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Pricing Innovation Strategy Impact for Telecommunication Industry Companies in Congo Brazzaville Based on Elasticity Analysis

Ngomah Madgil Don Stenay Junior[1, *], Ngomah Le Temps Décide Amour Prestige[1], Thierry Belinga[2], Jean Félix Makosso[3], Gertrude Ndeko[4]

[1]Department of Management, Wuhan University of Technology, Wuhan, China

[2]Department of Economics, Québec University, Montréal, Canada

[3]Department of Sciences and Communication Skills, Marien Ngouabi University, Brazzaville, Congo

[4]Department of Sociology/Population and Development, Marien Ngouabi University, Brazzaville, Congo

Email address

juniorngomah@gmail.com (N. M. D. S. Junior), letempsdecide@gmail.com (N. Le T. D. A. Prestige), thierry.belinga@uopeople.edu (T. Belinga), makossofr@yahoo.fr (J. F. Makosso), gertrudendek@yahoo.fr (G. Ndeko)

[*]Corresponding author

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Abstract

This research uses elasticity analysis to evaluate the impact of pricing innovation on the commercial performance of telecommunication industry Companies in Congo Brazzaville. As a first step, this study develops a refined analysis grid of product innovations according to their content, their "localization" in the company's offer or organization, and the degree of impact they introduce. It has been found that the innovation of telecommunications companies is based on the complicity product price. An innovation products and prices on the market, causing the increase of subscribers, and causing a buying behavior calling them to a high degree of consumption. This triggers an increase in production, therefore increase in sales or the financial indicator, thus encouraging growth on the income rates profitable to businesses. That is why this work has identified the determinants of innovation produced within the telecommunications companies in Congo Brazzaville. This is based on a joint investigation carried out mainly by 4 companies, notably MTN, AIRTEL, WARID and AZUR, which we found more productive and representative in terms of innovation factors and performance indicators. The quantitative data was collected from 2009 to 2016 through the Regulatory Agency of Telecommunication in Congo, convenience sampling was then employed to select four (4) companies. The quantitative data generated from this study was analyzed using Eviews.

Keywords

Pricing, Strategy Innovation, Elasticity Analysis

1. Introduction

After scrutinizing the sectors of economic activity in Congo Brazzaville, we realize that the telecommunications sector is experiencing more or less acceptable economic growth, especially in the field of mobile telephony. It should be said that today the telecommunications sector is developing without precedent and is imposing another system of management of companies that wish to prosper and make a place of choice in the current context of the globalization of trade. This sector also involves technological advances and, several companies and states of the world have made it a real battle horse for their sectors of activity. So, the Congo-Brazzaville once again has not remained at the margins of these technological advances. The telecommunications sector is proving to be an innovative sector in Congo-Brazzaville, with the appearance of several

mobile telephony companies, including MTN, AIRTEL, WARID, AZUR Congo and so many others. Commercial Internet and telephone network companies; that we are proposing to study here. In this perspective, the telecommunications market is being born a kind of competition. And it seems that the price premium or remains at the center of all the innovation strategies of these 4 companies in the telecommunications sector.

Thus, the main objective of this study is to evaluate the impact of price innovation on the commercial performance of telecommunication industry companies in Congo Brazzaville. It is in this perspective that our research has therefore been particularly interested in the various factors explaining innovation performance, the causal relationships that bind the processes and the actions committed to the results Obtained. In practical terms, we have asked ourselves two (2) main questions: what are the challenges of price innovation strategy on the consumers of telecommunication companies in Congo Brazzaville? What is the impact of price innovation on the commercial performance of telecommunication companies in Congo Brazzaville? As assumptions it seems that the innovation of the telecommunications companies is done on the basis of the offers on the market. A decrease in the prices of goods and services on the market, this decrease causes the increase of subscribers, leads to buying behavior calling them to a high degree of consumption. This triggers an increase in production. As a result, increase in sales thus promoting growth on income rates profitable to businesses.

2. Literature Review

2.1. Strategies Prices of New Products Theory and Applications

Since the work of [1], the pricing strategies for new products are largely associated with skimming and market penetration techniques. The first is to set high prices when the property is introduced to the market and then to lower it down the demand curve. The second seeks to take advantage of the economies of scale and the learning curve to set low prices. If these two strategies underline the willingness of sellers to make their products profitable over the long period (maximizing profits in the case of skimming and maximizing market shares in the case of penetration) and within the specific framework of the cycle of Life, they also imply that it is possible to exploit the heterogeneity of consumers by setting different (or identical) prices at different points of time. These practices, which are akin to inter-temporal price discrimination, are widespread in trade and would thus be part of the marketing mix of large firms.

Management and Marketing are excellent tools to allow us to analyze the pricing strategies of new products. Their thinking framework rests on the position of the product in its life cycle. During this life cycle, many changes in price elasticities [2], the costs of production, distribution and communication intervene and must be taken into account in the company's pricing policy. In other words, it is a question of establishing the profitability prospects of a product taking into account the investment made beforehand (the fixed costs) and its longevity in the life cycle, and not on the basis of short-term financial objectives (Equalization of marginal cost with the marginal recipe for the period). At the same time, the price strategy is based on the demand and costs of the firm, seized from a dynamic perspective, but also the costs of the competing firms.

2.2. Theoretical Approach to the Relationship Price Life Cycle

Life cycle theory usually breaks down into four phases. Launch phase (I): The launch of a product generally requires a certain period of adoption by consumers. Sales are therefore low, and the market is gradually opening up to the product. Its cost price is high as well as the costs of distribution and communication (advertising and promotion), hence a negative profitability. The growth phase (II): Sales are growing and the product is experiencing some success. We can talk at this time about the construction of a real market. The company will start making the first profits. Its cost price decreases, its profitability increases but the competitors start to react. The maturity phase (III): The market is starting to stabilize as all potential consumers have purchased the product. The company can make the entire production system profitable (fixed costs are largely covered). The profits will be the highest. The reaction of the competitors is realized. However, saturation is beginning to appear because potential customers have been affected as a whole and the conquest of new customers can only result from an improvement in the product that would allow it to avoid disappearing. The phase of decline (IV): the company records a decrease in its sales because it becomes obsolete, it is no longer adapted to the tastes of consumers, and alternative products appear on the market. However, the company can continue to make a profit if it has a good control of its production costs (learning effects). The company will have to seek to exploit other products (replacement products) and consider disinvestment or reconversion.

In his book "Managerial Economics" published in 1949, J. Dean establishes three preliminary steps to set the price of a new property at the launch stage: The first step is an estimate of demand. It is simply a question of exploring the consumer's preferences and abilities to discover the product. The seller then asks a series of questions such as, is the product likely to attract a certain clientele? can it be further improved? what price range can stimulate the consumption of the product?, what will be the sales corresponding to the different price levels?, what will be the reaction of competing producers and distributors?.... The second stage introduces the distribution policy that the seller will have to put in place. For goods that pass into the hands of retailers, the cost of distribution will govern the relationship price factory/Final price. This cost is closely related to fluctuations in production and volume of sales. The final step revolves around the sales promotion strategy [3]. As Dean points out, "initial

promotional spending represents an investment that can only be recovered when a market has developed" (1950, p 52). Therefore, innovating is simply to create a market (a difficult that will not meet future competitors) by playing on the different components of marketing-mix (product, price, distribution, communication). The price strategy of a new product can then be summed up in a choice between low prices when introducing the product to avoid any competition or set high prices in order to quickly recover its promotional expenses and skim the Application. These two pricing policies are commonly referred to as skimming strategy and penetration strategy.

(i) Skimming Policy

J. Dean shows that a relatively high price policy, coupled with large promotional expenses in the early stages of market development (and lower prices during subsequent stages), has often been beneficial for Many products. There are a number of reasons for this success. The first reason is that the new product incorporates a real innovation. Innovation is conceived here as the industrial exploitation of an invention. It leads to the obtaining of a patent which gives the owner a monopoly of use for a given number of years, hence the possibility of setting high prices as soon as the product is introduced. This is particularly true for the pharmaceutical industry taken as an example by J. Dean, but also for durable goods in general. [4] cite the examples of Kodak, Polaroid, RCA, SONY... which have successfully used a skimming policy. The second reason, the demand is usually more inelastic [5] at the price in the first few years when the product is well established on the market. This is especially true for consumer goods. Consumers are indeed still ignorant of the value of these goods compared to others (the idea of an asymmetry of information in favor of the seller is found). In addition, at least in the first few years, the product has no rival products (or even some products), so the cross-elasticity of demand is zero.

