogeneous	5. Homogeneous	5. Heterogeneous
6. Easy to price	6. Hard to price	6. Hard to price
7. 7.Can't be copied	7. Can be copied	7. Can't be copied
8. Can be shared	8. Can be shared	8. Can't be shared
9. 9.Use equals consumption	9. Doesn't use equals consumption	9. Use equals consumption
10. 10.Based on atoms	10. Based on bits	10. Based on atoms

2.3 Mobile Service (M-service):

Mobile operators classify the services provided through mobile networks into three categories of services. We can distinguish; the Communication Category including (Voice service and SMS), Information Category including mobile internet, and the Entertainment Category comprising betting, Quiz games, CRBT ''Caller Ring Back Tones'', tunes and music downloading etc…

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[5] Charles F. Hofacker, Ronald E. Goldsmith, Eileen Bridges and Esther Swilley E-services: A Synthesis and Research Agenda

[6] Adapted from Charles F. Hofacker, Ronald E. Goldsmith, Eileen Bridges and Ester Swilley: E-services: A synthesis and Research Agenda.

Due to the aggressive competition in the telecom market some operators are trying to diversify their VAS (short for Value Added Services), to satisfy their customers' needs and to acquire more subscribers by developing digitized innovative products and services called Mobile Services or in short M-services.

Mobile services or M-services are services delivered through mobile network using a mobile handset. Compared to classic E-services they are not necessarily an internet based service. In fact mobile services are provided by special service platforms linked to the MSC (short for Main Switch Centre) and to the Mobile Core Network and are managed by the IN (short for Intelligent Network Solution) and the CVBS (short for Convergent Billing Solution).

M-services are mainly offered to consumers who don't need the internet to access the benefit of the services; the Application interface (abbreviated as API) in this case is no longer a web interface like the common E-services are, but rather a USSD (short for Unstructured Supplementary Service Data) or IVR (short for Interactive Voice Response) interface that permits customers to connect in real time during the session, the connection remains open, allowing a two-way exchange of a sequence of data. SMS (short for Short Message Service) can be also used for information exchange, as we will learn from the M-Education case study; the received information and data can be stored in the handset by the customer if any review is required.

M-services are spreading faster than classic web based services in some developing countries, especially in East African countries, because they are facing less obstacles due the higher penetration of mobile network with an average penetration ratio of 54% compared to internet penetration where there is an average penetration ratio of 8%.Furthermore, the mobile network penetration is performing a growth of more than 20% per year[7]. In addition to the general limitation of access to the World Wide Web, the speed of internet is very limited due to the poor infrastructure. This fact also doesn't encourage users to enjoy online services.

One of the main measures supporting the diffusion of the M-services is the adoption of the Mobile Money platforms by the East African telecom operators, which is considered to be the most developed mobile payment system in the world.

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[7] Africa and Middle East Mobile Factbook 2Q 2014
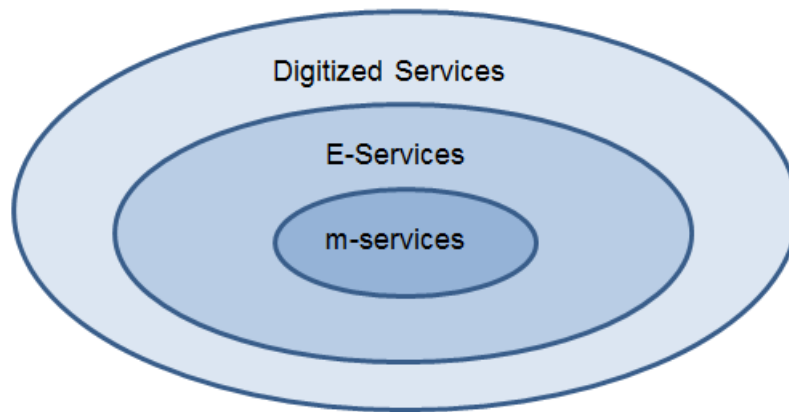
Figure 1: Relation between digitized services, E-services and M-servies[8]

2.3.1   Mobile Money (M-Pesa)

M-Pesa, as the M-Money is called in the Swahili language[9], is a mobile service permitting money transfer and micro-financing service. It can be found in most of the East African and some of the West African countries. The idea behind M-Pesa is that due to the lack of banking infrastructure and absence of bank agencies in most of the villages and small towns, telecom customers were able to use the credit transfer service from their mobile network to send airtime to their relatives who, later, were able to use it or resell it to get cash.

This phenomena encouraged telecom operators to invest in new software and platforms to create a new innovation service which allows users to deposit money into an account stored on their cell phones, to send balances using SMS technology (Short Message Service) to other users (including sellers of goods and services), and to redeem deposits for regular money. Users are charged a small fee for sending and withdrawing money using the service. M-Pesa has spread quickly and has become the most successful mobile phone based financial service in the developing world.

The established Mobile Money platforms are considered very reliable and secure despite they are not really sustainable in some mobile networks. M-Pesa can be used to settle any mobile commerce (m-commerce) transaction such as, buying airtime, paying bills, buying goods etc.

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[8] Adapted from D. Chaffey, E-business and E-Commerce Management, FT Prentice Hall 2002, p. 9

[9] ʾSwahili language is the mother tongue of the Swahili people and is widely spoken in the East African region.

Within the huge success of M-Pesa, the banking sector is starting to adopt this idea and to utilize the service features to develop m-banking with the collaboration of the mobile network providers.

2.4 Classification of E-services

E-services can be classified either by their level of digitization and their level of co-creation or by the nature of business activity that is supported and the nature of their target market, such as business-to-business, business-to-consumer, and consumer-to-consumer.

2.4.1 Level of digitization and level of co-creation

According to Seth and Sharma (2007) products and services can be classified in two dimensions; the degree of digitization which is the level to which service can be digitized, and the capability for co-creation including both service provider and customer interacting in aspects of the design, production and consumption of the product or service.[10]

Some services are entirely digitized in their delivery and interaction such as "Android Play Store" and 'Itunes". In contrast, the process around the physical service can be digitized but they have to be manufactured and delivered physically, and so they give a small range of digitization according to this rating system[11]; the services provided by www.zalando.com (for shoes and cloths) and www.123gold.com (for jewellery) can serve as an example in this context.

The second level is the capability of co-creation in aspects of the design including both the service provider and customer participation and resulting in an interaction between these two parties Classified products and mass customization services of this sort are, for instance, provided by the computer manufacturer Dell Computers or www.miAdidas.com or NikeiD.

However, some service providers design standard services and products like online payment with a low level of co-creation.

Other services provide moderate level of co-creation despite the product is not changed but the customer can create their own outcome. Examples are airlines where flights are fixed but

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[10] Seth, Sisodia and Sharma 2000; Prahalad and Ramaswamy 2004

passengers can create their own itineraries and choose their own seats. Last but not least, some companies are providing services requiring high levels of co-creation (legal services)[12]
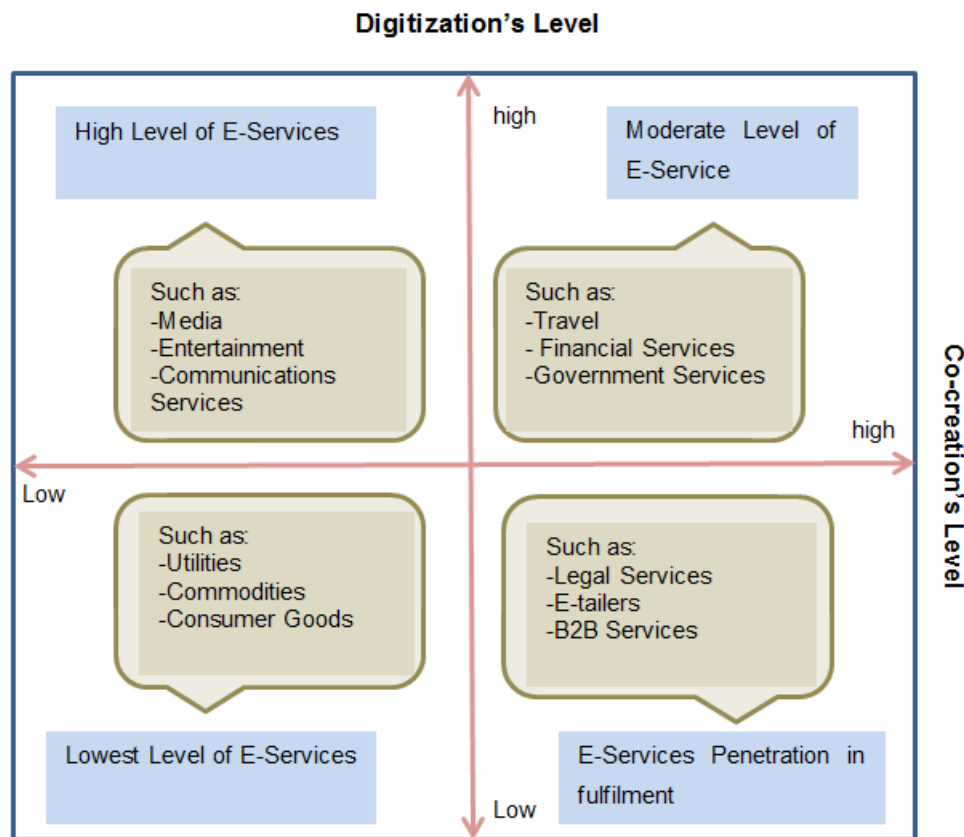
Digitization's Level

High Level of E-Services	high	Moderate Level of E-Service
Such as: -Media -Entertainment -Communications Services		Such as: -Travel - Financial Services -Government Services
Low		high
Such as: -Utilities -Commodities -Consumer Goods		Such as: -Legal Services -E-tailers -B2B Services
Lowest Level of E-Services	Low	E-Services Penetration in fulfilment

Co-creation's Level

Figure 2: Classification of Service[13]

Studies carried out by Jagdish N. Sheth (Emory University) and Arun Sharma (University of Miami) proved that the highest level of penetration concerns the E-services with high level of digitization and low level of co-creation.[14] It seems that both the service providers and the consumers prefer to use the E-service platform. We distinguish these E-services in the media area. Most of the newspapers, magazines, TV stations and radio channels in the developed countries provide information also via the internet through their webpage or mobile applications. Especially the entertainment company also have high penetration of E-services, such as music download and movie streaming services.

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[12] Seth and Sharma 2007

[13] Adapted from J. Sheth and A. Sharma: E-service – A Framework for Growth

[14] J. Sheth and A. Sharma: E-service – A Framework for Growth

In this industry providing E-services is a form of operation and not providing E-services makes firms less competitive. Therefore, high levels of E-services penetration are expected.[15]

The level of E-service penetration is moderate in the area where the level of co-creation and digitization are high. For instance, passengers can book, pay and print their travelling tickets and boarding passes through an E-service platform while the actual trip takes place in a physical environment. As well as in the financial sector: although most of the transactions can be digitized, not all co-creation can be carried out using E-services. Moreover, if an account modification is required, a human intervention is necessary.

In case of a low level of digitization (when firms are not able to digitalize the service and product) but there are high levels of co-creation, the E-services will be used in the fulfilment processes. The E-tailer "Amazon" is an example of conducting users' transaction on an E-service platform but the distribution is physical. Also lawyer are digitizing some of the basic services while the complex and personalized cases retain in the form of the classic ways of work.

Another example is the HP (Hewlett Packard) invoicing system "OB10", which allows processing invoices using E-services.

Lastly, when both of the levels of co-creation and digitization are low, companies will slowly adopt E-services platforms, as they cannot recognize the benefit and the value added from such implementation.

2.4.2 Business activity supported and the nature of their target market

E-services can be also classified following the nature of business activity supported and the nature of the target market in other words business-to-consumer (B2C), business-to-business (B2B) and consumer-to-consumer (C2C).[16]

The dimension of the types of the end products that E-services primarily support can be decomposed into three categories; physical, digital and pure service.

2.4.2.1 Physical service

The E-service supports a physical good; it concerns its assembly, design, aggregation or delivery. For instance, the US courier and logistics company FedEx's package tracking

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[15] Vargo, Stephen L. and Robert F. Lusch (2004)

[16] Amrit T. and Balasubramaniam R.(2001):E-services: Problem, Opportunities and Digital Platforms Page 2

services (B2C) allows customers to track their packages and to know where they are at that moment and can predict when it will be delivered. The computer manufacturer Dell's supply chain management services emphasis on gathering parts and components from across its suppliers on the back end (B2B) and managing their delivery to customers on the front end (B2C). Also eBay's auction service manages transaction of physical goods (and rarely purely digital goods) among buyers and sellers (C2C).

2.4.2.2 Digital service

The primary end product delivered by the E-services is a digital information product[17]. Such products are assembling digital good that exist primarily in electronic form. For example such services include aggregation of purchasable and electronically delivered software (B2C). www.artistdirect.com, www.MP3.com or any other e-music platform from which customer can download tracks from a vast choice of music album can serve as another example of B2C.

