# Marketing-Mix and Customer Satisfaction in MTN Rwanda-cell: Kicukiro District, Rwanda

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**Abstract:** This study aimed at finding out the contribution of marketing-mix on customer satisfaction. An analysis of data collected by means of self-administered questionnaires to 164 respondents revealed that there was an inverse relationship between marketing-mix and customer satisfaction (r = -0.082). Though most of the MTN marketing plan has progressively increased the satisfaction of its subscribers, many other measures were to be taken. This study suggests that reducing price per second would be one of the keys to attract and maintain customers. The marketing initiative to put in the market cheaper and affordable handsets not only Nokia, would ensure easy access to MTN products/services. Increasing the willingness to understand customers would continue to positively impact on customer satisfaction of MTN Rwanda-cell. In order to remain the market leader in the telecommunication industry in Rwanda, MTN Rwanda-cell has to thoroughly revise its marketing policy minding that the market is overflowing competitors of higher caliber like TIGO.

**Keywords:** Marketing, Marketing-mix, Customer, Customer Satisfaction

## 1 Introduction

Today customers are very demanding than ever, and it is vital for managers to understand how apply effectively the marketing strategies for assuring a long financial sustainability in the fast moving competitive market. It becomes the first responsibility of the marketing manager to critically know how combine the diversified components of the marketing, that most of the time results in the application of the marketing-mix. In any company, there is no way that they can deal with the customer satisfaction, without understand the element of marketing-mix and to which extend they do affect the customer satisfaction. The way Marketing-mix is understood and applied contributes in increasing company's performance through the satisfied customer. Profit can be enhanced due to the provisional of customer driven services through the observation of the marketing-mix packages. According to Kotler (2006), Finance, Operations, Accounting and other business functions will not really matter if there is not sufficient demand for products and services so the company can make a profit. Marketing is a process for understanding markets, for quantifying the present and future value required by the different groups of customers within these markets, for communicating this to all other functions

with responsibility for delivering this value and for measuring the value actually delivered (Malcolm MC Donald, 1999). According to Kotler and Armstrong (2001), marketing is the process by which individual and groups obtain what they need and want through creating, offering and freely exchanging product and services of value of others. Marketing is getting the right goods and services to the right people, at the right place, at the right time, with the right price and promotion. According to Roger and Karin (1989) marketing system plays a unique role in transforming the benefits of mass production in terms of physical distribution. The most common problem in the economic life today is distribution. Marketing in another hand is concerned with something that can attract the customer to enjoy product or service conformed to his or her need. To achieve such objectives therefore, marketing manager has to combine according to a delicate measured quantity the four sorts of elements that are composing the marketing-mix.

The marketing-mix refers to a total system of interaction on business activities designed to Product/services, Price, Place and Promotion which many companies in Rwanda not consider pretending that it creates diminution of the profitability. According to Kotler and Dubois (1992) customer satisfaction can be defined as person's feelings or disappointment resulting from comparing a service or product's perceived outcome in relation to his or her expectation. For Bo Bergman Bengt Klfsjo (2000) most companies range around the global understanding that customer satisfaction is essential in their success. Despite the concern of customer satisfaction by any business, few companies know how to link the customer's needs with the organization strategies in order to get a lasting customer satisfaction and those which ignore it will result in higher client turnover.

This paper on the marketing-mix and customer satisfaction emphasized on a Rwandan Telecommunication company that is MTN that came after few decades the Rwandan telecommunication market counting only one Telecommunication Company that was Rwandatel. Telecommunication service in Rwanda started in 1993. This is when Rwandatel, a national telecommunication company started its operations in Rwanda fully owned by the Government of Rwanda, by the time, it was the only telecommunication company providing fixed lines. In 1998, MTN Rwanda-cell a mobile telecommunication company was licensed and later in 2003, the company was given a license to provide fixed line in addition to mobile telecommunication services. The main problem was the constant migration of the customers to and from MTN Rwanda-cell to TIGO or to another competing company. This could be the consequence of customers' dissatisfaction in respect to the MTN services. Therefore a strong management of marketing-mix should be well indicated to overcome such issue faced by MTN Rwanda-cell in Kicukiro District, Rwanda. A lack of focus on marketing initiatives by any enterprise would result in poor performance and negatively affect revenue considerably. It was important therefore to analyze the contribution of marketing- mix to the customer satisfaction in order to provide useful recommendations to Telecommunication Company especially how MTN Rwanda-cell will strategically

grow its markets and continue to outcompete in the industry.