Launching a new product with a high price is an effective way to divide the market into segments that differ in their elasticity of demand at the price. The higher initial price serves to skim the market portion which is relatively inelastic at the price while successive price reductions hit the more elastic market sectors. [6] stresses a close link between the skimming price and what it calls the prestige price. Both of these techniques operate at the top of the market. The first is destined to sell high quality to very low financial risks, the other seeks to do the same thing using the price to promote status and prestige. The property is part of the individual's brand image, and the latter will pay a high price for this privilege. Thus, the heterogeneity of incomes, tastes, social classes... associated with a certain preference for time, allow the establishment of a policy of skimming. The seller will in this case tend to favor the value of the property rather than the costs of production.

The skimming policy is safe, or at least seems to be. When the elasticity of demand is unknown, high introductory prices can be interpreted as a price. The product will be marketed if and only if the initial prices cover the costs of production and sales (distribution, promotion...), an integral part of the investment expenditure of the new product.

In addition, it is easier for the company to lower its prices than to increase them. The price increase must indeed be justified with the customers, under penalty of seeing its sales fall. Thence, as underlined by [7] "Firms that have little knowledge of the demand curve are usually advised to employ skimming and then to gradually reduce prices until a satisfactory level of sales is achieved". Finally, firms are not always able to finance the product, wait for future sales revenues, or even increase their production capacity. Significant expenditure from the introductory phase (production costs, organization of distribution channels, promotional investment...) obliges the firm to quickly recover its costs. Even when market expansion makes the penetration price more profitable than the skimming price, the firm may be unable to mortgage its future income to finance its present investments. From there, the initially high prices finance the costs of launching a family of products when uncertainties block the usual sources of capital.

(ii) Penetration Price

The alternative policy is to use low prices in order to quickly penetrate the market. This policy is the opposite of the skimming policy whereby the price is reduced only if the short-term competition obliges it. In addition if the skimming policy has the virtue of making some profits at each stage of market penetration, it prevents fast sales to buyers located at the end of the income scale, and who are not willing to pay a premium to novelty. The low-price model should be adopted with a long-term vision of profit rather than in the short term (knowing that it usually takes time to reach a consequent volume of sales). Finally, contrary to the skimming price, the decision to set a price to extend its market can be taken in the different stages of the product life cycle, before launching, during the launch, during the phase of growth, maturity or Product decline. While some products were able to avoid prematurely disappearing due to a relatively low price, others seized the opportunity to exploit a niche market (example of the reissue of Works of maxi-pocket size at 10 F).

There are several reasons why the seller is aggressive on the market, the decision to set a low price follows a very elastic demand in the short term (often because of a number of substitutes offering similar profits) [8]. The price reduction therefore suggests a significant growth in sales. A low pricing policy at the start of the product anticipates the lower cost of the experience curve. The price will be set on the basis of the expected future costs rather than the costs present. With this strategic tool, the firm will seek to reach critical size faster and reduce its production costs. The experience curve is defined as the aggregation of three phenomena [9]: Economies of scale (volume phenomenon): These play at a given time between different competitors, but also in time: the size necessary to remain competitive increases with the growth of the market. Economies of scale are divided into two categories: the spread of fixed costs on higher production (research costs, design, development, administration, distribution...) and the improvement of

variable costs by a better Process. [10] strictly speaking (labor productivity, improvement of design, organization...). In this case, the competitive advantage is based on an essential time component. Innovation: This is the main part of the experience effect and differs from learning. Innovation is generally the result of a single producer (or co-operation between several) within the industry concerned. It is therefore obtained by concentrating research efforts on a particular area of expertise. The research requires an accumulation of knowledge, tests, and observations thus accumulated experience.

Innovation is widely regarded as pinnacle success factor in highly competitive and global economy [11]. An innovation perspective draws a clear picture of future opportunities that lie ahead. Analyzing the relationship between innovation capability and innovation type for firm performance especially in the insurance companies, the authors, consider that, managers need to carefully examine and confront how the various aspect of their business should be sourced to cost reduction, operational efficiency and enhance value. In the same way of ideas [12] discussed on a combined approach of profitability, brand and price strategies, which offers several ways to interpret the research outcomes. Businesses follow a strategy of cost leadership. As it can be seen, pricing innovation is almost impacting every activities in companies. That is why they talk about: Hedonic price modelling which is a technique widely used in tourism and hospitality research. This method is used to determine the influence on the price of certain attributes by a decomposition of the price of the goods observed by the sum of individual prices [13]. A better understanding of price positioning might lead to changes in brand strategy or the ways that businesses interact with external agents, as well as providing greater knowledge about potential competitors in the market.

An unresolved issue in innovation studies is to what extent and how innovation is affected by changes in the economic environment of firms. There is today a sizeable body of literature on the determinants of innovation activity [14]. These innovations were largely focused on industrial applications and factory automation. Following the trough of the 1990s, new opportunities were unleashed, notably by the deregulation of telecommunication markets and the massive investment activity that arose around internet infrastructure. The case of mobile telecommunications has been studied by one of the authors since the 1980s, and the use and development of theory have consequently evolved alongside the empirical studies over time. Transaction cost theory and its associated organization theory of the firm as developed by [15] provided the main framework at the start of the longitudinal study.

Mobile telecommunication technologies and other information and communication technologies (ICTs) have since the 1980s revolutionized the way we work, interact, and live our lives more generally by extending our ability to process information and to communicate without physical proximity [16]. Telecommunication products have variety of ranges and apart from the business growth the telecommunication products have considerable contribution in development of the society. The telecommunication business is going through constant changes or up gradations and there is always a corresponding change realized from business point of view and hence the proportional change witnessed by the society. The telecom companies through their commercial operations actively contribute to the progress of the society [17]. Technology is unleashing innovation through entrepreneurial zeal across the world like never before. No longer is value creation linked to scale but to the power of the idea [18].

The benefit of using a general definition of innovation is that innovation can be measured in a consistent way in all sectors and new indicators developed that describe the interactions between actors in sectors and between sectors [19]. Price policy definition is one of the most important decisions in management as it affects corporate profitability and market competitiveness [20]. Despite the importance that prices take in organizations, it appears that this element has not received proper attention by many academics and marketers since it represents, according to estimates, less than 2% of the papers on leading journals in the field. According to [21], price decisions are one of the most important decisions of management because it affects profitability and the companies' return along with their market competitiveness.

Strategic pricing requires a stronger relationship between marketing and the other sectors of a company. In order to enhance companies' economic and financial performance, the pricing policies should be defined by their internal capacities and on the basic systematical understanding of needs and wishes of their customers, in addition to market conditions such as, economic conditions and degree of competition [22].

Price is one of the most flexible elements of the marketing mix, which interferes directly and in a short term over the profitability and cost effectiveness of a company [23]. Up to now, there are two wide-applied methods for pricing: one is cost-based pricing, the other is value-based pricing, and the latter is usually much better for companies [24]. Consumers' behavior is another critical factor that managers consider in pricing decision [25]. Strategic consumers wish to maximize individual utility. At each time point, they may purchase the product at current price, remain at a cost to purchase later, or exit. [26] also approved that point and show that some manufacturers think adjusting price to control the retailer's and pricing strategies is reasonable and necessary, provides a good chance for manufacturers to satisfy their consumers. Talking about price strategy [27] also show and say such large-scale auction payments (price) generally influence a firm's ability to use the license and make firms' preferences over licenses and payments non-quasi-linear.