Considering also ACM's digital library (www.acm.org), which delivers electronically journal papers in PDF format. Whereas services such as Employease helping business build payroll records for their employees are classified as Business-to-business (B2B). While Services like "Gnutella", previously known as "Napster", or any other Peer-to-peer platform facilitates consumer-to-consumer trade of digitized information products.

2.4.2.3 Pure Service

We consider here pure service in the objective sense of the word; the end product is neither packaged information nor a physical artefact. In the B2B area we distinguish the applications service providers and web-delivered ERP services. The internet services "MSN" and "Yahoo Messenger", which allow customers to chat in real time, exemplify the C2C environment. The online retailer "Amazon"'s customer interest profiler, RebateCentral's rebate tracker are examples of such E-services in the B2C area[18].

We notice that this classification is not always obvious. In some cases, an input can be digital but the output is physical. Furthermore, some of these services can be classified in more than one category.

A complementary way of classification according to Amrit T. and B. Ramesh (2001, p. 2) is to map the E-services in three dimensional spaces according to the relative proposition of

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[17] R. Fileding, J. Whitehead, K. Anderson and G. Bolcer: Web based development of Complex Information product 'Communication of the ACM vol 41, p 84

[18] Amrit T. and Balasubramaniam R.(2001):E-services :Problem, Opportunities and Digital Platforms Page 2

physical and electronic components in them.[19] This way the physical-digital characteristic can be treated as a continuum rather than a collection of discrete states. After mapping accordingly, clusters of similar services can help determine their design, fulfilment and delivery similarities.

Figure 3: Classification of E-services according to their business activities and their target market[20]

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[19] A. Tiwana and B. Ramesh: E-services: Problems, Opportunities, and Digital Platforms

[20] Source: Adapted from A. Tiwana and B. Ramesh: E-services: Problems, Opportunites, and Digital Platforms
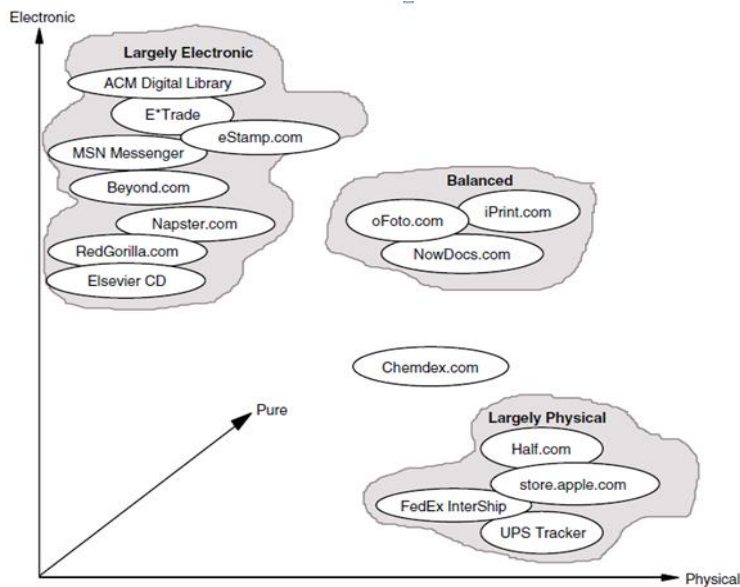
Figure 4: Mapping E-services across their digital, physical and pure service dimensions[21]

2.5 Innovation opportunities of E-services

The wide expansion of internet and telecommunication channels around the globe transformed fundamentally the ways of the services conceptualization and delivery. Accordingly, E-services incorporate not only the relationship between service providers and customers, but also the wide-ranging environment in which the service is rendered.

Correspondingly, E-service may be delivered in many different forms; as a web-site embedded service, as a web application back-end, as a package solution comprising multiple outsourced E-services or as a portfolio of related services delivered on metered basis. In addition to the growth of outsourced services and enhanced reliance on technology for service provision are indications that E-services offer tremendous opportunities for economic expansion.

2.5.1 Role of E-services as Complementary Assets to Innovation

2.5.1.1 Definition of Complementary Assets

Complementary assets are infrastructures, capabilities or means needed to support the successful commercialization and marketing of technological innovation[22]. Complementary

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[21] Adapted from A. Tiwana and B. Ramesh: E-services: Problems, Opportunites, and Digital Platforms

[22] Teece, David J. 1986. Profiting from technological innovation: Implications for integration, collaboration, licensing and public policy. Research Policy 15 (6): 285-305.

assets offer competencies that can be utilized with the know-how of the innovation to make it more effective. These competencies can be competitive manufacturing, marketing, after sales services, distribution, CRM (customer relation management) etc.

We distinguish three different types of commentary assets:

2.5.1.1.1   Generic assets

Generic assets are general purpose assets which do not need to be tailored to a particular innovation.

2.5.1.1.2   Specialized assets

Specialized assets are those where there is unilateral dependence between the innovation and the complementary asset.

2.5.1.1.3   Co-specialized assets

Co-specialized assets are assets for which there is a bilateral dependence between the innovation and the complementary asset.

2.5.1.2   E-services as Complementary assets

Whatever a company's business activity and strategy is, the need for services digitization, software tools and technologies to support the core business processes such as supply chain management coordination, call centre, customer relation management, distribution, inventory management purchasing, work flow management and order fulfilment functions is obvious. E-services endeavour to offer these capabilities with flexibility, adaptability and cost effectiveness. They also support relationship across innumerable stakeholders (suppliers, vendors, retailers) within the company's business without the traditional lock-ins that are associated with large investment in specialized custom developed information systems[23].

The non-monolithic and modular nature of E-services facilitates alliance formation, transactional switching, and delivery of adaptable, flexible, and scalable end-to-end technology architectures for client business[24].

FedEx's E-service enhances the perception of tangibility while reducing both perceived and actual risk by letting customers track packages online. Major airlines allow passengers to buy

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[23] D. Tapscott, D. Ticoll, and A.Lowy, Digital Capitals: Harnessing the Power of Business Webs.

[24] P. Seybold. Preparing for E-service Revolution

tickets online, check and get their boarding passes online. They can also conveniently choose or change seats through the airline company platform. Cisco offers technical support and other after-purchase services on its website.

As an additional benefit, use of this direct channel allows firms to discreetly collect information about their customers, thus permitting service improvements based on customer knowledge[25] (we'll come back to this in the e-CRM section, chapter 2.5.4).

Many companies deploy E-services as virtual improvement or substitutes for classic offline services. Retailers do this to provide additional benefits online (e.g. more sizes or colors, longer product lines, backordering capability and cost reduction) and bring more visibility to their products. The sports shoes manufacturer "Adidas" used its mass customization platform "miAdidas" to extend their sales and to acquire new customers, who were seeking for more customized shoes. The same example is what put in place the competitor "Nike" with its "NikeID".

For instance, "Amazon" provides extensive availability compared to bricks-and-mortar bookstores, and offers value-added features, such as book reviews to assist in selection. The US internet streaming media provider "Netflix" makes it possible to search tens of thousands of movie titles and receive DVDs by mail along with pre-labelled return packages. It also permits customers to watch online TV programmes and films anytime by streaming or simply downloading. "Netflix" make its platform accessible not only by PC, tablet or smartphone application but also through PlayStation 3, XBOX, WII etc.

Recommendation[26] and customization strategies[27] are typically implemented more efficiently online than in person; they can generate significant competitive advantage both through lower cost and increased customer benefits.

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[25] Iqbal, Verma, and Baran 2003

[26] Ansari, Essegaier, and Kohli 2000

[27] Rust and Kannan, 2003

2.5.2 E-service as an innovative business model

2.5.2.1 Business model definition

According to Magretta (2002) business models are "stories that explain how enterprises work". A good business model answers Peter Drucker's age old questions: Who is customer? And what does the customer value? It also answers the fundamental questions every manager must ask: How do we make money in this business? What is the underlying economic logic that explains how we can deliver value to customers at an appropriate cost?"[28]

A business model is also a concise representation of how an interrelated set of decision variables in the area of venture strategy, architecture, and economics are addressed to create sustainable competitive advantages in defined markets. It has six fundamental components: Value proposition, customer, internal processes/competencies, external positioning, economic model, and personal/investor factors (Morris et al. 2005).

Amit & Zott (2010, p.216) state, "The business model depicts the content, structure and governance of transactions designed so as to create value through the exploitation of business opportunities". Based on the fact transactions connect activities, the authors further evolved this definition to conceptualize the company's business model as "a system of interdependent activities that transcends the focal firm and spans its boundaries".[29]

As the immediate expansion of the Internet and communication channels coupled with the considerable decrease in communication costs the development of digitized services was feasible. The fast expansion of E-services has allowed the development of new ways to create and deliver new value added services and products through the creation of unconventional exchange mechanisms and transaction architectures. Furthermore, it emphasized the possibilities for the design of new boundary-spanning organizational forms. Indeed, these progresses have unlocked new horizons for the design of business models by permitting companies to change fundamentally the way they organize and engage in economic exchanges, both within and across firm and industry boundaries[30]. According to

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[28] C. Zott R. Amit and L. Massa "The business Model: Recent Development and Future Research"

[29] Amit, Zott, 2010

[30] Mendelson H., 2000: Organizational Architecture and Success in the IT Industry p. 513-529

Brynjolfsson and Hitt (2004, p.31), this includes the ways in which firms interact with suppliers as well as with customers.[31]

Companies offering new core E-services are among the most dynamic in the economy.

2.5.2.2 New Core Services

Portals such as "Google" are changing the services landscape in a very intense way. Contrasting its competitors (e.g. Microsoft), Google began as a pure E-service. While Microsoft fights to produce a new version of computer software once every several years, "Google"'s interacted software services are updated hourly. Moreover, Google has redefined how advertising functions, moving from the traditional obtrusive model of broadcast media to leveraging the context afforded by networked software.

Google Map's geographic service is available to an out-of-towner trying to find an address, e.g. to a business creating a real time parking spot exchange in Manhattan, to a government agency performing epidemiological analysis, and to a real estate broker offering an infomercial on local housing offerings. *Google Maps* can provide a unique pattern of benefits with greater flexibility and more information than a traditional paper map.[32]

The blog hosting site *MySpace* is another interesting example of a new core E-service because it shows the potentially discontinuous relationship between E-service software development and competitive advantage.

Another example is the online game provider *World of WarCraft* simultaneously hosting hundreds of thousands of gamers permitting users playing online and also interacting and competing against other online users in a shared virtual universe.

E-service software details, especially where design elements impact social processes, can matter a great deal with respect to marketing outcomes.

In regard of the pre-existing businesses or businesses based offline, developing new E-services may include a simulation and thinking once again about the answer to "what business are we in?" because applying the business in the electronic environment will involves changes for the existing business; it requires novel thinking to develop new products.

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[31] Brynjolfsson and Hitt 2004: Intangible Assets and the economic Impact of Computers, p.27-48

[32] Charles F. Hofacker, Ronald E. Godsmithn E. Bridges and Esther Swiley: E-services: A synthesis and Research Agenda.

On the other hand new E-services can be created by "decoupling" sections of the value chain from existing businesses and offering them online.

2.5.2.3 Business Models for E-Business

The term E-Business means doing business electronically or (Electronic Business); it includes e-commerce, e-markets and internet based business. It also refers to companies conducting commercial transaction with business partners through the internet.[33]

In his research Applegate (2001) introduces the six following business models: Focused distributors, portals, producers, infrastructure distributors, infrastructure portals and infrastructure producers.[34]

We can also identify the following principal dimensions for classifying e-business models. We can distinguish: The user's role, the interaction pattern, the nature of the offering, the pricing system, the level of customization and the economic controls. What is common to these approaches is an attempt to describe and organize around typologies and taxonomies the plethora of new perceived business archetypes enabled mainly by internet technologies.[35]

In the domain of e-business we noticed the changing nature of customer-firm relationships. Especially in the monetization of e-business domain, Pauwels and Weiss (2008, p.14-31) examine "fee and free" business models for providing digital content on the Internet. Their researches emphasis on the companies' performance implications of a shift from the "free" to the "fee" model and empirically analyses the role that marketing actions can play in accommodating this shift.[36]

In the regard of the degree of Internet advertising effectiveness, Clemons (2009) offers an overview of business models for monetizing Internet applications and E-services. He argues that "although the majority of attempts to monetize internet applications targeted at individuals have focused on natural extensions of traditional media or traditional retailing, there are several potential online business models that are not based on advertising and that given declining advertising effectiveness might constitute a better choice." Let's also consider the convergence of different media channels onto one digital platform which has resulted in

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[33] Mahadevan B. 2000. Business Models For Internet based e-commerce

[34] Applegate 2001: Emerging Business Models: Making Sense of the internet business landscape.p 49-101

[35] C. Zott R. Amit and L. Massa "The business Model: Recent Development and Future Research"

[36] Pauwels and Weiss 2008: Moving from Free to Fee. Journal of Marketing , 72: 14-31

structural change in the media industry. McPhillips and Merlo (2008) refer to this convergence by introducing the term media business model.[37] Structural change in the media industry also has been driven by the advent of new communication channels, such as mobile services (M-services). The implication of M-service in the media arena is the provision of IPTV (short for Internet protocol television) services by the telecommunication operator which allows its customers to enjoy the television programs on their handset if they are using a Smartphone.

