

FACTORS INFLUENCING COST OF INTERNET BANDWIDTH ACCESS BY END USERS IN KENYA: A CASE STUDY OF IWAY AFRICA LTD**Peter Muteru**

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ABSTRACT

In early 1995 the internet came to Kenya. The big deal at the time was e-mail, as new as it was, presented the promise of even less expensive and more data transfer capability than the analogue-powered fax machine. The general objectives of this study was looking at the service providers' cost factors and the role of the regulator and establish areas where improvements can be made in input cost application ,policy and increase access to the larger population of affordable internet services. The target population of the study was the commercial personnel of all the target population of the study was 10 internet service providers in the country registered under their umbrella bodies: Telecommunications Services Providers Organization of Kenya (TESPOK), Kenya ICT Federation (KIF). Three senior commercial personnel from each organization were purposively sampled for study because he/she will have all the information required in relation to investigation of the study and performance of the firm. A questionnaire was used to gather primary data. Secondary data was sourced from published books, government journals and the internet. Qualitative and quantitative techniques were used to analyze data. The study was beneficial to the Internet Service providers by providing insights on the cost factors and available competitive alternatives in the market and to the regulator who used various regimes to aid in the end users realizing more benefits by policy change and directing investment in areas that will drive price reductions. The study did not cover any other area outside the internet .The study was limited to the production factors quality of the connection, speed, global provider contracts, delivery technology to the cost of internet bandwidth.The study concludes that speed of connection; global provider contracts and regulator are significant in explaining the variations in the internet band width cost.The study recommends that companies should reduce international bandwidth costs (or improving quality of service to users) so as to avoid unnecessary long distance routings.

Key words: Speed of the connection, Global provider contracts, Endpoint Technology, License fees, and Internet Bandwidth

Introduction

The Internet is an international network whose origin came from the Federally-funded research that started in the Department of Defense in the early 1960s and was nurtured by the National Science Foundation of the United States until the mid-1990s (Wiseman, 2005). Between that time and now, the Internet has grown in sophistication, resources and services, and is in fact, creating an 'information economy' in both developed and developing countries. The driving force for the feat is the provision and utilization of the many Internet services, from simple ones like electronic mail, search engines, file transfer, remote login to advanced and newer functions such as broadband services; all driven by the TCP/IP protocol of the Internet. The Transmission Control Protocol (TCP) and Internet Protocol (IP) define the rule by which packets of data are addressed and transmitted across physical fibers, satellite and Wireless networks (U S Government Working Group, 1998). The connection and provision of these Internet service to consumers is usually done by the Internet Service Providers, and usually there is a mode of connectivity, a bandwidth for the services, the types and level of services to access (the height of which are broadband services). Broadband services require other more sophisticated modes of connectivity such as the fibre optic cable, microwave and VSAT (Very Small Aperture Terminal). In Kenya the provision of internet services was dominated in the first five years of the new millennium (1999/2000–2004/2005) was dominated by Telkom Kenya (TKL).

Internet pricing models and methodologies have been written, especially over the 20 years, during the commercialization period of the Internet. Bohn, *et al.*, (1993) suggested using a mixture of altruism and quotas to implement priority-based routing. MacKie-Mason and Varian (1992) introduced the idea of the *Smart Market mechanism* that followed the ideas of Bohn, *et al.*, but accounted for congestion externalities. Cocchi, *et al.* (1991, 1992) interlaced the idea of efficient pricing policies with network efficiencies concluding that both are compatible under the *type-of-service* (TOS) pricing mechanism. Faulhaber (1992, 1995) analyzes the type of subsidy that should be put in place and he also speculates on the future integrated communications market. Shenker (1993) and MacKie-Mason and Varian (1993, 1994, 1995) have written several papers on pricing issues related to the Internet, including some analyses of advantages and disadvantages of usage-based and flat-fee based models. MacKie-Mason, Murphy, and Murphy (1995) present a very comprehensive paper summarizing previous issues on the role of pricing on the Internet. Additional economic papers contributing to the above ideas were also taken into account. Sandra Schickele (1993) presents a case for the subsidy of the Internet by pointing out its benefits and market failure problems. There are a number of authors who have contributed in the area of building and utilizing pricing models for Internet services. Closely related to the work of Kamppari (2002) is that of Cushnie and Hutchison (2005) who build a charging and billing models for GSM and future mobile Internet services.