In the agriculture sector [28] in their study demonstrate that prices in European agricultural markets have become increasingly volatile in the past decade. It's to say that several sectors must improve price strategies because business or the world market is changing now and very

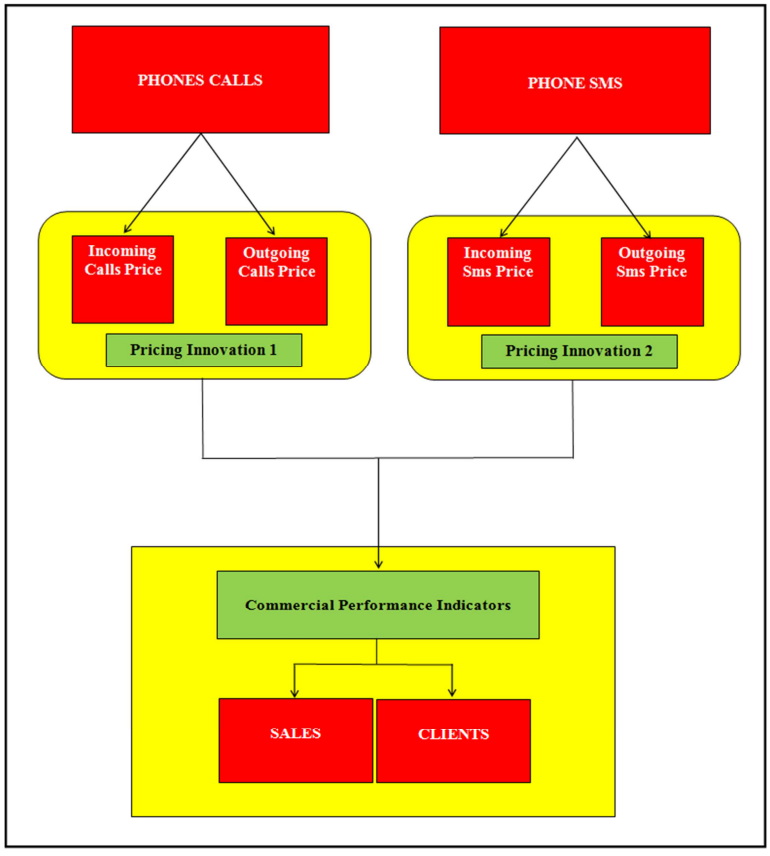
fastly. Managers have to take care and to bring all the time solutions to their business activities to expect never lose the market position. Thus, studying bicycle parts industry sector in competition [29], think this industry often adopt a low price strategy to be more profitable and efficient. The case company losing competitive advantage because of higher list price than other companies in Taiwan. The case company analyzes the manufacturing cost structure in order to promote the price competitive power. The precise cost information is cornerstone of strategy management to help senior manager and owner to make the competitive decision. That is why pricing decisions in order to maximize its expected profits per time unit in each pricing scheme [30].

Thus, the task of developing and defining prices is complex and challenging, because the managers involved in this process must understand how their customers perceive the prices, how to develop the perceived value, what are the intrinsic and relevant costs to comply with this necessity, as well as consider the pricing objectives of the company and their competitive position in the market [31]. In this way, [32] argue that companies which do not manage their prices lose control over them, impairing their profitability and cost effectiveness mainly due to the customers will on paying a determinate price, which not only does it depend on the perceived value, but also depends on the prices set by the leading competitors. Consequently, mistaken or inexistent pricing policies could lead buyers to increase the volume of information while allowing them to augment their bargaining power thus forcing price reductions and discounts. The difference between conventional price setting and strategic pricing consists on setting prices by reacting to the market conditions or managing them proactively, being their sole purpose to exert the most profitable pricing by generating more value for customers without the obligation of increasing the business' sales volume [33].

3. Research Methodology

In this empirical analysis we are aiming to show how the price innovation strategy impacts the telecommunication companies in the republic of Congo. First and foremost, we would like to detail about the methodology used to undertake this empirical analysis then we will introduce the factors of innovations and the commercial performance indicators used to study the impact of innovations on the telecommunication companies' sales. Our statistical analysis will be done in one main part: the quantitative analysis. There we will start firstly with the regression analysis using the sales (revenue) and numbers of clients as explanatory variables proxy with the price unit of calls and sms per minute locally and internationally as explaining variables, then we will have an elasticity analysis to see how the variations of the price (for calls and sms) do influence the number of calls made by the clients. Each research outcomes will be followed by an analysis that will lead us to reject or accept the hypothesis.

Our statistical analysis will follow the framework:



Source: Author

Figure 1. *Research Analysis Framework.*

As stated in the research framework we will be using two main products to illustrate the impact of the innovation in the performance of telecommunication companies in the Republic of Congo. These two products are: the phone calls and the SMS. For both products we will have the outgoing and incoming local and international calls and sms as our main independent variables. The innovation here can be seen on the price offered to the clients. So we will have a price strategy 1 and a price strategy 2, respectively for the calls and sms. Our statistical or empirical analysis will consist of studying the impact of these two strategies on the commercial performances of the telecommunication companies. To measure the commercial performances of the telecommunication companies we have used two variables: The Sales and the Clients or Subscribers (Figure 1).

4. Models

(i) Target Population

The research population according to Punch (2005) refers to the total target group who would, in the ideal world, be the subject of the research and about whom the researcher is trying to say something. It is therefore critical to define and identify the population properly and accurately for this study. For the purpose of this study, the population of the quantitative data collection is defined as all foreign firms and local firms operating in the telecommunication industry in Congo. The population for the qualitative data also refers to telecommunication companies Congo. This is in accordance with the affirmation of Bryman and Bell (2007) that the definition of the population should be related to the particular research inquiry. However, for reasons of specificity, a condition of all foreign companies being controlled by foreigners as suggested by the literature was imposed especially in the case of joint ventures. Kumar (2005:164) noted that it is impossible in many cases to gather data from the bigger group (population). Researchers therefore tend to select a sample from the total population for the study so as to gain information about the population. The sampling frame and methods are discussed next.

(ii) Data Sample

Sampling frame is a list or other record of the population from which all the sampling units are drawn (Collis and Hussey, 2003:155). In this study, a number of sampling frames were consulted in order to determine which one or what combination would be suitable for the study. In our target population we are doing our analysis within the period going from 2009 to 2016 (i.e. 8 years of observations) and 13 variables that we will observe during that time frame.

(iii) Source of Data

The data used in this research are mainly secondary data. Secondary data are the data collected by a party not related to the research study but collected these data for some other purpose and at different time in the past. If the researcher uses these data, then these become secondary data for the current users. These may be available in written, typed or in electronic forms. A variety of secondary information sources is available to the researcher gathering data on an industry, potential product applications and the market place. Secondary data is also used to gain initial insight into the research problem. Secondary data is classified in terms of its source – either internal or external. Internal, or in-house data, is secondary information acquired within the organization where research is being carried out. External secondary data is obtained from outside sources. There are various advantages and disadvantages of using secondary data (*shodhganga, 2012). In this research all our data were taken directly from the report of the regulatory telecommunication organization of Congo.*

5. Econometric Models

For the purpose of determining the impact of the innovation made in the telecommunication products (Call and SMS price) we will be using two economic models that are:

The Cobb Douglas production function, determined by the following equation:

$$Q_i = (K_i)^m (L_i)^n \quad [1]$$

In our context we have:

$$Q_i = R_i$$
$$K_i = P_i$$
$$L_i = Q_i$$

Meaning that equation [1] will become:

$$R_i = (P_i)^m * (Q_i)^n$$

Where:

R_i: Revenue made by Company i

P_i: Unit Price for Call or SMS for Company i

Q_i: Numbers of Calls and SMS of Company I

As we want to study the impact of the price (innovation) on the Revenue (performance indicator) we will use the Logarithmic linear function Ln. on each variable.

When applying the Log on the equation [1] we have:

$$LnR_i = Ln((P_i)^m * (Q_i)^n) = Ln\,(P_i)^m + Ln\,(Q_i)^n$$
$$LnR_i = mLnP_i + n\,Ln\,Q_i$$

So there are constant β_i that imply:

$R' = \beta_i P'_i + \beta_i Q'_i$ where:

$R' = \text{Ln}\, R_i$

$P' = L_n P_i$

$Q' = L_n\, Q_i$

(i) Dependent variables

In our research the depend variables represent our performance indicators which are: the Number of Clients (Cl), the total income for Calls (TCI) and total incomes for SMS (TSI).