2.5.2.4 Application service Providers

We consider the application services that drop along the borders of intangible and digital ends focused services in the B2B category. They are provided by application service providers (ASPs) as Internet service providers (ISPs) provide Internet access, although more complexly. Application service providers (ASPs) are information system (IS) service companies that commercialize software and information systems as a rental service rather than a software product or license of ownership. These service providers provide contractual service offerings that collectively deploy, host, manage, and rent access to an application from a centrally managed facility; they are – directly or indirectly – responsible for providing all the relevant expertise and supporting specific activities targeted at managing this application set[38]. These application service providers offers their services to customers over a network, typically internet and recently as integrated service to their own platform like the telecom operators start providing to monetize their assets in an efficient way, based on a contract between a service purchaser and provider that is structured around levels of service. Rather than having to choose technologies, customers get to choose outcomes such as acceptable performance levels, downtimes, transaction processing time bounds, response times, etc. Consequently, the market is being penetrated by a variety of firms, and in effect, changing the very face of outsourcing contracts.

We focus on application services for four reasons. First, they represent a category of online services that is growing at a phenomenal rate with a huge market value, they represent a new business model for outsourcing IS, and services in general. It is one of the fastest growing area within will be application services. Third, ASPs are making IT investments more competitive in a business environment where up to 40% of enterprise IS costs are spent in maintaining applications by shifting the maintenance burden away from the client side. And

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[37] McPhillips and Merlo 2008: Media Convergence and the evolving media business model. Marketing Review,8: 237-253

[38] C. Gillan and M. McCarthy: ASPs are Real.. but what is right for you?

finally, since it concerns the mobile telecommunication operators, on which we will focus in chapter 3 of this thesis.

Two predominant ASP firm models exist: (1) the application outsourcer and (2) the managed application provider[39]. While both types provide template configured versions of software through remote hosting of applications, the latter type represents a majority market share, essentially distinguished by three factors:(1) wrapping a set of services around outsourced applications, (2) offering higher degrees of application customization to fit each client's needs, and (3) employment of variable-pricing schemes that significantly differ from the fixed monthly fee structures used by application outsourcers, the model mainly used is the revenue share model. The second model has a striking degree of semblance to IT service providers who deliver third-party applications such as enterprise resources planning (in short ERP) systems as part of a suite that includes implementation, consulting, integration, maintenance and ongoing management.

2.5.3   Value Creation and Value Capturing

2.5.3.1   *Creating value for customers*

The concept of value creation is crucial for companies to compete in any domain, since it is only with a high value creation comparing to rivals they can get more opportunities and high profitability.

The value created is the difference between the customer's perceived benefit from a given product or service and the company's cost to deliver that product or service. For a better understanding of the value creation concept in E-service, T. Jelassi and Albrecht Enders define the relationship between; the customer benefit, cost and value created as following:

2.5.3.1.1   Customer benefit

Customer benefits are the value that each single consumer gains from a product or service. It consists of the buyer's willingness to pay for a given product or service.

To explain this concept, let's consider the online auction company eBid.net, we suppose we want to buy a Canon digital camera at eBid.net. After choosing one camera, we have the possibility to enter the bidding agent a maximum price at which we would be willing to buy a camera. Let's imagine this particular camera have a perceived value of 500$.The bidding agent then starts at the lowest offering price of 50$. Any time another bidder enters the

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[39] Faulkner, ASP Market Segments (1999)

competition and beat our bid, the bidding agent is automatically activated and places a bid just above the previous one, until it reaches our maximum price of 500$. If anyone else goes over this amount we drop out. The understood meaning behind this is that the benefit that we expect from the digital Camera does not justify the higher price that is now being charged. Our customer benefit and, therefore, also our maximum willingness to pay are 500$.

2.5.3.1.2 Cost

Simply it comprises all the expenses that are incurred in providing a product or service to the consumer. This involves different cost items, such as technology development, raw materials, production, marketing, sales and distribution. Variable costs, such as raw materials for a product or postage, can be attributed directly to an individual product, whereas fixed costs, such as the costs for the development or maintenance of a website or the construction of a warehouse, need to be spread out across all the products that are sold through this portal. The costs of firms depend on different cost drivers, such as economies of scale and scope, capacity utilization, previous experience or input prices.

2.5.3.1.3 Value Created

The Value created is the difference between the benefit that customer experience from a product and the costs that are incurred to produce it. The main two requirements that a company must fulfil to be able to compete in the marketplace are (1) the value that it creates is positive; the costs must be lower than the benefit it provides to consumers. Despite the evidence given by this requirement many companies didn't pay enough attention to it during the internet boom days. When offering doubtful customer benefits at outrageous cost. The example of *Iridium*, a product introduced by the US phone manufacturer *Motorola* in 1998, is a proof of a negative value created. Its aim was to redefine mobile telephony by introducing uninterrupted wireless communication anywhere in the world. The production costs for this service were about five billion dollars. However, this network suffered from several disadvantages: indoor poor coverage, handover problems, the handset were big and heavy. Faced with comparatively low consumer benefits, high costs, and low subscriber numbers of fewer than 50 000 subscribers, *Motorola* decided to terminate the project prematurely in 2000

(2) The value it creates must be higher than the value that is created by competitors. The only way for a company to carry on its business over the long term is to create similar or higher value than its rivals. Competitors can at any time reduce the prices due to lower costs or offer customers more benefits with the same price.

Consumer benefits are difficult to measure, because it cannot be quantified objectively, regardless of place, time and person. Instead, it is an abstract concept that varies from individual to individual[40], and it depends on:

- Personal preferences: we can have the benefit from driving a sports car, whereas our next-door neighbour, who has three children, will get much more benefit from a minivan.
- Place: a freezer in the North Pole compared a freezer in the Sahara.
- Time: the benefit of electric light during the day versus at night.

The varied range of characteristics for customer benefit can be divided into tangible and intangible sources.

2.5.3.1.4   Tangible sources of customer benefit include the following:

- *Product quality*: it refers to the objective qualities of a product, such as its functionality, durability (or reliability) and ease of use and installation. For example, the quality of a *Ferrari* car can be determined accurately by metrics such as maximum speed, acceleration, fuel consumption, or breakdown rate. On the other hand, the quality of *www.Tesco.com* 's online grocery business can be measured by the freshness and overall quality of the goods delivered.
- *Degree of product or service customization:* the more the product or service adapt to specific customer needs, the more benefit it creates for the individual user. *Dell* manufactures the PCs following specifications required by the customer, occasioning two sorts of benefits. First, all the components that an individual customer values in a PC are included; second, all components that are not valued are left out, thus helping to keep down PC prices.
- *Convenience:* the physical and mental effort that customer expends and time spent during the purchasing process need to be considered when comparing different suppliers. That's why consumer don't go to discount supermarket for a small bag of tea and prefer buying it from a local store despite the tea bag is more expensive. Through its online grocery service, *www.Tesco.com* 's purpose is to increase convenience for shoppers.
- *Service quality:* it refers to the friendliness and know-how of sale agents or, in case of digitized services it refers to the degree of personalization, ease of use, and response time and information quality of online enquiries.

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[40] T. Jelassi and A. Enders : Strategies for e-Business

- *Delivery Time*: the quick delivery is very important condition to consumers benefit. It generally depends on the location of the provider, and his quality of logistic process. The significant competitive advantage of company depends on its management approach, superior process flow and IT systems and application. For instance Amazon.com installed its warehouse in a way to be able to ensure the products are available and can be delivered in a record time.
- *Product range*: A wide range and profound selection provides an important basis of differentiation from competitors since it permits suitable and quick one-time shopping. Amazon.com is a good example of a retailer having a deep and wide product range, since customers can find, for example, most book titles that are currently in print (and out of print).

2.5.3.1.5   Intangible sources of consumer benefit include the following:

- *Brand*: it refers to the perceived qualities that customers associate with the firm that is providing a product or a service. A strong brand is a result from products that meet high-quality standards. It can also be a result of intensive and innovative marketing activities. Brands need to be put together and developed in order to be used as a differentiating characteristic in the marketplace. Heavy investment is required to create a new e-business brand such as *eBid.net*. On the other hand for already established firms such as *Tesco*, it's less difficult to gain online customers. They have advantages and the benefits from their solid brand through their outlet and Points of Sale (POSs).
- *Reputation*: it refers to the past performance of a firm; it is a major factor influencing reputation because it decreases their purchasing risk. Especially when a customer is making an online payment using his or her credit card. Most of them still feel uncomfortable when giving this information to an unknown firm and for them the company's reputation is crucial.

Customer benefit always depends on what the other companies in a specific industry offer, because consumers continuously compare different product providers to bring this dimension. T. Jelassi and A. Enders (2004, p. 100) differentiate between threshold features and success.[41]

- *Threshold features*: refers to the minimum necessities that a firm must accomplish in any product or service. If a firm cannot meet these minimum requirements, then it will

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[41] T. Jelassi and A. Enders 2004: Strategies of e-Business

get left out from the market because consumers will not even take it into consideration. A threshold feature might be, for example, a digital platform with functioning links or a secure payment mechanism for online transactions. These are required features that do not differentiate a product.

- *Success factors*: refers to the benefits that can be decisive for the consumer when choosing a specific product over the other. Those benefits are crucial for the buyer's decision to purchase a given product. At *Nordea Bank* for example, critical success features are the use easiness of the online banking site and the e-business services provided.

As conclusion, both threshold features and critical success factors produce customer benefit, but only the last improves the capability of a company to distinguish itself from its rivals by creating a superior consumer benefit.

2.5.3.2 Capturing Value

As much it's important to a company to create value that is higher than the competitors it's very important also for such company to capture a part of the value it generate in the form of profit or producer surplus.

Value creation doesn't give any information about how the value is distributed between customers and vendors, this distribution can happen through the price, the company is charging for a product or service. It can divide the value created into two different entities; the producer surplus and the consumer surplus[42].

- *The producer surplus*: it refers to the profits that a firm makes when commercializing a product. Basically the Profits are the difference between the price at which the product is sold and the costs of producing it.
- *The consumer surplus:* refers to the difference between the customer benefit, which is the maximum willingness to buy a product, and the price the customer has actually paid for it. Communally customers search for products or services that provide them a better surplus which can be accomplished through a higher customer benefit level at a similar price as other products or by a lower price with an equal quality.

We notice two factors influencing the value between customer and vendors: (1) Industry structure and (2) the relative level of a company's value creation

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[42] T. Jelassi and A . Enders : Strategies of e-Business

- *Industry structure:* refers to distribution of value depends on the arena in which a company is competing. Porter's five forces framework allows finding how value created is distributed. Industries with highly aggressive competition, low entrance barriers and readily available substitutes tend to be less attractive and, therefore, less profitable. This is due to the fact that existing and new competitors decrease prices in order to gain market share from their competitors. This means that the value created typically goes to consumers in the form of low prices. Therefore, it is difficult for a company to gain attractive profits in an industry that is characterized by the above-mentioned factors.

- *Relative level of a company's value creation*: It is the second important factor that determines profitability. If a company accomplishes to create higher value than its competitors, then it has the potential to gain attractive profits, even in highly competitive industries. For instance and in the PC area, *Dell* is gaining a high profit because of its unique direct sales model. Implementing this model the computer manufacturer gets rid of intermediaries in the distribution chain hence increase its profit.

2.5.4 Electronic Customer Relationship Management e-CRM

Electronic customer relationship management (e-CRM) refers to the use of the advanced network channel and digital applications to manage customer relationships. E-CRM is a procedure that allows the digitized services manager to achieve the following goals: First of all they aim to acquire customers, attracting them to their online platform where it is hoped they will interact by seeking information, detecting potential products, and eventually buying. Second, E-service managers want to retain the most profitable customers who use the service by creating a relationship with them to make them come back, it is hoped, as repeat users (or buyers). This is characteristic of e-commerce is often mentioned to as "stickiness".[43] Third, managers want to improve these consumers by means of up-selling and cross-selling to make them even more profitable. Fourth, they want to consult their customers as treasured sources of information about current and future market offerings, using customer input to improve marketing strategy. Finally, they want to convert their customers into brand representatives who promote the brand to other consumers through word-of-mouth or (e-WOM) which consist of emailing the link of the portals to their contacts or sharing the firm's link on social network as *Facebook*, *Twitter*, *Google+* etc.