## 2 Method

Descriptive and correlational research designs were used in this study. Descriptive method was used to describe the present characteristics of MTN Rwanda-cell clients as the study population while correlational design was used to determine if the variables of marketing-mix were associated with each other, and to determine the contribution of marketing-mix to the MTN customer satisfaction, in Kicukiro District, Rwanda.

*Population and sampling techniques*
*Population (N)*

Kenneth (1978) termed population (N) as a universe and defined it as a sum total of all units of analysis. Sommer et al (1992) defined a population as the total number items in a specified field of inquire and he add that population is asset of cases about which one wishes to draw some conclusions. As far as this study was concerned, it was difficult to know MTN customers in Kicukiro District because they buy airtimes in different areas. Thus this work considered an unknown population size.

*Sample size (n)*

This study used purposive and systematic sampling techniques to get a sample size (n=164) through which information concerning the MTN customer perception in respect to the offered services in Kicukiro District, Rwanda was gathered. The determination of the sample size for unknown population size was done following the formula

$$ni = \left(\boldsymbol{VC} * \frac{\boldsymbol{T}}{\boldsymbol{RC}}\right)\boldsymbol{2}$$

Where: ni = sample size for unknown population

T=Confidential interval (usually 1.282 or 1.645 for 2 sided test)

CV=Coefficient of variation (usually between 0.5 and 1)

RP=Relative precision (0.1 or 0.2)

Demonstration; $ni = \frac{(1.282*1)^2}{0.1} = (12.82)^2 = 164.3 = 164$

*Research Instruments*

A questionnaire was used in this study. According to Mannheim and Richard (1995), a questionnaire is defined as a survey instrument intended to use mailed self administered surveys, He further content that a questionnaire is a set of related questions designed to collect information from respondents It is an information gathering technique that gathers information attitudes, beliefs, behaviors and characteristics from selected respondents', organizations who may be affected by a given phenomenon. The questionnaires were distributed in sampled different respondents of MTN customers in especially Kicukiro District to provide the necessary questioned information related to marketing-mix and customer satisfaction. The questionnaire of this research was constructed around the respondents' profile, the perception of customers on marketing practices in MTN Rwanda-cell, and the perception of customers on satisfaction of MTN services.

*Validity of Instruments*

To ensure that the instrument measured what it was supposed to measure in this research, the instrument was checked to assure validity. For further improvements, the questionnaires were presented to the experts as well as to the

research advisors. The opinion of the expertise from the INILAK was solicited. Two senior lecturers in the department of management, one lecturer in the department of languages, and one lecturer (Statistician) in the department of mathematics validated the questionnaires. Because of their expertise and experiences, they were in a position to, without bias, advice on the contents and moderate the correctness and relevance of the instruments for this study. Before any adjustment to the questionnaires, any observation was discussed with the advisors and team members.

*Reliability of the Instruments*

A pilot study was conducted in Gasabo District. The researchers target in conducting pilot study was ascertaining the reliability of the instruments before distributing them to the respondents. This aimed at ensuring that the instrument would give the same results when given the second time to the relatively different sample.