Cl: Number of Clients
TCI: Total Income for Calls
TSI: Total Income for SMS
OC: Outgoing Local Calls
I.C: Incoming Local Calls
OS: Outgoing Local SMS
IS: Incoming Local SMS

Those variables are expressed in millions of units in our calculations. When doings the quantitative analysis with the graphic, we have introduced the logarithm function in our data to lower them. This application doesn't influence the interpretation of our results since the logarithm follows a linear progression.

(ii) Independent variables

POC: Unit price of Outgoing Local Calls
PIC: Unit price of Incoming Local Calls
POS: Unit price of Outgoing Local Calls
PIS: Unit price of Incoming Local Calls

(iii) Fixing the Missing Values in AZUR and WARID companies

In our data we have encountered some missing values for two companies: WARID and AZUR. After trying to use SPSS to replace the missing data using Multiple Imputation (Regression Method) we have encountered the problem of data dimensions. Since the sample of our data in over 8 years with 20 missing values the Multiple Imputation Method cannot work for this sample. That is why we have decided to undertake a regression analysis, to first of establish a linear equation between the missing variables and the years of observation, then forecasting the missing data on the year that is having information missing. The regression analysis used here is the OLS (Ordinary Least Squares).

The missing values of WARID are the followings.

i. Incoming Calls
ii. Outgoing SMS
iii. Incoming SMS
iv. Unit cost Outgoing call
v. Unit cost Outgoing SMS
vi. Unit cost Incoming SMS
vii. Total Incomes Calls
viii. Total Incomes SMS

Our purpose then is to determine the following equation for the 7 variables: $IC_t = \hat{\beta}_0 + \hat{\beta}_1 * Y_t$

When using EVIEWS 9 version we have the following outcomes:

[1] Incoming Calls:

$$IC_t = -51963722.4412 + 25870.9142967 * Y_t$$

[2] Outgoing SMS:

$$OS_t = -642868188.874 + 319866.400136 * Y_t$$

Table 1. *WARID Regression of Independent variables Outcome.*

YEAR	IC	OS	IS	POC	POS	PIS	TCI	TSI
2009	19,824	6,483	2,142	43	13	20	10589	140
2010	27,913	6,641	4,864	7	19	20	11937	155
2011	50,973	10,134	3,325	72	51	24	14433	482
2012	90,603	488,472	5,212	27	1	30	23004	1,143
2013	136,687	1,482,138	8,064	28	1	30	37282	2,286
2014	127,730	1,264,582	8,190	27	1	30	31856	1,942
2015	166,170	1,662,607	9,472	28	2	34	40,611	2,631
2016	192,041	1,982,474	10,664	26	7	37	46,066	3,090
B_0	-51,963.72	-642868188.9	-2392810.8	3597.228	9439.63	-4916.87	-10952135.21	-922196.3
B_1	25,871	319866.401	1192.200	-1.77142	-4.6857148	2.45714	5455.457	458.97142

Source: The Author

Table 2. *AZUR Regression of Independent variable Outcome.*

YEAR	OC	IC	OS	IS	POC	PIC	POS	PIS	TCI	TSI
2009	69278	6420	3159	49	65	65	37	25	2840	99
2010	83364	432	3451	414	64	69	33	26	4149	108
2011	42163	9,278	1,568	368	72	75	41	24	3351	61
2012	80098	25,652	3,238	1,147	68	75	18	30	6942	116
2013	172513	34,069	5,856	1,730	38	76	18	30	9354	182
2014	231042	45,962	8,566	2,485	47	82	10	30	11311	210
2015	232655	50,015	6,515	2,375	59	90	17	30	12844	176
2016	37527	9,991	1,107	2,032	64	90	17	30	8581	78
B_0	-28230069.9	-9354157.0	-584387.45	-732317.43	3394.657	-7167.266	7.56E+03	-1696.857143	-2626825.943	-16718.70477
B_1	14086.2	4659.321	292.45714	364.54285	-1.65714	3.600000	-3.742857144	0.857142857	1308.942857	8.371428573

Source: By the Author

6. Presentation of Results

To determine the price for calls at the domestic market level, we have determined the average price of the 4 companies. The formula used is presented as follows:

$$\bar{P}_x = \frac{1}{N}\sum_{i=1}^{4} X_i$$

$$N = 4$$

We have used the EVIEWS to estimation the following equations:

$$TCI_t = \beta_0 + \beta_1 * POC_t + \beta_2 * PIC_t + \beta_3 * OC_t + \beta_4 * IC_t + \partial_t ,$$

and

$$CL_t = \beta_0 + \beta_1 * POC_t + \beta_2 * PIC_t$$

after estimation we will have:

$$\hat{TCI}_t = \hat{\beta}_0 + \hat{\beta}_1 * POC_t + \hat{\beta}_2 * PIC_t + \hat{\beta}_3 * OC_t + \hat{\beta}_4 * IC_t$$

$$\hat{CL}_t = \hat{\beta}'_0 + \hat{\beta}'_1 * POC_t + \hat{\beta}'_2 * PIC_t$$

(i) Impact of the Calls Pricing Strategy on the Total Income for Calls

The outcomes of the regression model studying the impact of the calls pricing strategy on the calls income for each of the telecommunication companies and the overall market can be found in table 3.

Table 3. *Regression Model on the impact of the Calls pricing strategy on the Calls Income.*

MTN:	$TCI_t = 9.32 + 1.22 * POC_t - 1.48 * PIC_t + 1.24 * OC_t - 1.06 * IC_t$
AIRTEL:	$TCI_t = 10.42 + 0.18 * POC_t - 0.17 * PIC_t + 0.21 * OC_t - 0.14 * IC_t$
WARID:	$TCI_t = -1.371 - 0.079 * POC_t + 0.45 * PIC_t + 0.027 * OC_t + 0.85 * IC_t$
AZUR:	$TCI_t = -7.017 - 0.571 * POC_t + 3.442 * PIC_t + 0.271 * OC_t + 0.004 * IC_t$
DOMESTIC MARKET:	$TCI_t = 13.155 - 0.253 * POC_t + 0.023 * PIC_t - 0.0214 * OC_t + 0.058 * IC_t$

Source: Author

(ii) Impact of the SMS Pricing Strategy on the Total Income for SMS

The outcomes of the regression model studying the impact of the SMS pricing strategy on the SMS income for each of the telecommunication companies and the overall market can be found in table 4.

Table 4. *Regression Model on the impact of the SMS pricing strategy on the SMS Income.*

MTN:	$TSI_t = -11.733 + 0.302 * POS_t + 0.658 * PIS_t + 0.149 * OS_t + 1.591 * IS_t$
AIRTEL:	$TSI_t = -13.399 + 1.438 * POS_t + 0.111 * PIS_t + 0.649 * OS_t + 0.992 * IS_t$
WARID:	$TSI_t = -828.681 + 3.285 * POS_t + 49.007 * PIS_t + 0.001 * OS_t - 0.015 * IS_t$
AZUR:	$TSI_t = -4.213 - 0.0323 * POS_t + 1.542 * PIS_t + 0.496 * OS_t - 0.0134 * IS_t$
DOMESTIC MARKET:	$TSI_t = -3.856 - 0.170 * POS_t + 1.013 * PIS_t + 0.358 * OS_t + 0.459 * IS_t$

Source: Author

(iii) Impact of the Calls Pricing Strategy on the Number of Clients

The outcomes of the regression model studying the impact of the calls pricing strategy on the numbers of Clients for each of the telecommunication companies and the overall market can be found in table 4.

Table 5. *Regression Model on the impact of the Calls pricing strategy on the Number of Clients.*

MTN:	*CL = 2913.110 - 10.955*POC - 4.724*PIC*
AIRTEL:	*CL = 2517.813+ 9.238*POC - 14.756*PIC*
WARID:	*CL = 755.709- 2.063*POC - 3.194*PIC*
AZUR:	*CL = -202.627- 3.612*POC + 8.424*PIC*
DOMESTIC MARKET:	*CL = 8208.187 - 22.638*POC - 9.946*PIC*

Source: Author

(iv) Impact of the Sms Pricing Strategy on the Number of Clients

The outcomes of the regression model studying the impact of the SMS pricing strategy on the numbers of Clients for each of the telecommunication companies and the overall market can be found in table 5.