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[43] Boyer, Kenneth K., Roger Hallowell, and Aleda V. Roth (2002): E-services: Operating Strategy. *Journal of Operations Management*, 20 (2), 175-188

As the advanced telecommunication networks allowed diverse activities of a company's value chain, e-CRM has also became imperative since it aims at:
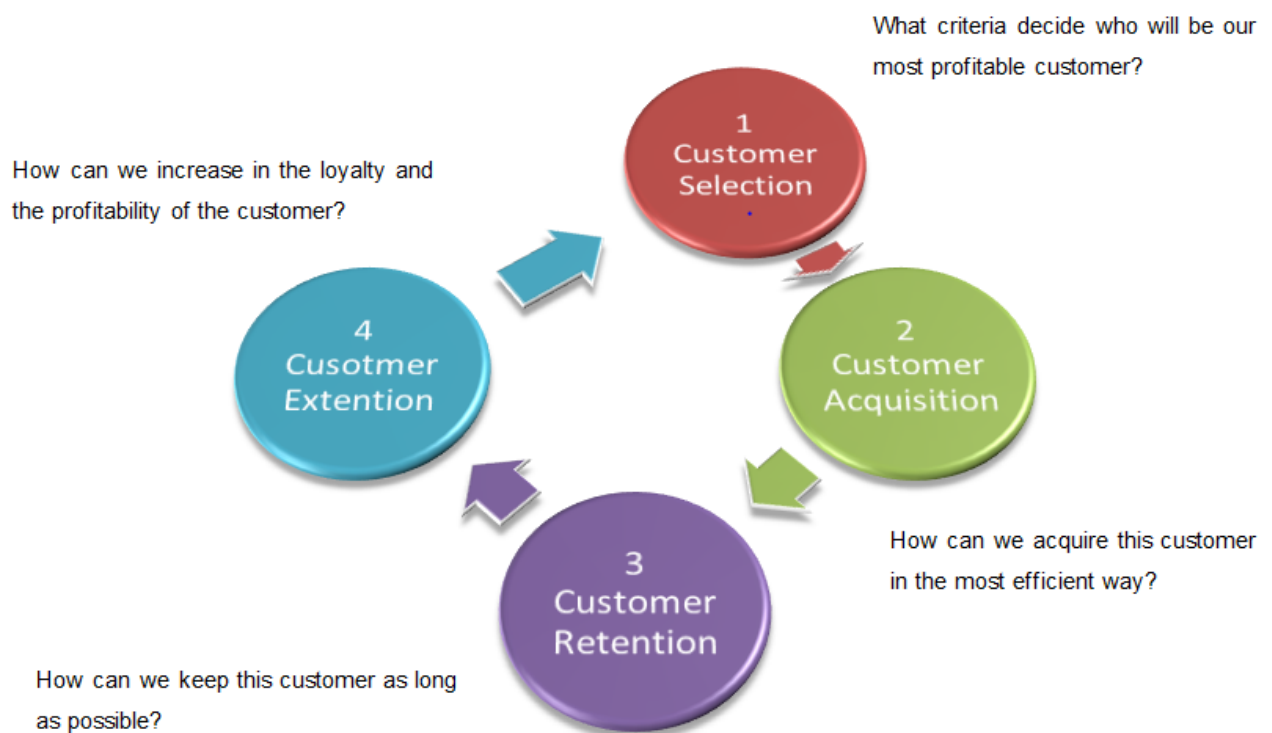
- Creating long-term relationships with customers to counterbalance acquisition costs
- Reducing the rate of customer defections
- Increasing the portfolio through cross-selling and up-selling
- Increasing the profitability of low-profit customers
- Focusing on high-value customers

E-CRM comprises the following four main elements (see figure 5): (1) customer selection, (2) customer acquisition, (3) customer retention, and (4) customer extension.

- *Customer selection*: refers to customer segment targeting, which was discussed in Section 2.4.2.
- *Customer acquisition:* includes sales, promotions and other motivations to (1) acquire completely new customers and attract existing ones to register on the online platform. In order to engage a customer in a relationship through the online channel. A firm needs to have at least the customer's basic information such as e-mail address. More detailed customer profiles include information such as a customer's personal interests, age, financial status address and role in the purchasing process. To acquire more detailed information, firms don't hesitate to offer customers an incentive such as free product sample or discounting. Companies use a number of different marketing tools to get potential consumer attention.
After using simple banner advertisement, marketers have added more sophisticated tools such as 'viral marketing', where customers can forward a portal link or other types of company information to each other via e-mail or through social media platforms.
- *Customer retention:* has the aim of converting one-time customers into repeat purchase customers and keeping them for as long as possible in their online channel. Two procedures can accomplish the customer retention; we can distinguish the personalization and communities. The personalization or mass customization feature on a platform allows consumers to match their specific needs, helps to increase 'stickiness'. Strong online communities with many other different users help to create network effects. Both personalization and online communities encourage users to stay with a particular firm.

Customer extension emphases on increasing the lifetime value of a customer. Companies achieve this by intensifying the scope of an existing customer relationship through cross-selling. For Instance East African telecommunication operator *Smart* is integrating triggered

data-mining to cross-sell more mobile services to its existing customers.[44] Triggered data-mining works as follows: When there is a change in a customer account – for instance, a larger consumption than usual (which can mean change to a more incentive job or change from jobless situation to active working, or change from student status to working status), an address change (change from the calling location, comparing to the previous months, it compares monthly the day and the night outgoing and incoming calls), in or a marital status change (can be got from the *Facebook* status or from the outgoing or incoming calls to a specific number) – a trigger in the database is set off and informs about this change. Exploiting these data helps the company to provide and define the right product and service to its customer according to their new needs matching their new situation and behaviour.

What criteria decide who will be our most profitable customer?

How can we increase in the loyalty and the profitability of the customer?

1 Customer Selection

4 Cusotmer Extention

2 Customer Acquisition

3 Customer Retention

How can we acquire this customer in the most efficient way?

How can we keep this customer as long as possible?

Figure 5: Customer Relationship Management Cycle[45]

2.6 Digitized services in the East African Environment

While digitization of Services is prospering all around the developed countries and is offering several opportunities to either companies or users, it's still facing big challenges in

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[44] Actually developing this Project as Commercial Director of Smart Tanzania.

[45] Adapted from T. Jelassi and A. Enders Strategies of e-Business

developing countries and especially in East African countries, such as Tanzania, Uganda and Burundi.

The main challenge and obstacle to the E-service platforms is the penetration of internet. The penetration in Tanzania amounts to 12%, in Uganda to 13% and in Burundi to 1,7%. In other words, there are about 8.1 million internet users compared to a total population of these three countries of 96 million inhabitants, which makes a penetration ratio of 8%[46].

Moreover, the access to the internet is limited and the speeds are also limited, additionally to the high costs for internet services. For instance, the average price of an exemplary telecommunication provider in Tanzania is 400$/Mb per month.[47]

Mobile operators are the main enabling internet access to these populations. These countries are characterized by miniscule penetration of the fixed lines, which indicates that internet access via wireline access infrastructure (DSL cables or fibre optic) is only possible for a minor segment of the population, mainly big companies and organizations can afford and implement such infrastructure.

Mobile internet access accounts for more than 90% of the total internet subscription. The TCRA (Tanzania Communications Regulatory Authority) reported that the mobile internet access subscription are having a growth rate of more than 38%, Uganda Communication Commission UCC stated that the mobile internet access subscription constituted 85% of the total population. In regards of Burundi the ARCTB (L'Agence de Régulation et de Contrôle des Télécommunications) informed that it is around 29% and the growth is estimated to be 65% per year between 2012 and first quarter of 2014. However, the continuous growth is facing a main barrier which is the power supply for recharging the mobile devices. In the East African region the fraction of the population with mobile internet access but no access to electricity is growing particularly in the rural areas, where less than 3% of the rural inhabitants have access to electricity.[48]

Thus the lack of reliable power supply is another obstacle for the growth of E-service.

The main indicator of the E-service level is the consideration of the E-governance indicator which resumes the situation of digitized services in these countries.

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[46] Cf. www.internetworldstats.com

[47] Based on the prices offered by BOL (Benson Informatics Limited) April 2014

[48] Le Wang, Edward Mutafungwa, Yeswanth Puvvala and Juka Manner: Strategies for Energy-efficient Mobile Web Access

2.6.1 E-governance

E-governance or electronic governance refers to use of digitization of government services. Also can be defined as the application of information and communication technology (ICT) for delivering government services, exchange of information communication transactions, integration of various stand-alone systems and services between government-to-customer (G2C), government-to-business (G2B), government-to-government (G2G) as well as back office processes and interactions within the entire government framework. Through e-governance, government services will be made accessible to citizens in a convenient, efficient and transparent manner. The three main target groups that can be distinguished in governance concepts are government, citizens and businesses/interest groups. In e-governance there are no distinct boundaries.

Generally four basic models are available: government-to-citizen (customer), government-to-employees, government-to-government and government-to-business.[49]

Table 2: E-government development index[50]

Rank	Country	E-gov index Value	Online service component	Telecom. Infrastructure component	Human Capital Component
139	Tanzania	0.3311	0.3529	0.083	0.5564
143	Uganda	0.3185	0.2941	0.0732	0.5883
173	Burundi	0.2288	0.1503	0.0173	0.5188

Referring to the UN E-government survey, we notice that the three countries of Tanzania, Uganda and Burundi are considered to be three of the least developed countries in E-service adoption, but fortunately the growth of the different indices in 2012 for these countries is considerable compared to the previous year (2011). For instance, the index value of Burundi increased by 14% compared to the previous year. A similar pattern was seen in Uganda (increase of 13.26%) and Tanzania (increase of 13.16%). The growth for the coming years is estimated to be more than 16% per year.

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[49] Garson, D.G. (2006): Public Information Technology and E-Governance. Sudbury, MA

[50] Adapted from UN E-government survey 2012.

In Tanzania, for instance, all of the existing 21 government ministries, 18 departments and 29 agencies are at least at the web-presence stage, where static websites have been implemented. Also, there has been an increase in the use of emails and internet in the public sectors. Further, various training programmes on the use of computers are conducted at different levels within and outside the ministries. Despite the progress made in this area, ensuring confidentiality, integrity and availability of critical information remains a challenge. The national e-government strategy has highlighted some significant issues such as lack of proper policies, strategies and institutional frameworks for supporting e-government initiatives at the institutional. This barrier has been caused by, among others, lack of strong directives from above (top management), lack of proactive leadership and weak support from management team members.

As a result there have been unorganized e-government initiatives in Tanzania which have led to a duplication of e-government initiatives that resulted into losing the few available resources.

Table 3: E-services Usage in East Africa (Tanzania, Uganda and Burundi)[51]

E-services Applications	Example of Applications	Usage of the application			Observation
		Tanzania	Uganda	Burundi	
E-Health	E-healthcare	Yes	Yes	Inexistent	Initiated by the Agha Khan Hospital
E-ticketing	Buy flight ticket	Yes	Yes	Yes	
	buy a concert or an event ticket	Inexistent	Inexistent	Inexistent	
E-Banking	Bill payment	Inexistent	Inexistent	Inexistent	
	Transfer Money	Yes	Yes	Yes	
	Applying for loan	Inexistent	Inexistent	Inexistent	
	Check exchange rates	Yes	Yes	Yes	
E-Government	Financial Services	Inexistent			
	Legal Services	Yes	Yes	Yes	Government Portal Offers few services
	License renewals	Inexistent	Inexistent	Inexistent	
	Filing and payment of income taxes	Inexistent	Inexistent	Inexistent	
E-Education	E-library	Yes	Yes	Yes	Not very common
	Online classes	Inexistent	Inexistent	Inexistent	
	Download notes	Inexistent	Inexistent	Inexistent	
	Checking marks	Inexistent	Inexistent	Inexistent	
	Download forms	Yes	Yes	Yes	
	Examination and registration	Inexistent	Inexistent	Inexistent	
Social Networking	Social Networking Service	Yes	Yes	Yes	Usage of social Network (Facebook, twitter g+ is increasing
E-Commerce	E-Commerce	Inexistent	Inexistent	Inexistent	
	M-Commerce	Yes	Yes	Yes	is increasing, impact of the success of M-Pesa
	Marketing	Yes	Yes	Yes	
	Commodities like cloths and books (buy)	Rare	Rare	Rare	
	Commodities like cloths and books (sell)	Rare	Rare	Rare	

[51] H. Taherdoost, S. Sahibuddin, N. Jalaliyoun: E-services Usage Evaluation Application's level of Co-creation and Digitization

	Scientific Paper (buy)	Rare	Rare	Rare	
	Any kind of downloading like music (buy)	Rare	Rare	Rare	
Entertainment	TV Stations	Inexistent	Inexistent	Inexistent	
	Radio Stations	Yes	Yes	Yes	Some of the local radios have online broadcasting
	Newspapers	Yes	Yes	Yes	
	Online games	Yes	Yes	Yes	Many users connect online to play
	online music	Yes	Yes	Yes	Many users connect online to listen to music
	online movies	Yes	Yes	Yes	free movie streaming is used by most of th internet users
Information Access	Using web search like google	Yes	Yes	Yes	
	journals	Yes	Yes	Yes	

2.6.2   E-service in the East African macro-environment

E-service ventures, or any ventures for that matter, do not operate in isolation from their environment. The ability of a company to create value for its customers and to generate profits depends on circumstances and the direct influence of the macro environment.