*Reliability Statistics*

| Cronbach's Alpha | N of Items |
|---|---|
| .736 | 35 |

The reliability was tested using Cronbach's Alpha coefficient and it was required that the higher the score the more reliable the generated scale would be. The research was expecting to get a reliability coefficient greater or equal to 0.75. The questionnaire was administered to 16 respondents in a pilot study to test the reliability of the scale and the result for Cronbach's Alpha was 0.736

*Data Gathering and Collection Procedure*

For the purpose of this research, and as principal means of data collection, the study employed the questionnaires. Based on the outcomes of the pilot study, and after performing the required adjustments to the questionnaires, the instrument was used for data collection. Before administering the research instrument to the respondents, ethical issues were taken into consideration. Researchers were given letter, by the Dean, of faculty of economic sciences and management to the Managements of MTN Rwanda, requesting permission to carry out research. They followed right protocols before approaching the respondents like looking for formal authorizations from relevant MTN before collecting any information, or conducting the research. In order to reach respondents, the researcher had two possibilities. For the first possibility, researchers distributed questionnaires to the respondents at their households or their operating areas. For the second possibility, the researcher self-administered questionnaires and respondents filled them being at the Kicukiro District.

*Statistical Treatment of Data*

Data was gathered, coded, and recorded into Statistical Package for Social Sciences (SPSS) program. Encoded data were then checked to ensure there were no encoding errors-missing data and outliers.

*Method of Data analysis*

The Statistical Package for Social Sciences (SPSS 18) was employed to organize and tabulate the data collected. The following statistical procedures were used to analyze and interpret the data:

a) Cronbach's Alpha coefficient was used to test the reliability of the questionnaires;
b) Descriptive statistics were used to describe the background of the respondents. In this research the following statistical tools from SPSS served to analyze data:

1. Frequencies
2. Percentages
3. Pearson's Product moment coefficient (r): It is the average product of the standardized scores of two variables. It is a very common measure of relationship between two variables. In this research the stated correlation, as respective responses to the research questions, was tested for the purpose of acceptance or rejection. A rejection of the correlation implied there was a significant relationship which meant the acceptance of the alternative answer. The test was at the 0.05 significance level.

## 3 Results and Discussions

Questionnaires targeted 164 respondents whose only 159 (196.96%) responded to the self administered questionnaires. The researchers gathered data from respondents; the findings were analyzed by means of SPSS and interpreted in four parties. Those parties included the respondent profile, the Marketing-mix, the level of customer satisfaction and their perceptions on the same satisfaction.

Table 1 Distribution of the respondents by Age

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 10-20Years | 21 | 13.2 | 13.2 | 13.2 |
| | 21-30Years | 54 | 34.0 | 34.0 | 47.2 |
| | 31-40Years | 51 | 32.1 | 32.1 | 79.2 |
| | 41-50Years | 25 | 15.7 | 15.7 | 95.0 |
| | 51years and above | 8 | 5.0 | 5.0 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

II.

III. Table 2 Distribution of the respondents by Gender

| Responses | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|
| Male | 80 | 50.3 | 50.3 | 50.3 |
| Female | 79 | 49.7 | 49.7 | 100.0 |
| Total | 159 | 100.0 | 100.0 | |

In respect to the respondents profile, table 1 shows that twenty one (21) people (13.2% of the respondent) were aged in the range of 10-20 years, fifty four (54) i.e 34.0% in the range between 21-30 years, fifty one (51) people i.e 32.1% of the respondents were between 31-40 years, twenty five (25) people i.e 15.7% of the respondent were in the range of 41-50 years , while eight (8) people i.e 5.0% of the respondent in the range of 51 years and above. The greater range was between 21-40 years. The raison was said to be firstly the youngness. Young people participate in different activities which require them to use Product and Service such offered by MTN, secondly the fact that people of

that range are known to be active. From table 2, the distribution analysis of the respondents by gender shows that 50.3% of the respondents were male and 49.7% were female. That gave an idea that number of males and number of females were almost the same for consuming product and services accessible from MTN Rwanda-cell. From table 3, the survey conducted in MTN Rwanda-cell's Customers indicated that 36.5% of the respondents were married. Researchers were interested in knowing why married people had higher level than others. The answer was that married people were fully grown up and participate in different activities; therefore they need to use telecommunication from many companies as MTN.

Table 3 Distribution of the respondents by Marital Status

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Single | 42 | 26.4 | 26.4 | 26.4 |
| | Married | 58 | 36.5 | 36.5 | 62.9 |
| | Divorced | 42 | 26.4 | 26.4 | 89.3 |
| | Widow | 17 | 10.7 | 10.7 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

IV.