Table 6. *Regression Model on the impact of the SMS pricing strategy on the Number of Clients.*

MTN:	*CL = 2052.743 - 48.047*POS + 1.98*PIS*
AIRTEL:	*CL = 1983.290 - 2.088*POS - 5.321*PIS*
WARID:	*CL = 727.080- 7.338*POS - 4.430*PIS*
AZUR:	*CL = 1169.237- 12.802*POS - 22.257*PIS*
DOMESTIC MARKET:	*CL = 7117.261 - 95.312*POS - 0.061*PIS*

Source: Author

7. Elasticity

Elasticity measures how much buyers and sellers respond to changes in market conditions, and allows us to analyze supply and demand with greater precision. Elasticity is a measure of the responsiveness of quantity demanded or quantity supplied to one of its determinants (Mankiw, 2000).

7.1. Elasticity Price Demand

The law of demand states that a fall in the price of a good raises the quantity demanded. The price elasticity of demand measures how much the quantity demanded responds to a change in price. Demand for a good is said to be *elastic* if the

quantity demanded responds substantially to changes in the price. Demand is said to be *inelastic* if the quantity demanded responds only slightly to changes in the price (Mankiw, 2000). What determines whether the demand for a good is elastic or inelastic? Because the demand for any good depends on consumer preferences, the price elasticity of demand depends on the many economic, social, and psychological forces that shape individual desires. Based on experience, however, we can state some general rules about what determines the price elasticity of demand.

Here we are going to study the impact of price variation (Innovation) on the demand of telecommunication product. The elasticity of demand in any market depends on how we draw the boundaries of the market. Narrowly defined markets tend to have more elastic demand than broadly defined markets, because it is easier to find close substitutes for narrowly defined goods. The outcomes of the elasticity study of the price strategy on the number of local calls and sms can be seen in table 7.

Table 7. *Elasticity Study of the Price and Demand.*

1. Local Incoming Calls Unit Price and Numbers of Local Incoming Calls				
YEAR	IC	PIC	Elasticity Price/Demand	Findings
2010	713923	99	2.1	Elastic Demand
2011	922583	74	0.9	Inelastic Demand
2012	1198556	81	0.3	Inelastic Demand
2013	1274032	77	0.8	Inelastic Demand
2014	1361017	67	1.9	Elastic Demand
2015	1208857	73	0.7	Inelastic Demand
2016	392239	76	0.1	Inelastic Demand
Local Outgoing Calls Unit Price and Numbers of Local Outgoing Calls				
YEAR	PIS	IS	Elasticity Price/Demand	Findings
2010	21	30879	0.8	Inelastic Demand
2011	28	29358	0.2	Inelastic Demand
2012	35	36923	1.1	Elastic Demand
2013	41	46243	1.5	Elastic Demand
2014	33	68705	2.5	Elastic Demand
2015	36	69375	0.1	Inelastic Demand
2016	39	65792	0.5	Inelastic Demand
2. Local Incoming SMS Unit Price and Numbers of Local Incoming SMS				
YEAR	OC	POC	Elasticity Price/Demand	Findings
2010	2321711	61	1.9	Elastic Demand
2011	3300326	66	0.2	Inelastic Demand
2012	3277501	57	21.3	Elastic Demand
2013	3097730	60	1.2	Elastic Demand
2014	3864506	53	0.5	Inelastic Demand
2015	4684676	49	0.4	Inelastic Demand
2016	1172778	51	0.0	Inelastic Demand
3. Local Outgoing SMS Unit Price and Numbers of Local Outgoing SMS				
YEAR	OS	POS	Elasticity Price/Demand	Findings
2010	245797	14	0.2	Inelastic Demand
2011	379920	23	1.3	Elastic Demand
2012	1010372	9	0.4	Inelastic Demand
s2013	1821882	11	0.2	Inelastic Demand
2014	4136202	7	0.3	Inelastic Demand
2015	5895276	6	0.4	Inelastic Demand
2016	2590356	16	3.5	Elastic Demand

Source: Author

7.2. Analysis of Results

To analyze the results of our empirical study we will start with the regression analysis outcomes and then the elasticity study.

(i) Findings on the Regression Analysis

As for the regression analysis we have two main impact to study, (1) the impact of the pricing innovation strategy on the revenue of the telecommunication companies and in the overall market, then we also have the (2) influence of the pricing innovative strategy on the number subscribers.

(ii) Impact of Pricing Strategy innovation on the Revenue

In table 3 and appendix 1.1, in a company like MTN, the price of incoming calls and the number of incoming calls are negatively impacting the total revenue generated by the Calls. A unit change in the income unit price and the number of incoming calls respectively reduce the revenue of 1.46 and 1, 08. This is impact is significant at the 10% level of significance but not at 5%. This implies that any increase of the incoming call price is impacting the revenue of calls at MTN. As for the unit price of outgoing and outgoing local calls we notice a positive influence of those variables on the revenue. As for the SMS, all the dependent variables are having a positive impact on the revenue, but still that impact in not significant at 5% or 10% level of significance (table 4 and appendix 2-1).

We have the similar results with AIRTEL with regard to the impact of the unit price of calls on the revenue, but the impact of the price unit for incoming calls and the number of incoming calls are not significant (Table 3 and appendix 1.2). The SMS pricing strategies have a better outlook with AIRTEL compared with MTN. Indeed, we notice that a unit change on the outgoing and incoming SMS unit prices will increase the revenue generated by SMS respectively of 1.43 for outgoing unit price, 0.11 for incoming unit price and 0.64 for the number of outgoing SMS, 0.99 for the number of incoming SMS, and they are all significant at 5% and 10% except the price for incoming SMS that is not significant at 5% (Table 4 and appendix 2-2). This implies that with AIRTEL the pricing strategy is having a better impact with the SMS products with a positive and significant impact on the revenue generated by SMS.

WARID on the other side, in table 3 and appendix 1.3, we can observe that when the is unit change for the outgoing and income call prices we notice that the negative impact but not significant on the calls revenue of 0.07 and as for the outgoing price and the a positive and increase of the revenue of 3% that is significant at 5%. The number of outgoing and incoming calls are also positively affecting the revenue that is significant for both variables at 10%. Only the number incoming calls are significant at 5%. When we analyze the impact of the SMS pricing strategy on Total income we notice that except the number incoming SMS all the other variables are having a positive and significant impact on the income (Table 4 and appendix 2-3). Here we notice that the change of SMS price being outgoing or incoming is having a better impact on the income like with MTN and AIRTEL.

We observe the same phenomenon as with WARID when we analyze the outcomes of AZUR regression. Considering the results of the impact of call price on the income we notice indeed that except the outgoing unit price for calls that is having a significant negative impact on the income generated by the calls (outgoings and incomings) all the remaining variable have a positive impact on the total income for calls (table 3 and appendix 1.4).

In the overall market, the trend is somehow the same from what we have observed in the individual companies. According to table 3 and appendix 1-5, we notice that in the whole market the outgoing variables are having a negative effect on the total income for the calls and the incoming variables on their sides are having a positive effect. Nevertheless, both outgoing and incoming call price and amounts are not having a significant impact on the overall income for the calls in the domestic market. As for the SMS, taking into consideration table 4 and appendix 2-5, except the price of outgoing SMS unit price that is having a negative effect on the explanatory variable, all the other variables are having a positive impact on the total revenue generated by the SMS, but only the incoming unit price for SMS that is having a significant impact at 5%.

From this analysis we can notice that the changes on the pricing strategy for both Calls and SMS are having an impact on the income generated by the Calls and SMS.

(iii) Impact of the Pricing Strategy innovation on the number of subscribers

The hypothesis made before running this regression model on Eviews was that price has a positive but not significant on the number of subscribers. Now let's see if this hypothesis worked for both strategies.