The macro-environment takes a wide perspective of the factors that influence a company's strategy and performance. Evaluating the macro-environment can present noteworthy opportunities and threats to a firm's strategy. Therefore, at the outset of any strategy formulation, it is useful to analyse the trends that characterize the macro-environment in its different dimensions: political, legal, economic, social and technological.

2.6.3   Political and legal environment

It relates to concerns on different organizational levels. At country and industry levels, it includes issues such as governmental subsidies, taxation, monopoly legislation and environmental laws.

In the three countries under consideration the political powers and governments are trying to give more intention to the developing of E-services, TCRA in Tanzania and UCC (abbreviated for Uganda Communications Commission) in Uganda mentioned recently that they are trying to set up some significant modification in the legislation to make the transaction smoother and easier. For instance, the Tanzanian government imposes foreign equity ownership restrictions on a number of service sectors. For example, foreign capital participation in the telecommunications sector is limited to a maximum of 65%. Furthermore, Tanzanian laws specify that at least one-third of the share capital of insurance companies

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must be owned by Tanzanian citizens. The media industry is subject to limits on foreign ownership as well. While the broadcasting services act allows a maximum of 49% foreign ownership of Tanzanian TV stations, foreign capital participation in local nationwide newspapers is prohibited. It takes 14 procedures and 38 days to establish a foreign-owned limited liability company (in short LLC) in the Tanzanian city of Dar es Salaam. Tanzania is currently in the advanced stage of preparing a new constitution, which is expected to be in place before the next general election in 2015, and which will reform the business sector to be more attractive to foreign investor and thus encourage entrepreneurs in diverse domains and creating good opportunity for E-service to prosper in the country.

As the taxation, the financial regulations are starting to take in consideration the electronic invoices, which weren't accepted few years ago. Since the taxation is a difficult issue in e-commerce more means were put in place to fight the fraud in this domain.

Fighting corruption and putting in place strong directives, encouraging proactive leadership are the main challenges for these countries to increase the growth and development of E-services. International organizations also should participate in this development and provide the missing know-how.

2.6.4   The economic environment

In the United Republic of Tanzania, the economy has continued to perform strongly, with current growth at around 7%. Driven largely by communications, transport, financial intermediation, construction, agriculture and manufacturing. In the medium term, growth will be supported by the ongoing investments in infrastructure. Also, these medium-term growth projections are supported by continued investments in the recently discovered natural gas reserves in Tanzania and the expansion in public investments (including the ongoing construction of USD 1.2 billion gas pipeline from the city of Mtwara to Dar es Salaam), as well as the related investments intended at stabilising power generation in the country. The main challenge that is facing Tanzania is that the development growth rate is not sufficiently broad-based and poverty levels still remain high. Despite high growth averaging 7% over the past decade, the recent household budget survey results indicate that 28.2% of Tanzanians are poor, and poverty remains more prevalent in rural areas than in urban areas.

In Uganda, 2013 saw the consolidation of macroeconomic stability and a gradual recovery of economic activity, with estimates putting annual real gross domestic product (GDP) rate 5.2%, compared to 2.8% in 2012. This recovery in economic activity has benefited from a fiscal and monetary policy stance focused on containing inflationary pressures, while ensuring debt and exchange rate stability, thus providing an enabling macroeconomic

environment for growth. Growth prospects, however, continue to be disadvantaged by a relatively unfavourable investment climate for the private sector, as well as the capacity constraints in public sector investment. Management reports indicate real GDP growth at 5.2% in 2013, on the back of strong exports and public investment, bringing real GDP growth closer to Uganda's underlying growth potential of 7%. The medium-term forecasts indicate a consolidation of these trends, with GDP growth reaching 6.6% in 2014 and 7% in 2015, and improvement of the current account balance and a mildly expansionary fiscal policy.[52]

In regards of Burundi, series of exogenous shocks (a rise in world oil prices and food prices and a decline in revenue) struck economic activity in 2013. Growth in GDP accelerated slightly from 4.2% in 2012 to 4.6%, inflation dropped from 18.2% to 7.8%, the fiscal deficit narrowed from 9.1% to 2% and the Burundian franc (BIF) depreciated by 5% against the US dollar (USD) from January to December. The primary sector contracted by 2% in 2013, mainly due to the effects of rainfall on coffee production. The economy has slowly recovered over the past two years as services and the secondary sector have expanded, the latter having benefited from investment in industry, construction and public works.

These economic recoveries of the three countries and enhance economic performance in different sectors are ameliorating the environment for a better integration of E-services which can bring more benefit and improvement to the region. Digitization of the services in different sectors will ameliorate the delivery and will bring more jobs to reduce the unemployment which is estimated at 12% in Tanzania, 83% of the youth aged from 16 to 25 in Uganda and 12.9% in Burundi.

2.6.5 The technological environment

In regards of E-services, the technological environment is very important. The technological innovations, such as the Internet or wireless devices, led to the rise of new market opportunities and business models. Also the infrastructure disserving the technology and other important factors of the technological developments are standards and languages such as the TCP/IP (Transmission Control Protocol/Internet Protocol), HTTP (Hypertext Transfer Protocol), HTML (Hypertext Mark-up Language) and, more recently, XML (Extended Mark-up Language).

As previously mentioned an average of more 90% of the internet users are provided by their mobile Telecommunication Operators in the East African Region, due to the lack of fixed infrastructure on one hand and because of the wide network coverage of the

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[52] ww.africaneconomicoutlook.org

telecommunication Companies on the other hand. These customers who are able to buy a smart phone amount to only 20% of the total mobile subscriber. They are facing power supply problem to recharge their mobile devices. As it is well known that the access to the web energy efficiency is intensively affected by the TCP (Transmission control Protocol) throughput, through the RTT (Round Trip Time). Digitized services can be delivered more efficiently to the user. The content can be optimized for mobile devices, HTTP compression can be used on the server, catching data close to the users helps since access time is lower and performance enhances proxies can be deployed. Also E-services can be provided through other interface than the web, (for example through USSD, or SMS especially when the content is textual. Cf. chapter 4.1.2, Mobile Search Service (M-Search)).

The use of these techniques improves the (QoE) quality of experience of the customer, which is reflected back to the network Operator and the service provider.

3   MOBILE NETWORK IN EAST AFRICA

3.1   Mobile Network

The definition of a mobile network or a cellular network; is a radio waves covering a large area which is divided into defined shapes and sizes called cells. Each single defined area is a cell that has one transceiver which is also known as a BTS (Base Transceiver Station). These BTSs connect one cell phone user to the network. The BTSs consist of radio equipment and at least 3 antennas. The antennas are put on specific height (on a tower if it's a greenfield site, or on mast on the top of building if it is a rooftop site) according to the topology of the landscape for the area to be covered. Base stations provide radio coverage over a wide geographic area. This allows for a greater number of small portable or handheld devices with network capability like mobile phones, smart phones, laptops, navigation systems and more to communicate with each other and with other non-portable network devices like land line telephones, desktop computers and radios anywhere in the network.

A group of BTSs are linked to the Base Station Controller (BSC) which controls and supervises them. The BSC is responsible for the allocation of radio resources to a mobile call and for the handovers that are made between base stations under its control. Other handovers are under control of the MSCs.

A MSC (Mobile Switching Centre) is a telephone exchange device that makes the connection between mobile users within the network from mobile users to the public switched telephone network and from mobile users to other mobile networks. The MSC as already mentioned administers handovers to neighbouring base stations, keeps a record of the location of the mobile subscribers and is also responsible for subscriber services and billing.

There are a number of advantages and disadvantages involved in the creation or setup of cellular networks, for instance, base stations in cellular networks offer increased capacity. This can be varied depending on a number of different factors, like human population on a specific area. Cellular networks also offer reduced power use. This means that cellular networks do not require huge amounts of power to function. The other important aspect is that they offer a larger coverage area. Distant BTS can be linked by microwave antennas which can have a range of more than 30 km. This is very important because there is no need to re-establish a new network each time we run out of range.

3.1.1 Functional Structure of Mobile Network

3.1.1.1 The Components

There are two main standards in mobile network depending on the used technology such as GSM (Global System for Mobile Communication) and CDMA (Code Division Multiple Access). CDMA network is mainly used in North America and a few African countries. Nowadays most of the CDMA networks are switching to GSM technology due to the huge functionality offered and flexibility to the operator. Furthermore it offers better connectivity to the customers who can connect with a normal handset. CDMA networks require special phones to connect. In this connection, mention can be made of the telecom provider *Smart* in Tanzania, previously *BOL Mobile*, switching the entire network from CDMA to GSM).

The most important component to a cell network is a mobile station (MS) also known as user equipment (UE): A mobile station is simply a mobile or wireless device such as a cell phone or a laptop with a mobile broadband adapter that contains a control unit, a transceiver, an antenna and software system for data and voice transmission (communication with a mobile network). This is what customers use to make calls send SMS or connect to the mobile internet. In regards to the GSM networks, the mobile station consists of the mobile equipment (ME) and the removable SIM (Subscriber Identity Module) card or data card storing the IMSI (International Mobile Subscriber Identity) a unique key shared with the mobile network operator and other data.

Most of the GSM mobile stations are 2G and 3G systems. There are other important issues that are concerned or influence how cellular networks work, known as the air interference standards and there are mainly three air interface protocols or standards that handle this subject. There is the Frequency Division Multiple Access (FDMA), Time Division Multiple Access (TDMA) and Code Division Multiple Access (CDMA). These standards are basically the Medium Access Control (MAC) protocols that define the rules for entities to access the communication medium. These air interface standards allow many mobile users to share simultaneously the determinate amount of radio channels and thus communicate with each other more efficiently and frequently. Additionally, the next component to the BTS worth mentioning is the gateway. The gateway is defined as the communication between two systems. These systems can both be wireless or one can be wired and the other can be wireless. The gateway usually has two logical components which are responsible for its proper working. Two such important components are the Mobile Switching Centre, most commonly known as the MSC and the other is the Interworking Function known as IWF. The MSC connects the cellular base stations and the mobile stations to other MSCs in a specific area. Each cell in a cellular network is controlled by the MSC, which monitors each caller's

signal strength and arranges cellular handover. It also locates and redirects calls to another MSC which is closer in case the signal is fading in order to maintain the link. MSCs can be connected wirelessly with microwave antennas or with wired connections through fibre optics. MSCs maintain individual user records, current status of subscribers and information on call routing and billing in two subscriber databases: the Home Location Register (HLR) and the Visitor Location Register (VLR). The Home Location Register (HLR) is a database for permanent storage of subscriber data and service profiles; this is for users who reside in that specific location. The Visitor Location Register (VLR) is a database that contains temporary information about subscribers who do not reside permanently in that geographical cell. The MSC uses this information to keep track of and serve visiting subscribers. Through the VLR the operator can also know and manage their active subscribers at a specific time. It is also the database that supports roaming capability.[53]

3.1.1.2   Topology

A cellular network contains a number of BTSs itself with their radio antennas and a base station controller (BSC), a Mobile Switching Centre (MSC) to the location registers (HLR and VLR) and the link to the Public Switched Telephone Network (PSTN). The links between the BTSs and the BSC can be wired or wireless.
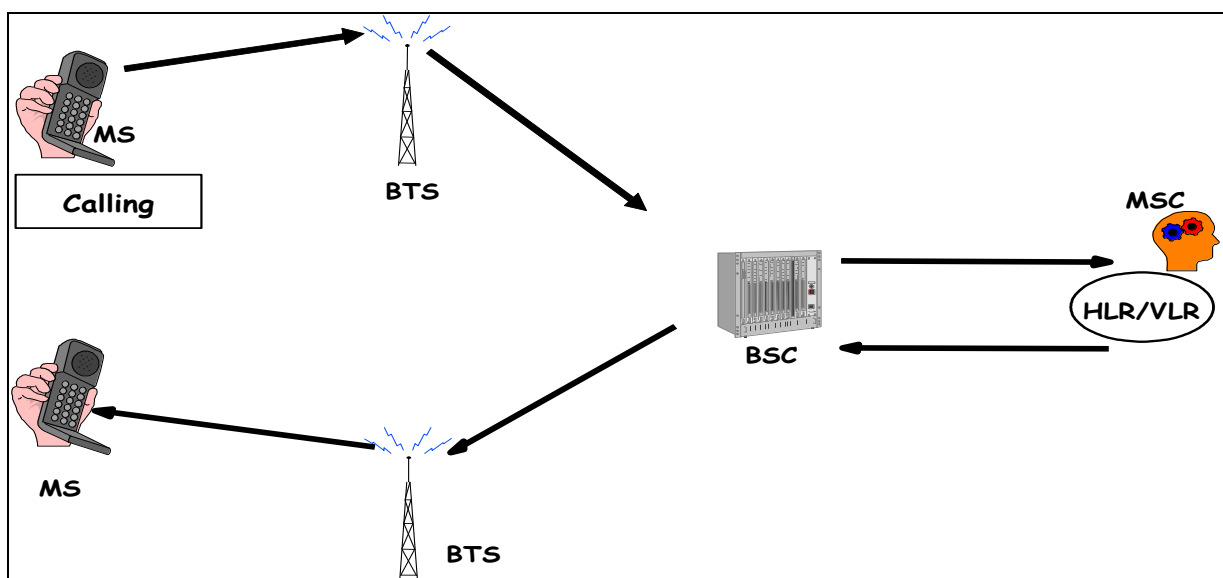

Figure 6: Calling Scheme

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[53] Michael B Motlhabi : How do Cellular Network work?