Their work became significantly important because mobile telephone communications and the Internet are converging and may eventually operate on a common platform – the TCP/IP networks. What the authors did was to apply selected Internet charging models to the mobile telephone network market and determined their relative suitability. Charging and billing models such as the metered charging, fixed price charging, packet charging, expected capacity charging, edge pricing, paris-metro charging and market-based reservation charging were exhaustively weighed by the authors and they concluded by providing a ‘unified’ flexible model that combines some of these existing charging models for the use of mobile Internet services. Stiller (1999) earlier published their own common Internet service pricing models from an ISP point of view. Their motivation was their conviction that suitable pricing models for Internet services represent one of the main necessities for a successfully running implementation of a charging and accounting tool.

One distinction of this study lies in its perception of the need to take break these theoretical schemes down real project needs, for that is the only way to evaluate the different approaches with regards to the technical efficiency of the ISPs as well as the economic viability of the venture. This study will be geared towards analyzing the various input factors towards an understanding cost of internet bandwidth to the end customer with reference to internet Service provider - Iway Africa Ltd.

Statement of the Problem

Kenya continues to experience high internet bandwidth prices making it a major challenge to individuals, business and governments in accessing internet services. The contribution of ICT and especially ISP to the development and the realization of both the Millennium development goals MDGs and the Vision 2030, the government’s master plan for development, cannot be under estimated. The issue of pricing of Services in the provision of Internet connection and services is worthy of attention in a developing country like Kenya. From the Internet Service Providers’ viewpoint; this becomes a factor in Internet operations, especially because of the growing realization of the essence of Internet, the increasing demand for services and the emergence and possibility of new broadband services that subscribers desire to enjoy in the country. As Internet traffic increases, Internet pricing is a key issue to keep the whole system economically feasible and sustainable. Previous studies by Nguyen et al., (2005) on pricing schemes; Cao, Shen and Milito (2002) on a game theoretical approach to internet pricing; Goeddeke et al., (2011) on the impact of ISP competition on pricing and Trinh, GyarmatiL and Sallai (2011) on Understanding the Impact of User Loyalty on Internet Access Pricing have all focused on the pricing in general but not on the constituent factors that contribute towards the pricing of internet access by ISPs. In addition the author did not come across any previous literature on internet access pricing by ISPs in Africa general and Kenya in specific. This study was therefore geared towards determining the factors influencing cost of internet bandwidth access by end users in Kenya.

General Objective

The general objective of the study was to determine the factors influencing cost of internet bandwidth access by end users in Kenya and the role of the regulator in driving end customer pricing.

Specific Objectives

The study was guided by the following specific objectives:

- (i) To establish the influence of connection speed on internet access price
- (ii) To determine the influence of global provider contracts on internet access price
- (iii) To investigate the impact of the delivery technology of optic fiber, VSAT, GSM, CDMA on the pricing of internet access.
- (iv) To assess the influence of the regulator on the pricing of internet access

Literature Review

Pricing Theory

The review sought to provide an overview of studies previously done and will focus on the objectives of the study. The identified gaps of previous studies were highlighted and discussed. Theoretical review refers to interrelated ideas based on theories, Kombo and Tromp (2006). It is a reasoned set of prepositions, which are derived from and supported by data or evidence. To explain the conceptual underpinnings of the study, the theories were presented below.

Business Objective

Determining the business objective gives a company a framework for developing the best pricing strategy to meet that objective. Different objectives will lead to different prices for that service. Much of the literature evaluates pricing from the standpoint of maximizing long term profit (Bruegelmann, 1986).

Academic Fields

There are three main academic fields involved in the study of how to price a service. They are the fields of accounting, economics and marketing (Bruegelmann, 1986). These areas view the pricing differently. The accounting profession takes a cost oriented approach. Cost and managerial accountants are mainly concerned with the proper allocation of the costs incurred in the development and the delivery of a service. Economics is mainly concerned with the marginal analysis of a service. It emphasizes the costs directly associated with the production of an additional unit or the serving of an additional customer. All costs incurred before this point are considered sunk. They are generally not considered relevant to the price that should be charged for the next unit sold. Marketing is more market-oriented than cost-oriented. It emphasizes the value of the service to the consumer considering demand intensity and customer psychology. The approaches of each discipline will be discussed later in this sections after the concepts of average costing; marginal costing and scarce resources have been introduced.