The impact of the Call and SMS pricing strategy on the number subscribers, summary can be found in the following table: from 2009-2016 there has been a negative impact of both strategies on the number of subscribers. Only MTN, AIRTEL and AZUR pricing strategies are having a positive impact of on the number of subscribers. For instance with MTN, a unit percentage increase of sms outgoing price will increase the number of clients of 1.9% but this result is not significant at 5% or 10%. On the other side we also have AIRTEL which outgoing call unit price is having also a positive impact on the number of subscribers but with no significance at 5% and 10%. With AZUR on the other hand, at 5% and 10% level of significance we have positive and tangible impact of incoming call unit price on the number of subscribers. The overall market of telecommunication demonstrates nevertheless that for both call and sms unit price (outgoing and incoming), there is a negative impact of the independent variables over the dependent variable given: number of subscribers (Table 8 and appendix 3-5 and appendix 4-5), even though it remains true that this negative impact is still not significant.

Table 8. *Impact of the Call and SMS pricing strategy on the number of subscribers.*

Companies	Variables		Significance at 5%	Significance at 10%
MTN	POC	-	No	No
	PIC	-	No	No
	POS	-	Yes	No
	PIS	+	No	No
AIRTEL	POC	+	No	No
	PIC	-	No	No
	POS	-	No	No
	PIS	-	No	No
WARID	POC	-	No	No
	PIC	-	No	No
	POS	-	No	No
	PIS	-	No	No
AZUR	POC	-	No	No
	PIC	+	Yes	No
	POS	-	No	Yes
	PIS	-	No	No
Domestic Market	POC	-	No	No
	PIC	-	No	No
	POS	-	No	No
	PIS	-	No	No

Source: The Author

(v) Finding on the Elasticity Price-Demand ($E_{P/D}$) Analysis

The elasticity analysis on this research topic was performed at two level. We have studied the elasticity price-demand ($E_{P/D}$) to find out the implication of the variation of one-unit price on the number of calls and sms (local).

As a result, the relationship between $E_{P/D}$ and total revenue

can be described for any good:

i. When the price elasticity of demand for a good is *perfectly inelastic* ($E_{P/D} = 0$), changes in the price do not affect the quantity demanded for the good; raising prices will always cause total revenue to increase. Goods necessary to survival can be classified here; a rational person will be willing to pay anything for a good if the alternative is death. For example, a person in the desert weak and dying of thirst would easily give all the money in his wallet, no matter how much, for a bottle of water if he would otherwise die. His demand is not contingent on the price.
ii. When the price elasticity of demand for a good is *relatively inelastic* ($-1 < E_{P/D} < 0$), the percentage change in quantity demanded is smaller than that in price. Hence, when the price is raised, the total revenue increases, and vice versa.
iii. When the price elasticity of demand for a good is *unit (or unitary) elastic* ($E_{P/D} = -1$), the percentage change in quantity demanded is equal to that in price, so a change in price will not affect total revenue.
iv. When the price elasticity of demand for a good is *relatively elastic* ($-\infty < E_{P/D} < -1$), the percentage change in quantity demanded is greater than that in price. Hence, when the price is raised, the total revenue falls, and vice versa.
v. When the price elasticity of demand for a good is *perfectly elastic* ($E_{P/D} is -\infty$), any increase in the price, no matter how small, will cause the quantity demanded for the good to drop to zero. Hence, when the price is raised, the total revenue falls to zero.

Hence, as the accompanying diagram shows, total revenue is maximized at the combination of price and quantity demanded where the elasticity of demand is unitary.

It is important to realize that price-elasticity of demand is *not* necessarily constant over all price ranges. The linear demand curve in the accompanying diagram illustrates that changes in price also change the elasticity: the price elasticity is different at every point on the curve.

When studying the Elasticity Local Incoming Calls Unit Price and Numbers of Local Incoming Calls (Table 9) we discover that only in year 2010 and 2014 that we had an elastic demand, meaning that he percentage change in quantity demanded is greater than that in price. Hence, when the price is raised, the total number of calls falls, and vice versa. But for the periods 2011-2013 and 2015-2016, the demand is inelastic meaning that the percentage change in quantity demanded is smaller than that in price. Hence, when the price is raised, the total calls increase.

Table 9. *Local Incoming Calls Unit Price and Numbers of Local Incoming Calls.*

YEAR	IC	PIC	Elasticity Price/Demand	Findings
2010	713923	99	2.1	Elastic Demand
2011	922583	74	0.9	Inelastic Demand
2012	1198556	81	0.3	Inelastic Demand
2013	1274032	77	0.8	Inelastic Demand
2014	1361017	67	1.9	Elastic Demand
2015	1208857	73	0.7	Inelastic Demand
2016	392239	76	0.1	Inelastic Demand

As for the local Outgoing Calls Unit Price and Numbers of Local Outgoing Calls (table 10) we realize that from 2012 to 2014 we had an elastic demand and from 2010-2011 then 2015-2016, an inelastic demand.

Table 10. *Local Outgoing Calls Unit Price and Numbers of Local Outgoing Calls.*

YEAR	PIS	IS	Elasticity Price/Demand	Findings
2010	21	30879	0.8	Inelastic Demand
2011	28	29358	0.2	Inelastic Demand
2012	35	36923	1.1	Elastic Demand
2013	41	46243	1.5	Elastic Demand
2014	33	68705	2.5	Elastic Demand
2015	36	69375	0.1	Inelastic Demand
2016	39	65792	0.5	Inelastic Demand

Local Incoming SMS Unit Price and Numbers of Local Incoming SMS elasticity study reveals that in the year 2010, 2012 and 2013 we had an elastic demand and 2011, 2014-2016 the market experience an inelastic demand (table 11).

Table 11. *Local Incoming SMS Unit Price and Numbers of Local Incoming SMS.*

YEAR	OC	POC	Elasticity Price/Demand	Findings
2010	2321711	61	1.9	Elastic Demand
2011	3300326	66	0.2	Inelastic Demand
2012	3277501	57	21.3	Elastic Demand
2013	3097730	60	1.2	Elastic Demand
2014	3864506	53	0.5	Inelastic Demand
2015	4684676	49	0.4	Inelastic Demand
2016	1172778	51	0.0	Inelastic Demand

When dealing with the elasticity demand between Local Outgoing SMS Unit Price and Numbers of Local Outgoing SMS (Table 12), we also notice that there is a discontinuity of the elasticity of over the period of observation. The demand was elastic in 2012 and 2016 but inelastic in 2010 and from 2012 to 2016.

Table 12. *Local Outgoing SMS Unit Price and Numbers of Local Outgoing SMS.*

YEAR	OS	POS	Elasticity Price/Demand	Findings
2010	245797	14	0.2	Inelastic Demand
2011	379920	23	1.3	Elastic Demand
2012	1010372	9	0.4	Inelastic Demand
2013	1821882	11	0.2	Inelastic Demand
2014	4136202	7	0.3	Inelastic Demand
2015	5895276	6	0.4	Inelastic Demand
2016	2590356	16	3.5	Elastic Demand

The study of the elasticity demand reveals that there is no uniformity of the way the change in the price impacts the number of calls and sms that will generate revenue.

8. Conclusion and Recommendations

This analysis evaluated the pricing innovation strategy impact for telecommunication companies in Congo Brazzaville. In the first step, this analysis showed how the price was influencing the commercial performance of telecommunication sector and contributed in the economic development in Congo Brazzaville situation. Four (4) companies for telecommunication industry were been analyzed and their global market (MTN AIRTEL WARID and AZUR companies). Many pricing innovation strategies have been revealed and their implication in the sector. A Quantitative analysis was used to determine the impact on commercial performance. Thus, the elasticity analysis on this research topic was performed at two level. We have studied the elasticity price-demand ($E_{P/D}$) to find out the implication of the variation of one-unit price on the number of calls and sms (local). The hypothesis made before running this regression model on Eviews was that price has a positive but not significant on the number of subscribers.

The recommendations are those that go first to the companies of the analysis that are almost totally based on different pricing strategies without sometimes worrying about the bitter taste of the quality of their networks, which sometimes penalizes users. Thus, for more increase its turnover and be able to distinguish themselves from the competition, in Congo-Brazzaville telecommunications companies must improve the network quality degrading especially for operations two dominant market (MTN and AIRTEL), as this was also found by ARPCE and listening to consumers 50-50 service reports lately. They should spread complement 3G network throughout the Congolese territory and plan new measures of total acquisition of 4 G to expand the telephone network to the Congo. It should work with the Congolese Government to effectively bring the entire ICT, especially on the optical fiber project for 5 years and which is still in progress complete. Because, until then the Congo-Brazzaville still attends a greater failure of Internet, telephone... the demand is always high in this area. The much heralded fiber does not meet demand for navigation on the Congolese to telecommunication market.