A network cell defines a specific geographical area with a definite number of available frequencies for allowing users in that location to make and receive calls. The network architecture depend on a number of different components to be in place, for instance, the GSM technical specifications define the different components that form a GSM network. Basically there are four main parts that heavily influence the structure of a network; (1) The Mobile Station (MS), (2) the Base Station Subsystem (BSS), (3) the Network and Switching Subsystem (NSS) and (4) the Operation and Support System (OSS).

The above mentioned components are all found within a cell which is then divided into regular shaped cells, which are hexagonal in most cases but square, circular or some other irregular shapes,
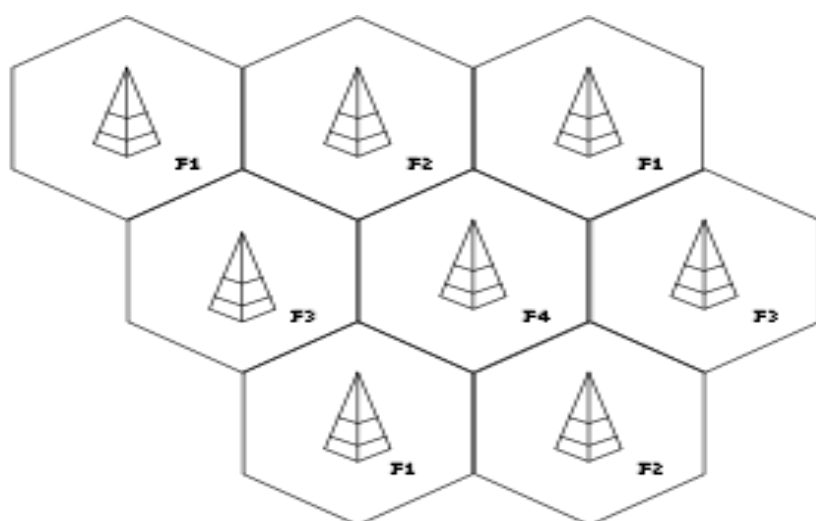
Figure 7 Network cells

BTSs are critical to the proper functioning of a cell network since they facilitate the communication between different mobile stations and so to improve the quality of the received signal, often two receiving antennas are used and these are placed at some equal distance to an uneven multiple of a quarter of wave length (for 900 MHz the wave length it is 30 cm). This technique, known as antenna diversity or space diversity, avoids interruption caused by path fading. The antennas can be spaced horizontally or vertically. Horizontal

spacing requires more complex installation, but better performance is obtained in this configuration. [54]

Apart from the hardware that is used to make a cellular network function there are some protocols which are set up. The protocols define a set of steps which can allow meaningful conversations to take place. In cellular networks these protocols describe the data that is to be transmitted and that both mobile stations and the base station expect. This then allows components within a network to know what and when to listen, transmit and, if necessary receive relevant data.

3.2 Telecommunication Environment in East Africa

3.2.1 Telecommunication Environment in Tanzania

The United Republic of Tanzania has six operational mobile network provider; *Vodacom* (owned by Vodafone and the South African telecommunication group, Telkom), *Airtel* (Baharti Enterprises), *Tigo* (Millicom International Cellular), *Zantel* (owned by Etisalat and Zanzibar Telecom Ltd), *Sasatel* (Owned by Dovetel), *TTCL Mobile* (Tanzania Telecommunication Company owned by the state of Tanzania) and *Smart* previously called *BOL* (part of the *Aga Khan Development Network* (*AKDN*)). It has also two fixed-line operators (*TTCL* and *Zantel*) *TTCL* operating in the main land and *Zantel* on the island of Zanzibar.

The mobile penetration ratio in Tanzania is approaching 54% with annual subscriber growth of more than 38%.

The converged licensing regime allowed numerous players to enter the telecommunication market in Tanzania. The lift of the restrictions against voice over internet protocol (VoIP) telephone as well as the introduction of third and fourth generation (3G, 4G) mobile services and wireless broadband networks is improving the internet sector which has been disadvantaged by the low level of development of the traditional fixed-line network.

After the launch of 3G mobile broadband services, the mobile became the country's leading internet service providers additionally to their extensive national infrastructure and existing subscriber bases in the voice market. Telecommunication operators are aiming to increase their revenue because of the mobile internet services, and other mobile services since the revenue from the communication category services (voice and SMS) is continues to drop due

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[54] . Sofoklis A. Kyriazakos:Telecommunication Laboratory.

to furious competition and the prices war between the different companies. The ARPU (Average Revenue per User) has dropped from $5 US to $4 US in the last 12 months. Mainly all the operators are investing on new infrastructure to be able to provide the Long-term Evolution (LTE) technology. Additionally to the internet mobile service, the Mobile Money or M-Pesa creates a fast developing source of revenue. In mid-2013 *Bharti Airtel* estimated that in Tanzania over 10% of GDP is transacted through this money service on either money transfer or m-commerce (Mobile Commerce)

3.2.2 Telecommunication Environment in Uganda

Like in Tanzania, the introduction of mobile telephone has revolutionized Uganda's telecommunications industry, where we can distinguish six mobile network providers: *Orange* (Owned by Orange SA), *MTN* (Mobile Telephone Networks), *UT* (Uganda Telecom Limited), *Airtel* (Baharti Enterprises) recently merged with *Warid* and *Smart* (Twin company to Smart Tanzania, owned by the *Aga Khan Development Network* (*AKDN*)).

The big number of telecom operators in a country like Uganda has influenced the prices and has accelerated the subscriber growth. The mobile penetration ratio in Uganda is – much higher than Tanzania – at about 85%.

As the rest of the East African market the mobile network operators are the main provider of the internet. More than 90% of the internet users are disserved (?) by their mobile internet. Unfortunately and despite of the high penetration ratio of the mobile, the internet penetration ratio is still very low and doesn't exceed 8%.

The new 3G and 4G licences encouraged the telecommunication companies to invest in new infrastructures to better serve their customers with a better technology and lower prices in the future.

Within the low ARPU (less than USD $4) the mobile operators are trying to improve their revenue within 3G and 4G mobile broadband services as well as mobile money transfer and m-banking services. Generating new mobile service is also the aim of most of the telecommunication players.

In this context of testing and providing new service *Smart Uganda* is adopting M-Education (Mobile Education) service, case study that it will be presented in the fourth chapter of this thesis.

3.2.3 Telecommunication Environment in Burundi

In Burundi we distinguish also six operational mobile network operators/providers: *Leo* (owned by Orascom Telecom and Vimplecom), *Tempo* (owned by VTEL Holdings), *ONAMob* (owned by the Burundi state), *ECONET* (owned by ECONET Wireless), *Lacell* (owned by the Nepalese company Lacell SU) and *Smart* (part of the Aga Khan Development Network (AKDN) sister company to *Smart Tanzania* and *Smart Uganda*).

The mobile penetration ratio in Burundi is much lower than the ratio in Uganda and Tanzania; it is approaching 29% with annual subscriber growth of more than 65%.

Like in Tanzania and Uganda the mobile network providers are the main companies delivering internet. The mobile internet in Burundi is serving more than 90% of the internet users, who present only 4% of the total population of the country.

The Burundi telecommunication market is one of the most attractive African markets for investors. The country is enjoying stable GDP growth for last several years, within a high population density. The relatively low, yet fast growing, mobile market penetration provides substantial potential in the few coming years. However, investors' reserve is still evident because the country's low economic output and the fact that outside the main urban areas fixed-line infrastructure remains poor. To overcome these difficulties, the government, supported by the Word Bank, has sponsored a joint venture with a number of prominent telecommunication companies to build a national fibre backbone network, allowing onward connectivity to submarine cable infrastructure landings in Kenya and Tanzania[55]. The first sections of this network will be switched in the second quarter of 2014.

The access of the country to the international submarine cable will effectively end its dependence on expensive satellite connection. It will be provide more bandwidth with much lower prices for customers.

3.3 Digitized services through mobile network

As we noticed, the mobile networks are serving the East African countries better than any other channel, either by their core business based on the communication categories such as Voice and SMS, or by providing the internet customers with mobile internet and covering more than 90% of the users.

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[55] http://www.budde.com.au/

Because of the decline of the revenue due to war prices, telecommunication operators do not have other choices than diversifying their products and creating more value to their customers through new services category.

After the success of the mobile money services, mobile companies are aiming to develop more mobile services.

Unfortunately, the effort done until now is weak and resulted a few entertainment category services such as mobile horoscope services (customer sends SMS to a special number with their date of birth to get their daily horoscope), Quiz games (using the USSD menu, consumer can answer question mainly about general culture), CRBT (Caller Ring back tones) through which they can change the back tones, and make their caller listen to a chosen song when calling them.

None of the offered services is dealing with major concerns such as health, education, employment etc.

When asking some telecommunication players why they are not providing mobile services such as mobile Education (M-Education) or mobile health services (m-health), the answer given is that these services need CAPEX (capital expenditures) investment and research and, thus, is consuming time and money, whilst nobody knows if these services will provide the desired revenue.

Smart, the AKDN mobile network, has allowed the author to develop such products and test them in the market (cf. chapter four, case studies M-Education and M-Search).

3.4 Unserved Customer and Base of the Pyramid

"*These unhappy times call for the building of plans that rest upon the forgotten, the unorganized but the indispensable units of economic power...that build from the bottom up and not from the top down that put their faith once more in the forgotten man at the bottom of the economic pyramid.*" U.S. president Franklin D. Roosevelt, 7th of April, 1932

In economics, the bottom of the pyramid[56] refers to the largest, but poorest socio-economic group. In global terms, it mentions the 3 billion people who live on less than US$2.50 per day.[57]

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[56] The term "bottom of the pyramid" or "Base of the Pyramid" or just the "BoP' is used in particular by people developing new business models that intentionally target that segment, often using new technologies.

Several authors emphasise on the approach that focuses on the poor as business partners and innovators, rather than just as potential producers or consumers. In this context and in the telecommunication industry this theory was proven by the mobile money services. As mentioned previously, it was this segment who primarily invented this mobile financing service before the mobile networks companies adopted it.

Hart and Simanis from Cornell University have led the development of "the Base of the Pyramid Protocol" which is an entrepreneurial process guiding firms when developing business partnership with communities having poor income in order to co-create business with high value creation and high value capturing. This process was adopted by several companies.

Prahalad proposes that businesses, governments, and donor agencies stop thinking of the poor as victims and instead start seeing them as resilient and creative entrepreneurs as well as value-demanding consumers.[58] He suggests that there are huge benefits to companies who choose to serve these markets in ways responsive to their needs. Maybe all the poor of today are the middle-class of tomorrow. Moreover there are poverty-reducing benefits if firms work with civil society organizations, non-governmental organizations (NGOs) and local governments to create new local business models.

With this in mind, finding solutions for the base of the pyramid should be then seen by companies as a core business strategy. Management should no longer consider the communities at the base of the pyramid as needing to be "taken care of" through philanthropy. Their vision should be converted to it as a business opportunity. Pursuing this opportunity requires company's strategy to focus on this opportunity and develops trusted relationships with the community.

A successful venture in the bottom of the pyramid require different approaches from the firms, they should change their models focus on:

- Finding the opportunity in the base of the pyramid
- Applying business principles to solve social problems
- Delivering low-cost and affordable solutions

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[57] Anuba Shah: Poverty Fact and Stats 2013

[58] C.K. Prahalas, Stuart L. Hart: The Fortune at the Bottom of The Pyramid

- Thinking differently: Providing services for the base of the pyramid using the same infrastructure, distribution system, and cost structure won't work. An entirely different way of thinking, distributing, and marketing is necessary.
- Partnering with the community such as NGOs and local authorities[59]

In regards to the profit and income the projected revenue stream for this segment should not be based on high margins but on a large number of customers.

3.4.1 Base of the Pyramid in East Africa

3.4.1.1 Tanzania

As it's already mentioned Tanzania is an emerging economy with high potential and a remarkable growth in its GDP over the past years, unfortunately it remains one of the world's poorest countries in terms of per capita income. The continued average annual GDP growth rate of 7%, still disguises great disproportions across sectors and geographical areas. The rural Tanzanians are mainly poor and are mostly working in the agriculture sector, which is composed of a majority of smallholders.