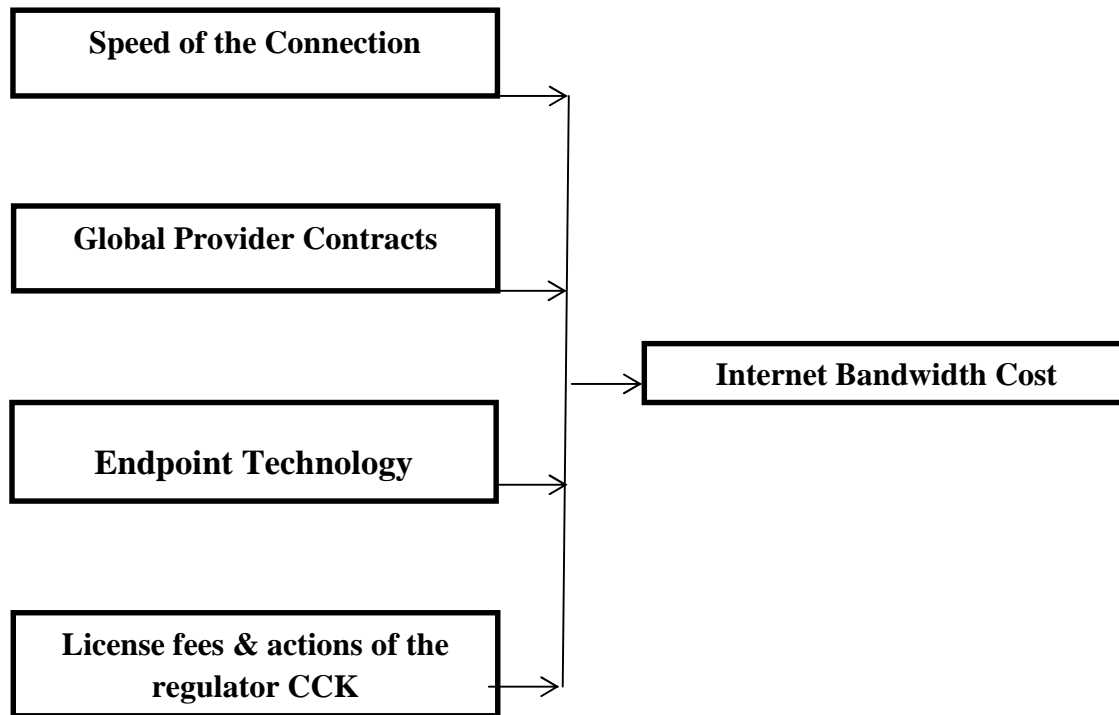
Costing Methods

As previously mentioned, each field approaches pricing from a different perspective. The following sections review the findings from Bruegelmann's (1986) research. His research addressed how the three different fields of thought (accounting, economics, and marketing) approached price and how businesses apply the different pricing theories. *Accounting*: Cost accounting refers to the determination and control of costs. The cost accountant is concerned with the costs of manufacturing products and with the expenses of selling and distributing the products. It is important that the cost accountant collect, assemble, and interpret data in a way that helps management to assess current operations and plan for the future (Needles, 1981). Cost and management accounting textbooks recommend the use of variable costing in short-run pricing decisions. In the long run, prices must be set to enable the recovery of total costs plus a satisfactory return to the investors. *Economics*: Economics textbooks state "the microeconomic theory of price rests on the following assumptions (Bruegelmann, 1986):

- (i) The only criterion for setting prices is the maximization of total profits.
- (ii) The firm produces only one product, if the firm is a multi-product company then all products are manufactured and sold in the same proportions.
- (iii) The decision-maker has exact knowledge about the company's total costs at each level of output;
- (iv) The decision maker also knows how much he can sell at each price. (Gabor, 1977)

Bruegelmann (1986) points out that "... a firm will increase its output until, at a certain price, its incremental revenue equals incremental cost, thus maximizing [its] profits. *Marketing*: Marketing textbooks' recommendations for the pricing problem are more market-oriented than cost-oriented. Both variable and fixed costs are considered in setting prices but the pricing analysis begins with determining the value the product will provide to a potential user, considering demand intensity and customer psychology (Bruegelmann, 1986). *Bruegelmann's Findings*:

Conceptual Framework



Independent Variables

Dependent Variable

Conceptual Framework

Research Methodology

The research was conducted through a case study since it is a research on one organization.