Appendix

Appendix I: Impact of the Calls Pricing Strategy on the Total Income for Calls

Dependent Variable: TCI
Method: Least Squares
Date: 12/21/17 Time: 15:04
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	9.326006	1.918019	4.862312	0.0166
POC	1.226525	0.565781	2.167843	0.1187
PIC	-1.488031	0.536701	-2.772551	0.0694
OC	1.247607	0.522046	2.389841	0.0968
IC	-1.062588	0.467788	-2.271517	0.1078

R-squared	0.824324	Mean dependent var	11.66090
Adjusted R-squared	0.590090	S.D. dependent var	0.132030
S.E. of regression	0.084531	Akaike info criterion	-1.834227
Sum squared resid	0.021436	Schwarz criterion	-1.784576
Log likelihood	12.33691	Hannan-Quinn criter.	-2.169102
F-statistic	3.519227	Durbin-Watson stat	2.369676
Prob(F-statistic)	0.164678		

Figure 1. *MTN.*

Dependent Variable: TCI
Method: Least Squares
Date: 12/21/17 Time: 15:11
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.42794	1.523895	6.842953	0.0064
POC	0.181418	0.328800	0.551758	0.6196
PIC	-0.178653	0.371190	-0.481298	0.6632
OC	0.215221	0.264503	0.813678	0.4754
IC	-0.146787	0.225437	-0.651120	0.5614

R-squared	0.263865	Mean dependent var	11.45358
Adjusted R-squared	-0.717649	S.D. dependent var	0.070470
S.E. of regression	0.092357	Akaike info criterion	-1.657140
Sum squared resid	0.025589	Schwarz criterion	-1.607489
Log likelihood	11.62856	Hannan-Quinn criter.	-1.992015
F-statistic	0.268834	Durbin-Watson stat	1.812352
Prob(F-statistic)	0.881574		

Appendix 1.3 WARID
Dependent Variable: TCI
Method: Least Squares
Date: 12/21/17 Time: 15:24
Sample: 2009 2016
Included observations: 8

Figure 2. *AIRTEL.*

Dependent Variable: TCI
Method: Least Squares
Date: 12/21/17 Time: 15:24
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.371134	1.603958	-0.854844	0.4555
POC	-0.079560	0.041714	-1.907272	0.1525
PIC	0.452867	0.124060	3.650391	0.0355
OC	0.027469	0.057240	0.479891	0.6641
IC	0.851107	0.051091	16.65852	0.0005

R-squared	0.995813	Mean dependent var	10.06507
Adjusted R-squared	0.990229	S.D. dependent var	0.584349
S.E. of regression	0.057761	Akaike info criterion	-2.595847
Sum squared resid	0.010009	Schwarz criterion	-2.546196
Log likelihood	15.38339	Hannan-Quinn criter.	-2.930722
F-statistic	178.3593	Durbin-Watson stat	3.298647
Prob(F-statistic)	0.000676		

Figure 3. *WARID.*

Dependent Variable: TCI
Method: Least Squares
Date: 12/21/17 Time: 15:35
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.017221	5.256205	-1.335036	0.2741
POC	-0.571304	0.574181	-0.994990	0.3931
PIC	3.442779	0.919051	3.746016	0.0332
OC	0.271703	0.179417	1.514371	0.2272
IC	0.004284	0.078134	0.054834	0.9597

R-squared	0.931274	Mean dependent var	8.779964
Adjusted R-squared	0.839640	S.D. dependent var	0.574532
S.E. of regression	0.230071	Akaike info criterion	0.168315
Sum squared resid	0.158798	Schwarz criterion	0.217966
Log likelihood	4.326739	Hannan-Quinn criter.	-0.166561
F-statistic	10.16295	Durbin-Watson stat	2.970979
Prob(F-statistic)	0.043185		

Figure 4. *AZUR.*

Dependent Variable: TCI
Method: Least Squares
Date: 12/21/17 Time: 15:52
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.15507	2.066340	6.366361	0.0078
POC	-0.253906	0.395579	-0.641859	0.5666
PIC	0.023560	0.402940	0.058470	0.9571
OC	-0.021475	0.287377	-0.074726	0.9451
IC	0.058550	0.294458	0.198838	0.8551

R-squared	0.466877	Mean dependent var	12.69706
Adjusted R-squared	-0.243953	S.D. dependent var	0.100250
S.E. of regression	0.111811	Akaike info criterion	-1.274843
Sum squared resid	0.037505	Schwarz criterion	-1.225192
Log likelihood	10.09937	Hannan-Quinn criter.	-1.609719
F-statistic	0.656806	Durbin-Watson stat	1.217803
Prob(F-statistic)	0.661866		

Figure 5. *Domestic Telecommunication Market.*

Appendix II: Impact of the SMS Pricing Strategy on the Total Income for SMS

Dependent Variable: TSI
Method: Least Squares
Date: 12/21/17 Time: 15:05
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.73320	6.712558	-1.747947	0.1788
POS	0.302230	0.411319	0.734784	0.5157
PIS	0.658702	0.349302	1.885766	0.1558
OS	0.149225	0.159333	0.936562	0.4181
IS	1.591274	0.633292	2.512702	0.0867

R-squared	0.970930	Mean dependent var	8.182244
Adjusted R-squared	0.932171	S.D. dependent var	0.684102
S.E. of regression	0.178168	Akaike info criterion	-0.343012
Sum squared resid	0.095231	Schwarz criterion	-0.293361
Log likelihood	6.372049	Hannan-Quinn criter.	-0.677888
F-statistic	25.05016	Durbin-Watson stat	1.240053
Prob(F-statistic)	0.012175		

Figure 6. *MTN.*

Dependent Variable: TSI
Method: Least Squares
Date: 12/21/17 Time: 15:12
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-13.39990	1.661054	-8.067107	0.0040
POS	1.438583	0.344507	4.175775	0.0250
PIS	0.111518	0.284808	0.391556	0.7215
OS	0.649244	0.112302	5.781212	0.0103
IS	0.992832	0.218103	4.552125	0.0199

R-squared	0.990194	Mean dependent var	7.787909
Adjusted R-squared	0.977119	S.D. dependent var	1.036327
S.E. of regression	0.156760	Akaike info criterion	-0.599026
Sum squared resid	0.073721	Schwarz criterion	-0.549375
Log likelihood	7.396105	Hannan-Quinn criter.	-0.933902
F-statistic	75.73203	Durbin-Watson stat	2.305737
Prob(F-statistic)	0.002413		

Figure 7. *AIRTEL.*

Dependent Variable: TSI
Method: Least Squares
Date: 12/21/17 Time: 15:27
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-828.6816	170.6884	-4.854939	0.0167
POS	3.285330	1.282509	2.561642	0.0831
PIS	49.00716	7.226371	6.781712	0.0066
OS	0.001153	9.54E-05	12.08545	0.0012
IS	-0.015444	0.022140	-0.697590	0.5356

R-squared	0.999345	Mean dependent var	1483.638
Adjusted R-squared	0.998473	S.D. dependent var	1161.338
S.E. of regression	45.38728	Akaike info criterion	10.73751
Sum squared resid	6180.016	Schwarz criterion	10.78716
Log likelihood	-37.95005	Hannan-Quinn criter.	10.40264
F-statistic	1144.993	Durbin-Watson stat	2.194424
Prob(F-statistic)	0.000042		

Figure 8. *WARID.*

Dependent Variable: TSI
Method: Least Squares
Date: 12/21/17 Time: 15:46
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.213106	3.094380	-1.361535	0.2666
POS	-0.032921	0.170545	-0.193034	0.8593
PIS	1.542323	0.797441	1.934091	0.1486
OS	0.496130	0.050109	9.901081	0.0022
IS	-0.013489	0.041969	-0.321414	0.7690

R-squared	0.986819	Mean dependent var	4.777972
Adjusted R-squared	0.969245	S.D. dependent var	0.434844
S.E. of regression	0.076259	Akaike info criterion	-2.040181
Sum squared resid	0.017446	Schwarz criterion	-1.990530
Log likelihood	13.16072	Hannan-Quinn criter.	-2.375057
F-statistic	56.15063	Durbin-Watson stat	2.428761
Prob(F-statistic)	0.003753		