The Agriculture didn't get any benefit from the governmental push as the other sectors and it is still in need of modernization and more investment. Despite it consists one of the main column of the Tanzanian economy, it presents 25% of the GDP, and employing about 80% of the workforce of the population.[60] Several statistics mentions that 90 % of the Tanzania base of the pyramid lives in rural areas. The rate of poverty varies meaningfully across the country, but is higher between rural families who live in arid and semi-arid regions. These families for living depend exclusively on livestock and food crop production. According to the UNDP (United Nations Development Program), the rank of the United Republic of Tanzania is 163rd of 170 countries in 2000, and improved to 152nd of 187 countries in 2013. It is estimated that one third of Tanzanians live below the basic needs poverty line, and well below the international poverty line.

3.4.1.2 Uganda

A considerable effort was made by Uganda to reduce the poverty. The countrywide rate dropped from 56% of the population in 1992 to 24.5% in 2009 especially in the urban areas. Despite these gains the absolute number of poor people continued to increase due the

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[59] V. Kasturi Rangan, Michael Chu : Business Innovation at the Base of the pyramid

[60] http://www.ruralpovertyportal.org

population growth. Poverty remains definitely rooted in rural areas where 84% of the Ugandans live.

About 8 million Ugandans live below the national rural poverty line mainly constituted by smallholder farmers living in remote areas. In remote rural areas, additionally to the lack of modernization, investment input and technology, there is an enormous lack of infrastructure such as roads and means of transportation to boost the farmers' income and expand their production. Northern Uganda is considered as the poorest part of the country. The poverty rate is continually more than 40%. Several civil conflicts affected these regions and constantly disrupted farmers' lives and their agricultural products.[61]

3.4.1.3 Burundi

For almost two decades Burundi suffered from conflicts and troubles, contributing to the widespread of poverty. Ranked 185th out of 187 countries in 2011 by the UNDP (United Nations Development Program), Burundi is constituted by 80% of poor citizens living below the poverty line. The GNI (Gross National Income) per capita in 2010 was $170 US, which consists of 50% of the value before the civil war.

During 20 years of war more than 300 000 civilians were killed and more than 1 million people escaped to live in refugee camps or in exile in the neighbouring countries.

Burundi is now in a new building phase after emerging from repeated conflict and ethnic rivalry during which poverty rate doubled from 33% to 67% and economic decline pushed the GDP per capita down by more than 27%.

Agriculture, which is the main source of livelihood for 90% of the Burundians, suffered a lot from the fights. Corps and livestock were damaged and pillaged. Additionally to the insecurity environment, rural Burundians were put under serious anxieties.

The large majority of Burundi's poor people are small-scale subsistence farmers who are trying to recuperate from the long civil war and its consequences. One of the main constraints the agriculture sector is facing is the decreased amount of the fertile lands due to the population growth.

Several factors influence the poverty in Burundi:

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[61] http://www.ruralpovertyportal.org

- Increased population density on over cultivated, eroded land supporting farms of an average size of 0.5 ha or less
- Insecurity environment and dislocation
- Persistent drought
- Shortage and poor quality of agricultural tools and technology, and limited market investments
- Shortage of the technical know-how and poor productivity of labour
- Limited industry activities and Low revenue from subsistence agriculture
- Lack of basic health and education services and safe drinking water
- Huge rates of illiteracy[62]

3.5 Innovation to the Base of the Pyramid in East Africa

Basically in the East African environment, the unserved citizens are those at the base of the pyramid constituted mainly by rural people mostly farmers struggling to improve their conditions and income. Mobile telecommunication in East Africa suffering from the low revenue can see in this segment a huge opportunity to grow their income using the approach mentioned by V. Kasturi Rangan and Michael Chu (2008) which is based on (1) finding the opportunity at the base of the pyramid (2) applying business principles to solve social problems (3) delivering low-cost and affordable solutions (4) thinking differently, since providing services for the base of the pyramid using the same infrastructure, distribution system, and cost structure won't work. An entirely different way of thinking, distributing, and marketing is necessary and (5) partnering with the community such as NGOs and local authorities.[63]

A similar approach was followed by *Grameen Telecom* in Bangladesh when putting in place their Village Phone Project (VPP).

"Grameen Telecom assumed the task of meeting the "social" bottom line by making mobile telephony available to Bangladesh's 68 000 Villages. To meet this objective, Grameen Telecom set up the VPP. The idea was to provide mobile PCO-style (public call office) operation in the villages by capitalizing on GrameenPhone's existing mobile network, operating experience and the portability of its GSM phones."

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[62] IFAD report : Enabling poor rural people to overcome poverty in Burundi

[63] V. Kasturi Rangan and Michael Chu: Business Solution at the Base of the Pyramid. Global Business Summit

"The VPP business model was deceptively simple and offered a potential win-win situation for all involved, including the service providers and the end users. Four business entities were involved in the VPP: GrameenPhone (the mobile network operator), Grameen Telecom (the not-for-profit business), the Grameen Bank (the not-for-profit micro credit bank) and the mobile handset owner in the village, commonly referred to as the Village Phone Lady (who was a member of the Grameen Bank)"[64]. The VPP contributed efficiently to GrameenPhone to gain more than 70% of the telecommunication market share in Bangladesh.

In East Africa, mobile network operators already have their infrastructures installed and covering more than 70% of the territories. Several services can be offered to the rural area. Unfortunately, most of the companies are focusing on the big cities and limiting their offering to the rural area to the communication category services such as voice and SMS.

Mobile network should start by engaging the local entrepreneur to their business by outsourcing the distribution channel and their point of sale (POSs). Who can be a better ambassador to their product than the local inhabitants? This will decrease the unemployment rate and can create a better socio-economic environment in the region and surely better distribution of the telecommunication products and services.

For a better customer acquisition from the base of the pyramid, telecommunication companies should start, first of all, by providing handset with an affordable price (less than 15$) to gain these customers able to spend 3$ to 4$ per month on communication, but unable to buy handset costing more than 15$.[65]

This segment constituted mainly by rural farmers who buy goods (such as seeds, tools etc.) and sell their products while having difficulties in their commercial options, and facing high transactional costs due to lack of communication capabilities. Bringing technology and innovation to them by simple mobile services will equip them with all types of information such as prices of goods, weather forecast, etc. (cf. chapter four: in the empirical study the author will present M-Search, a mobile service helping farmers to get the information needed).

Contributing in informing the farmers and helping to make them more efficient buyers and sellers will decrease the transactional costs and will bring better efficiency. This will create a greater value to them.

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[64] Prashant Malaviya : Telenor in Bangladesh, Achieving Multiple Bottom Lines at GreameenPhone

[65] According to market research on this segment done by Smart Tanzania

More mobile services can be developed by telecommunication companies in unserved domains such as education (cf. chapter four, empirical part and the case study on M-Education, a mobile service for health care, information access etc.).

4 EMPIRICAL STUDIES

In this part of this thesis the author will present two innovative mobile services being implemented in *Smart East Africa*'s network aimed to improve the daily lives of the unserved customer (Base of the Pyramid) mainly in unserved domains.

It will be proven that mobile network can be an alternative channel for service digitization, and for customers who are currently not yet using the internet (more than 90% of the East African) either because of the high prices or because they are not using costly smart phones.

4.1 Case Studies

The first case study is dealing with education, an important domain combating the huge illiteracy rate in the region. This mobile service will be used as a scholar support to the young secondary school pupils. This mobile service is conducted and launched in Tanzania as a testing market, and it may be applied in Uganda and Burundi after finalizing the negotiation of partnership with the local authorities.

The second case will be dealing with information access. Through the mobile search services (M-Search) customers can access information without the use of internet or expensive smart phones. The aim of this service is to improve the access to information to farmers, job seekers, customers searching for goods to buy or to sell etc. The two cases will be presented in two opportunities analysis plans (OAP).

4.1.1 Mobile education (M-Education)

4.1.1.1 Description of the product

4.1.1.1.1   Market need

In countries like Tanzania, where the internet penetration rate is less than 13% digitization of services only through the web channel cannot be the adequate solution especially for crucial need like education to develop the knowledge of pupils and offer an extra scholar support to them.

The recent estimation of the population of the United Republic of Tanzania is 46 million within 48% of its population aged between (12 to 19 years old) ''secondary school levels''. According to the Tanzania Ministry of Education 75% of the young Tanzanians are attending courses in either private or public secondary schools, forming a total number of more than 16 million pupils.

Like in the other East African countries the classes are populated with more than 40 pupils per class. It is obvious that this class environment is not adequate for the pupils to follow what is being taught. A lot of students therefore need extra support outside the classrooms.

When analysing the mobile market we find that, as previously mentioned, the penetration ratio is more than 50%; which means that each family owns in average more than 2.8 handsets. With this in mind we can consider the mobile network as an adequate channel to launch an educational service through mobile phones (in short M-Education).

4.1.1.1.2   Product Description:

The digitization of the education through the mobile phone is an innovative Value Added Service (VAS) that can be offered through the mobile network.

How does it work?

Smart Tanzania in partnership with the NGO *Twaweza* specialized in the development of the education in Tanzania, have convinced the Ministry of Education to assign experts able to summarize the chapters of each material taught each week.

The experts are able to summarize courses in each of the contents of the courses taught in classes, such as Mathematics, Biology, Physics and Philosophy. For the existing seven different forms of the secondary education, experts can provide weekly input, which will be then uploaded in the different platforms: SMSC (Short Messages Service Center), IVR (Interactive Voice Response) and USSD (Unstructured Supplementary Service Data). Through these interfaces the pupils or the parents will be able to access the needed information.

Since the program for each level is the same all around the country and they are taught at the same period following the calendar imposed by the ministry of education, this makes the information and the service offered up to date and following the need of the customers.

SMS Command:

The customer (pupil or parent) sends a SMS to 100 with two key words, whereas the first is the subject desired and the second is the level of the form. For example the customer sends a SMS to 100 including ''Physics Form4''. The customer will immediately receive a response with the summary of that week's chapter including formulas and important definition of the chapter. The received text, consisting of maximum 640 characters, can be included in four text messages (160 characters per SMS).

USSD Interface:

Figure 8: USSD menu structure

As per the menu structure the customer dials *100# to access the menu, then types 1 for education then types the number given to the level desired. After that he dials the number attributed to the subject required. Finally he will receive a screen with the complete summary of the chapter uploaded that week.

IVR Platform:

In regards to the IVR (Interactive Voice Response) platform the customer will dial 100 and he will access to the vocal command to guide him through the IVR menu. As per the USSD menu, the customer will receive the information, but this time all the information and the commands are provided vocally.

4.1.1.1.3 Market Overview

As previously mentioned the product is innovative and does not exist in the market at least under these forms. The services offered are statics and they are under the entertainment category such as gaming and betting. The most dynamic are the services offering news headlines (without details). Moreover none of the products offered are addressed to

education and improvement of the knowledge of the pupils.

Similar products are offered in other countries. However none of these products are provided through the mobile network channel since they are usually provided through CD or on Internet platforms. This makes M-Education service unique in the Tanzania and the East African market.

4.1.1.2 Assessment of the opportunity

4.1.1.2.1 Market need fulfilled

The digitization of education through mobile network as proposed above fulfils the need of the secondary school pupils from the first to the seventh form at the age of 12 to 19 years). Moreover, this mobile service can be an interesting opportunity to parents desiring to make the follow up of their son's and daughter's studies.

The target segment as already mentioned is secondary school students from ages 12 to 19 years old from families with a monthly income of more than $150, which is 65% of the Tanzanian family, thus more than 10 million potential customers.

4.1.1.2.2 Growth

When considering *Smart Tanzania* subscriber's growth, estimated at 25% monthly for the next 12 months, the subscribers for the M-Education will be growing at 10% of the total number of the new subscribers (cf. annex for further details).

This growth can be considered as constant and can increase more since this product is encouraged and promoted by the Ministry of Education and a local NGO *Twaweza* with a mission to help the young children for a better future and a better education level.

4.1.1.2.3 Future Expansion

The product described above can be expanded by adding more subjects and materials according to the student's individual needs. The services can also be extended to allow customers to access contents of previous weeks additionally to the contents of the actual week's teaching schedule.

By implementing a larger server several summaries of school lesson contents of each single subject taught in class are provided by this service and can be accessed at any moment.

Another variation is to provide quizzes to the customers, so that they can test their knowledge in the lesson contents of the offered subjects.

4.1.1.3 *Corporate entrepreneurial self-assessment*

One of the main goals of *Smart Tanzania* as part of the *AKDN* (*Aga Khan Development Network*) is to create services to the unserved population in East Africa and also to bring technology to those who cannot afford it. Following these principals, offering such mobile services to improve the education level of the young Tanzanians is a one of the company's objectives.

Customers will be charged $0.63 for weekly subscription or $2 for a monthly subscription to the M-Education services. Each subscriber will be able to access the complete offered materials.

4.1.1.3.1 Experience needed for implementation

Additionally to the contribution of the teachers who prepare brief and consistent summaries about the weekly school lesson contents, the co-operation of the NGO staff of *Twaweza* with their field experience with young Tanzanians, and the know-how of *Smart Tanzania*'s technicians in order to achieve the technical implementation of the service are the critical factors for a success of the product.