The target population of the study was the commercial personnel of 10 internet service providers of which Iway Africa Kenya Ltd is part. Three commercial personnel from each organization were purposively sampled for study because they had the information required in relation to investigation of the study and performance of the firm.

Purposive sampling was used to select Iway Africa respondents.

Primary as well as secondary data was collected. Secondary data was obtained from relevant literature review from dissertations/thesis, car journals, magazines and the internet. Primary data was collected using questionnaires. The data collection process took less than a week.

Responses in the questionnaires were tabulated, coded and processed by use of a computer Statistical Package for Social Science (SPSS) program to analyze the data. The responses from

the open-ended questions were listed to obtain proportions appropriately; the response was then be reported by descriptive narrative. Descriptive statistics such as mean and standard deviation were used.

Research Findings

The Speed of the connection (Objective 1)

The first objective of the study was to establish the influence of connection speed on internet access price. The study found that majority of the respondents indicated that customers audited the speed of their connections to a medium extent and that the regulator, CCK, audited the speeds delivered to customers.

Global Provider Contracts (Objective 2)

The second objective of the study was to determine the influence of global provider contracts on internet access price. The study further found out that majority of the respondents indicated that the company prices to customers were competitive and attractive to the market; that the customers felt that the prices they got for internet services were fair to a medium extent and that the organization applied the simple and low cost technology in delivering internet services..

Impact of Delivery Technology (Objective 3)

The third objective of the study was to investigate the impact of the delivery technology of optic fiber, VSAT, GSM, CDMA on the pricing of internet access. The study further found out that majority of the respondents indicated that Wimax had the largest number of customers; that the type of delivery technology affected the competitiveness of the service delivered on price terms to a large extent and that the company used the cost plus mark-up method to arrive at the end customer price; that cost was a large factor in determining the number of customers willing to sign up. A company would rarely strictly base the price charged for its services on a pure variable cost basis but so as to determining the number of customers willing to sign up (Bruegelmann, 1986).

Influence of the Regulator

The fourth objective of the study was to assess the influence of the regulator on the pricing of internet access. The study found out that majority of the respondents indicated that 21-30% was the percentage of licensing fees and levies charged by the regulator CCK, contributed to the end customer cost and that the international bandwidth cost had a direct impact on the end customer cost.

Regression analysis

The researcher conducted a multiple regression analysis so as to examine the factors influencing cost of internet bandwidth access by end users in Kenya: A case study of IWAY Africa Ltd.

Estimated Coefficients

Model	Unstandardized coefficients(B)	p-Value
Const.	32.23	2.65e-11 **
Speed of Connection	0.572	0.0196 *
Global Provider Contracts	0.266	0.0436 **
Technology	0.396	0.0293 *
Regulator	0.490	0.0045 **

* Level of significance at 0.01 ** Level of significance at 0.05 ***Level of significance at 0.1

Under “unstandardized coefficients,” the “Constant” (32.23) is the “a” coefficient. The unstandardized regression equation is as follows:

$$IBC = 32.23 + 0.572SC + 0.266GPC + 0.396T + 0.490R$$

Where IBC is the Internet Band Width Cost, SC is the Speed of Connection, GPL is the Global Provider Contracts is the Technology and R is the Regulator.

A unit change in the speed of connection will lead to a 0.572 change in the internet band width. A unit change in the global provider contracts will lead to a 0.0059 change in the internet band width. A unit change in technology will lead to a 0.2004 change in the internet band WIDTH while a unit change in regulator will lead to a 0.973 change in the internet band width.

As depicted in Table 4.1, At 1% level of significance, speed of connection, Technology while at 5% level of significance global provider contracts and regulator are significant in explaining the variations in the internet band width.

Conclusions

The study concludes that speed of connection; global provider contracts and regulator are significant in explaining the variations in the internet band width cost.

Recommendations

In view of the findings that emerged from this study, the researcher made the following recommendations:

The study recommends that companies should reduce international bandwidth costs (or improving quality of service to users) so as to avoid unnecessary long distance routings.

The study recommends that firms should make use of marginal costing in pricing decisions this is because pure cost-plus pricing does not give enough attention to the intensity of demand and consumer behavior.

Finally, the study also recommends that those who price a product should use a combination of the methods depending on the environment in which they are pricing. They should look at the expectations of the price-setter has about the future.

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