V. Table 4 Distribution of the respondents by Education

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Primary Level | 20 | 12.6 | 12.6 | 12.6 |
| | Secondary | 87 | 54.7 | 54.7 | 67.3 |
| | University | 52 | 32.7 | 32.7 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

VI. Table 5 Distribution of the respondents by Occupation

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Student | 38 | 23.9 | 23.9 | 23.9 |
| | Teacher | 46 | 28.9 | 28.9 | 52.8 |
| | Lecturer | 27 | 17.0 | 17.0 | 69.8 |
| | Business | 25 | 15.7 | 15.7 | 85.5 |
| | Agriculture | 23 | 14.5 | 14.5 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

Table 4 indicates that the overall distribution analysis of the respondents by education level representing 87.4% was of secondary and university levels. This demonstrates that almost the majority of MTN customers were educated at higher level which always has implication more than does primary level which represented 12.6%. Table 5 indicates that out of 159 respondents, businessman/businesswomen class represented 34.6%. The researchers found out that the clients who did businesses they needed MTN products which helped them to do their business. The students using MTN Network according to selected sample size represented 18.2% and those who are doing agriculture had lower percentage representing 13.8%.

Concerning the analysis of Marketing-mix in MTN Rwanda-cell,

the focus was oriented on variables such as Price, Place, Product and Promotion. In respect to the question of knowing the number of household members, table 6 indicates that seventy seven (77) people i.e 48.4% of the respondents possessed from 1-4 people, seventy five (75) people i.e 47.2% declared having from 5-9 people, seven (7) people i.e 4.4% of the respondents affirmed having 10 people and above. Researcher asked this question in order to know the MTN subscribers in each respondent's house. The greater number of households possessing big number of members was into the two first ranges. This is due to the fact that holding a mobile phone was said to be costly.

VIII.

IX. Table 6 Members in household

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | 1-4 people | 77 | 48.4 | 48.4 | 48.4 |
| | 5-9 people | 75 | 47.2 | 47.2 | 95.6 |
| | 10 people and above | 7 | 4.4 | 4.4 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

X. Table 7 Subscribers of MTN in House

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | One person | 24 | 15.1 | 15.1 | 15.1 |
| | Two people | 60 | 37.7 | 37.7 | 52.8 |
| | Three people | 43 | 27.0 | 27.0 | 79.9 |
| | Four people | 29 | 18.2 | 18.2 | 98.1 |
| | Five and above | 3 | 1.9 | 1.9 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XI. Table 8 Kind of MTN Products

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Samsung | 27 | 17.0 | 17.0 | 17.0 |
| | Nokia | 61 | 38.4 | 38.4 | 55.3 |
| | Motorola | 47 | 29.6 | 29.6 | 84.9 |
| | Blackberry | 20 | 12.6 | 12.6 | 97.5 |
| | Others | 4 | 2.5 | 2.5 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XII.

XIII. Table 9 Access on implementation of new product

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| valid | Yes | 52 | 32.7 | 32.7 | 32.7 |
| | No | 107 | 67.3 | 67.3 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

Table 7, illustrates that in family between two people and three people presenting 64.7% were MTN subscriber only. Researchers asked this question in order to know the situation of MTN clients in each respondent family. In a family of four members, the MTN subscribers represented 18.2%. From the same information it was shown that when the number of family members

was greater than five people, the probability of being MTN subscriber was little. Table 8 indicates that for the different products offered by MTN, Nokia and Motorola were the products which were used in higher quantities. These products represented 68% of the total products. The researchers were interested in knowing the reason these products were consumed more than others and the given raison was the value or cost of these products. In addition to that reason, the researchers have been told that these products were lovely. Respondents told the researchers that they have longer life than others and that when they were damaged they were easy

XV.

to be repaired. In regard to the implementation of new product, table 9 shows that fifty two (52) people i.e 32.7% of the respondents declared participating while one hundred and seven (107) people i.e 67.3% of the respondents opted for not participating in implementing the new products. This showed that there was no access to clients in implementation of a new product. This means that MTN use push method to put their products on market because clients have not any suggestion on the new product.