The Ministry of Education's partnership is crucial for the quick spread and the development of the service.

4.1.1.3.2 Critical steps

The critical steps during the implementation of the project are, firstly, the credibility and commitment of the teachers who will prepare the summaries of the school lesson contents and how serious they are while providing the right information. Secondly, some chapters would be difficult to be summarized in 4 text messages or 640 characters.

4.1.1.4 *Financing:*

To implement this mobile service, the company does not need to spend an extra CAPEX since all the platforms are already purchased and used for other services. Most of the expenses concern mainly the field of operation and marketing. Nevertheless, for any future expansion of the product and to archive all the content summaries an investment on a new server will be required.

In regards of the external resources the teacher or expert preparing the summaries of the school lesson contents are paid by the Ministry of Education who will be sharing the revenue with the mobile operator in return; to be precise the operator credits the amount of forty percent of the revenue gained on each subscription to the service to the ministry.

4.1.2   Mobile Search Service (M-Search)

4.1.2.1   Description of the product

4.1.2.1.1   Market Need:

As previously mentioned the base of the pyramid in East Africa constitutes a major part of the citizens. These people are struggling daily to improve their income and their living conditions. Due to the poor or complete lack of state support for people in need, they are mostly left to their own.

Mobile telecommunication operators can on the one hand create value to this segment by providing access to information, and on the other hand capture value by monetizing the existing infrastructure, which is implemented and covers more than 70% of the territories. Following this strategy the operators will increase their revenues, which are up to then limited by the price war.

Mobile search (M-Search) is a mobile service that can allow people to access updated information and creates the possibility to ameliorate their daily lives. For example, farmers can be informed about the market selling prices of their products or the buying prices products they need, such as tools or seeds. They can also access the weather forecast simply using their mobile handheld in order to know if the roads they are taking to reach the market or other points of sale are accessible or not.[66] Moreover, job seekers with limited means can also get job offers in their towns without incurring transportation costs.

4.1.2.1.2   Product Description:

The M-Search is an innovative mobile service affordable for customers that do not have access to internet. It can be captured by a simple low-end handset (smart phones are not required).

How does it work? *Smart Tanzania* is equipped with the CVBS platform (Converging Billing Solution) which is a flexible environment for developing application interface (API) permitting to the core network to link to the internet and make searches using key words. It also allows

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[66] One of the transport obstacles for people living in the East African region concerns the climatic conditions: A sudden tropical rain storm leads to inaccessible roads in the largely unsurfaced road network in the rural regions.

the ability to filter the results following the desired criteria. The API mainly searches results in the country's websites to make the research and the results more accurate to the customers.

For example, a customer sends SMS to 110 with the key words ''weather forecast'', the SMSC related to the CVBS registers the location according to the BTS covering the customer, and through the API (Application Interface) it searches for the weather forecast in that specific area, filters the results and send the optimum one to the customers.

In the same way and order as above mentioned a farmer would send a SMS to the same number with the key word "banana price" and the API linked to the web will find the common market prices of bananas and send back the results.
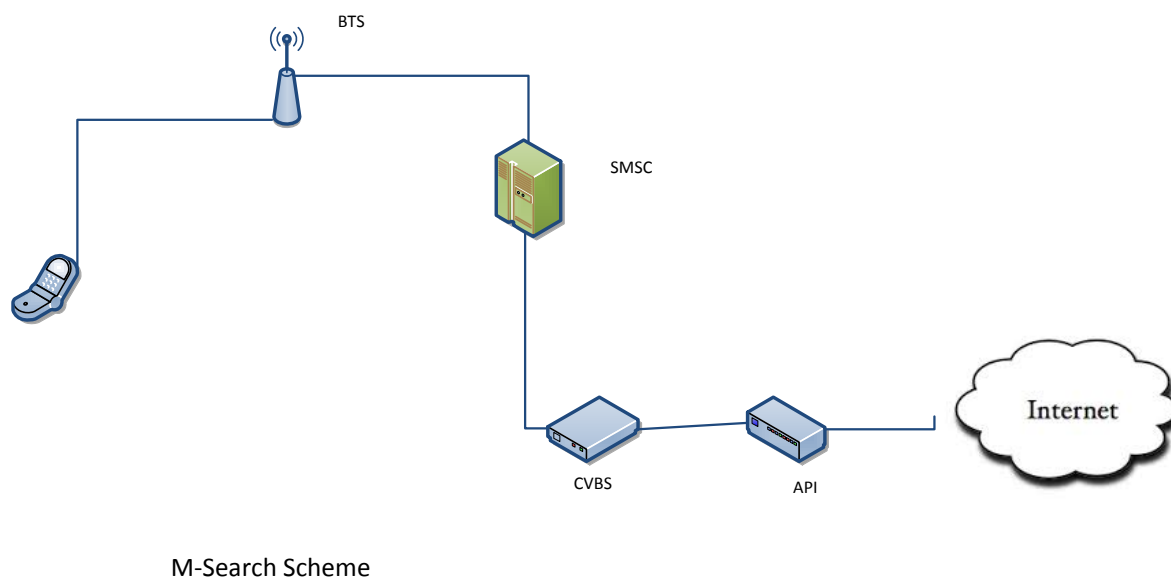
M-Search Scheme

Figure 9: M-Search Scheme

4.1.2.1.3 Market Overview

The M-Search is an alternative service to the classic internet search using *Google* or other search engines. It allows customers who do not have access to the internet or who cannot afford a smart phone to have access to useful information.

This unique service will fill an information gap to the base of the pyramid until the vulgarization of internet usages and decrease of prices. It can be profitable for the telecom operators and bring benefits to the users.

4.1.2.2 Assessment of the opportunity

4.1.2.2.1 Market need fulfilled

The lack of information access is a huge problem for the base of the pyramid, especially for farmers and customers living in the rural areas. Contributing to informing the farmers, for instance and helping them to become more efficient buyers and sellers will decrease their transactional costs and results in higher cost efficiency. This will create a greater value to them.

4.1.2.2.2 Service Life Cycle:

The M-Search life cycle will not exceed 2 to 3 years, thanks to the growth of the internet penetration, the quick development of the new technology like 4G and LTE and the price war between the various telecommunication players; we assume that the prices will continue to drop and internet access will be affordable to customers within that period.

4.1.2.2.3 Future Expansion:

Since the forecasted life cycle for the service is only 2 to 3 years, expanding the product under this form will be not profitable. The suggestion is that this service will be also offered using a web interface and in this manner can be also accessed by internet users. It can represent a good opportunity to launch a local search engine.

4.1.2.3 Corporate entrepreneurial self-assessment

One of the main goals of *Smart East Africa* as part of the *AKDN* (*Aga Khan Development Network*) is to create services to the unserved population in East Africa and also to bring technology to those who cannot afford it. Following these principals, offering such mobile services to improve the living conditions of the base of the pyramid is a one of the company's objectives. Customers will be charged $1 for a weekly subscription or $3 for a monthly subscription for the M-Search service.

4.1.2.3.1 Experience needed for implementation

Developing the API is one of crucial factor for the success of the service; fortunately, it can be done in house by the internal technical department of the operator *Smart*.

Further factors leading to a success of the product is the follow up of the exchanged information and ensuring that customers are getting the data they are requiring. The daily tracking of the customer feedback will help to improve the service.

4.1.2.4 Financing:

In the same manner as the previous service (M-Education), putting in place the M-Search will not need any extra CAPEX, since the equipment is already installed and the API can be developed in-house. Therefore, most of the expenses are operation and marketing expenses.

4.2 Future of Mobile service in East Africa

As we can consider from the two case studies, exploiting the extensive penetration and the fast growth of the mobile network in the three East African countries (a coverage of more than 70% in the inhabited territories in Tanzania Uganda and Burundi), , shows that mobile services is crucial to bring information and technology to help the unserved (Base of the Pyramid). Mobile Telecom Operators should modify their business model strategies and should adapt it in order to provide these services and make partnerships with this segment representing more than half of the total population in the region.

It is no longer an option for these firms to concentrate only on high-value customers if they want to improve their revenue, since the price war is already declared and the competition is getting more aggressive. Modifying their business model strategies passes by diversifying their product and services, or by partnering with other service providers and outsource their infrastructures by playing the role of ASPs can be also profitable.

It is proven that digitization of services through the mobile network is possible also without the use of the internet and – furthermore – it is very cost-effective. Additionally to the two mobile services presented in this thesis, the Mobile Money (M-Pesa) is another proof and opportunity to increase and extend other services in mobile commerce (m-commerce).

5   CONCLUSION

Nowadays nobody can ignore the importance of the service digitization, an emerging phenomena since the internet boom. In the developed countries companies are continuously developing and implementing strategies for E-services to create transactional efficiencies and improve customer's satisfaction. Unfortunately in the developing world providing digitized service is still facing several challenges not only because of the lack of infrastructure and internet high prices, but also due to the market players especially the telecommunication companies who are not willing to modify easily their business model strategies and adopt it to the reality of the market.

The mobile network companies in the East African environment are the key element to spread the digitized services, either by providing them or by offering their infrastructure to service providers, and play the role of ASPs. This will on the one hand create opportunity to entrepreneurs to develop new businesses in this domain without making high investments on expensive infrastructure. On the other hand, outsourcing their equipment and knowledge will monetize telecommunication companies' previous investment.

More benefits can be captured by telecom companies when partnering with the base of the pyramid and providing products that are capable to fulfil their needs. This partnership is crucial to increase revenue and to gain more market share, and it depends on the modification of their business strategies in line with the slogan "they need to change and the change should be done now".

The base of the pyramid needs basic services such as access to education, health and information. Despite of the fact, that these services are not the core business of the telecommunication firms they can still provide this in partnership with other professionals such as NGOs, local authorities, Ministries etc. The M-Education service is an example of the feasibility of this approach. Telecommunication decision-makers should start to discern more areas to provide more diversified services, since the revenue from the communication category service is declining due to the aggressive competition.

Future works can emphasize on the unserved services that incorporate opportunities to both providers and customers.

Further studies and research on how to change the business model strategies for better serving the base of the pyramid is the essential basis for guiding companies through the process and decrease their business risk.

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ANNEX

Table 4

M-Education

Daily bundles	M 1	M 2	M 3	M 4
Subscriber base	200000	250 000	312 500	390 625
M-Education users	8000	13 000	19 250	27 063
Penetration	4,0%	4,0%	4,0%	4,0%
Users deactivating		1 040	1 540	2 165
Weekly bundle number of activation	5 333	8 667	12 833	18 042
Revenues from weekly subs. fee - BIF - net of taxes	3 307	5 373	7 957	11 186
Renewal revenue	3 968	6 448	9 548	13 423
Total Revenue weekly Bundles	**7 275**	**11 821**	**17 505**	**24 609**
Monthly bundle number of activation	2667	4 333	6 417	9 021
Revenues from monthly sub.fee - BIF - net of taxes	4520	7 345	10 876	15 290
Total Revenue Monthly bundles	**4 520**	**7 345**	**10 876**	**15 290**
Total Revenues	**11 794**	**19 166**	**28 380**	**39 898**
Expenses :				
Announcement Recording expenses	938			
Flyers and posters printing	3875	1 938		
Radio&TV advertising	7031	7 031		-
HR for Posters fixing and Flyers distribution	625			
Total costs	12469	8 969	-	-
Profits	(674)	10 197	28380	39 898
Cumulative Profit/(Loss) $	(674)	9 523	37903	77 802

	M 5	M 6	M 7	M 8	M 9	M 10	M 11	M 12
	488 281	610 352	762 939	953 674	1 192 093	1 490 116	1 862 645	2 328 306
	36 828	49 035	64 294	83 367	107 209	137 012	174 265	220 831
	4,0%	4,0%	4,0%	4,0%	4,0%	4,0%	4,0%	4,0%
	2 946	3 923	5 144	6 669	8 577	10 961	13 941	17 666
	24 552	32 690	42 863	55 578	71 473	91 341	116 176	147 220

63

15 222	20 268	26 575	34 459	44 313	56 631	72 029	91 277
18 267	24 321	31 890	41 350	53 176	67 958	86 435	109 532
33 489	**44 589**	**58 465**	**75 809**	**97 489**	**124 589**	**158 465**	**200 809**
12 276	16 345	21 431	27 789	35 736	45 671	58 088	73 610
20 807	27 703	36 324	47 100	60 570	77 408	98 455	124 763
20 807	**27 703**	**36 324**	**47 100**	**60 570**	**77 408**	**98 455**	**124 763**
54 296	**72 293**	**94 789**	**122 909**	**158 059**	**201 997**	**256 919**	**325 572**
-	-	-	-	-	-	-	-
54 296	72 293	94 789	122 909	158 059	201 997	256 919	325 572
132 098	204 390	299 179	422 088	580 147	782 144	1 039 063	1 364 635