Figure 9. *AZUR.*

Dependent Variable: TSI
Method: Least Squares
Date: 12/21/17 Time: 15:53
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-3.856674	4.305588	-0.895737	0.4364
POS	-0.170987	0.202454	-0.844574	0.4604
PIS	1.013569	0.319748	3.169897	0.0505
OS	0.358963	0.222124	1.616050	0.2045
IS	0.459587	0.640278	0.717793	0.5247

R-squared	0.985146	Mean dependent var	9.141188
Adjusted R-squared	0.965341	S.D. dependent var	0.881934
S.E. of regression	0.164189	Akaike info criterion	-0.506426
Sum squared resid	0.080874	Schwarz criterion	-0.456775
Log likelihood	7.025703	Hannan-Quinn criter.	-0.841302
F-statistic	49.74189	Durbin-Watson stat	2.653214
Prob(F-statistic)	0.004486		

Figure 10. *Domestic Telecommunication Market.*

Appendix III: Impact of the Calls Pricing Strategy on the Number of Clients

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:07
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2913.110	521.8679	5.582083	0.0025
POC	-10.95524	10.54793	-1.038616	0.3466
PIC	-4.724233	5.761525	-0.819962	0.4495

R-squared	0.466926	Mean dependent var	1847.750
Adjusted R-squared	0.253696	S.D. dependent var	360.5416
S.E. of regression	311.4679	Akaike info criterion	14.60047
Sum squared resid	485061.2	Schwarz criterion	14.63026
Log likelihood	-55.40186	Hannan-Quinn criter.	14.39954
F-statistic	2.189777	Durbin-Watson stat	0.664593
Prob(F-statistic)	0.207477		

Figure 11. *MTN.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:13
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2517.813	320.7751	7.849155	0.0005
POC	9.238994	8.646665	1.068504	0.3341
PIC	-14.75686	9.127389	-1.616767	0.1669

R-squared	0.557989	Mean dependent var	1756.625
Adjusted R-squared	0.381185	S.D. dependent var	271.6152
S.E. of regression	213.6656	Akaike info criterion	13.84670
Sum squared resid	228264.9	Schwarz criterion	13.87649
Log likelihood	-52.38679	Hannan-Quinn criter.	13.64577
F-statistic	3.155970	Durbin-Watson stat	2.397489
Prob(F-statistic)	0.129892		

Figure 12. *AIRTEL.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:29
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	755.7096	305.3888	2.474582	0.0562
POC	-2.063283	6.739283	-0.306158	0.7718
PIC	-3.194721	4.027430	-0.793240	0.4636

R-squared	0.141471	Mean dependent var	515.5000
Adjusted R-squared	-0.201940	S.D. dependent var	301.1155
S.E. of regression	330.1221	Akaike info criterion	14.71680
Sum squared resid	544903.1	Schwarz criterion	14.74659
Log likelihood	-55.86720	Hannan-Quinn criter.	14.51587
F-statistic	0.411958	Durbin-Watson stat	1.106159
Prob(F-statistic)	0.682947		

Figure 13. *WARID.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:47
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-202.6276	131.8680	-1.536594	0.1850
POC	-3.612295	1.057769	-3.415014	0.0189
PIC	8.424658	1.336761	6.302290	0.0015

R-squared	0.925102	Mean dependent var	236.7500
Adjusted R-squared	0.895142	S.D. dependent var	97.35172
S.E. of regression	31.52417	Akaike info criterion	10.01938
Sum squared resid	4968.866	Schwarz criterion	10.04917
Log likelihood	-37.07753	Hannan-Quinn criter.	9.818457
F-statistic	30.87859	Durbin-Watson stat	3.507121
Prob(F-statistic)	0.001535		

Figure 14. *AZUR.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:55
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8208.188	1006.473	8.155395	0.0005
POC	-22.63848	46.76503	-0.484090	0.6488
PIC	-9.946931	32.00744	-0.310769	0.7685

R-squared	0.543488	Mean dependent var	5879.625
Adjusted R-squared	0.360883	S.D. dependent var	1050.838
S.E. of regression	840.0906	Akaike info criterion	16.58489
Sum squared resid	3528761.	Schwarz criterion	16.61468
Log likelihood	-63.33957	Hannan-Quinn criter.	16.38397
F-statistic	2.976302	Durbin-Watson stat	1.511842
Prob(F-statistic)	0.140809		

***Figure 15**. Domestic Telecommunication market.*

Appendix IV: Impact of the Sms Pricing Strategy on the Number of Clients

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:09
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2052.744	580.5770	3.535696	0.0166
POS	-48.04797	16.09524	-2.985228	0.0306
PIS	1.980060	15.89278	0.124589	0.9057

R-squared	0.640726	Mean dependent var	1847.750
Adjusted R-squared	0.497016	S.D. dependent var	360.5416
S.E. of regression	255.7009	Akaike info criterion	14.20589
Sum squared resid	326914.8	Schwarz criterion	14.23568
Log likelihood	-53.82356	Hannan-Quinn criter.	14.00496
F-statistic	4.458476	Durbin-Watson stat	0.490736
Prob(F-statistic)	0.077369		

***Figure 16.** MTN.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:14
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1983.290	486.7935	4.074192	0.0096
POS	-2.088660	21.71939	-0.096166	0.9271
PIS	-5.321167	12.80608	-0.415519	0.6950

R-squared	0.046443	Mean dependent var	1756.625
Adjusted R-squared	-0.334980	S.D. dependent var	271.6152
S.E. of regression	313.8279	Akaike info criterion	14.61556
Sum squared resid	492439.6	Schwarz criterion	14.64535
Log likelihood	-55.46225	Hannan-Quinn criter.	14.41464
F-statistic	0.121762	Durbin-Watson stat	1.237471
Prob(F-statistic)	0.887905		

***Figure 17.** AIRTEL.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:32
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	727.0800	730.6723	0.995084	0.3654
POS	-7.338308	8.551048	-0.858176	0.4300
PIS	-4.430538	23.56509	-0.188013	0.8583

R-squared	0.142820	Mean dependent var	515.5000
Adjusted R-squared	-0.200053	S.D. dependent var	301.1155
S.E. of regression	329.8628	Akaike info criterion	14.71523
Sum squared resid	544047.3	Schwarz criterion	14.74502
Log likelihood	-55.86091	Hannan-Quinn criter.	14.51430
F-statistic	0.416539	Durbin-Watson stat	1.101506
Prob(F-statistic)	0.680269		

***Figure 18.** WARID.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:49
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1169.238	929.9880	1.257261	0.2642
POS	-12.80271	6.371870	-2.009254	0.1007
PIS	-22.25719	27.74468	-0.802215	0.4588

R-squared	0.857864	Mean dependent var	236.7500
Adjusted R-squared	0.801010	S.D. dependent var	97.35172
S.E. of regression	43.42699	Akaike info criterion	10.66004
Sum squared resid	9429.519	Schwarz criterion	10.68983
Log likelihood	-39.64014	Hannan-Quinn criter.	10.45911
F-statistic	15.08878	Durbin-Watson stat	2.110999
Prob(F-statistic)	0.007617		

***Figure 19.** AZUR.*

Dependent Variable: CL
Method: Least Squares
Date: 12/21/17 Time: 15:57
Sample: 2009 2016
Included observations: 8

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	7117.261	2340.789	3.040539	0.0287
POS	-95.31205	65.31747	-1.459212	0.2043
PIS	-0.061727	59.95327	-0.001030	0.9992

R-squared	0.302745	Mean dependent var	5879.625
Adjusted R-squared	0.023843	S.D. dependent var	1050.838
S.E. of regression	1038.235	Akaike info criterion	17.00843
Sum squared resid	5389660.	Schwarz criterion	17.03822
Log likelihood	-65.03371	Hannan-Quinn criter.	16.80750
F-statistic	1.085488	Durbin-Watson stat	1.554011
Prob(F-statistic)	0.405956		

***Figure 20.** Domestic Telecommunication Market.*

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