XIV.

XVI. Table 10 Price of MTN Product

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Very Expensive | 21 | 13.2 | 13.2 | 13.2 |
| | Expensive | 63 | 39.6 | 39.6 | 52.8 |
| | Cheap | 43 | 27.0 | 27.0 | 79.9 |
| | Very cheap | 32 | 20.1 | 20.1 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XVII. Table 11 Opinion to MTN current Price

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Very Expensive | 31 | 19.5 | 19.5 | 19.5 |
| | Expensive | 65 | 40.9 | 40.9 | 60.4 |
| | Cheap | 31 | 19.5 | 19.5 | 79.9 |
| | Very cheap | 32 | 20.1 | 20.1 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XVIII.

XIX. Table 12 MTN Pricing compared by other operator

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Very high | 46 | 28.9 | 28.9 | 28.9 |
| | High | 55 | 34.6 | 34.6 | 63.5 |
| | Moderate | 37 | 23.3 | 23.3 | 86.8 |
| | Low | 13 | 8.2 | 8.2 | 95.0 |
| | Very low | 8 | 5.0 | 5.0 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XX.

XXI. Table 13 MTN Distribution Channel

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Excellent | 26 | 16.4 | 16.4 | 16.4 |
| | Good | 45 | 28.3 | 28.3 | 44.7 |

| | | | | | |
|---|---|---|---|---|---|
| | Moderate | 40 | 25.2 | 25.2 | 69.8 |
| | Fair | 24 | 15.1 | 15.1 | 84.9 |
| | Poor | 24 | 15.1 | 15.1 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XXII.

XXIII. Table 14 Promotion or Diminution from MTN

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 62 | 39.0 | 39.0 | 39.0 |
| | No | 97 | 61.0 | 61.0 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XXIV. Table 15 Accessing Airtime from MTN

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Difficult | 44 | 27.7 | 27.7 | 27.7 |
| | Easy | 115 | 72.3 | 72.3 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XXV. Table 16 Product offered by MTN

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Reliable | 15 | 9.4 | 9.4 | 9.4 |
| | Usable | 50 | 31.4 | 31.4 | 40.9 |
| | Adaptable | 60 | 37.7 | 37.7 | 78.6 |
| | Appropriate | 27 | 17.0 | 17.0 | 95.6 |
| | Aesthetic | 7 | 4.4 | 4.4 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

Concerning the price, Table 10 shows that sixty three (63) people i.e 39.6% of respondents declared the price of MTN as expensive, twenty one (21) people i.e 13.2% as very expensive, forty three (43) i.e 27.0% as cheap, while thirty three (33) people i.e 20.1% found it very expensive. It is seen that a greater number declared the price being expensive. This created a constant migration from one to another telecommunication company, because a half of MTN clients complained on price. Concerning the opinion about price, Table 11 shows that sixty three (65) people i.e 40.9% of respondents declared the price of MTN as expensive, thirty one (31) people i.e 19.5% as very expensive, thirty one (31) people i.e 19.5% as cheap, while thirty two (32) people i.e 20.1% found it very expensive. According to the researchers, majority of the respondents regard price as very expensive. However, fewer of the respondents found MTN Price as not much expensive comparatively to the price of some of the competitors.

Table 12 specifies that forty six (46) people i.e 28.9% of the respondents found the price as very high, fifty five (55) people i.e 34.6% found it high, thirty seven (37) i.e 23.3% as moderate, thirteen (13) i.e 8.2% as low while eight (8) people i.e 5.0% rated it as very low. The rate of high was chosen by the greater number of the respondents 63.5%.

From table 13, one hundred and one (111) people i.e 68.9% of the total respondents found MTN Distribution

channel being good. They declared getting product knowledge easily. They said that MTN Distribution channel, MTN products and Services were knowledgeable to all. This was a result of training and strong marketing campaigns that has enabled MTN Rwanda-cell to meet its customer's targets.

As indicated by Table 14, even if sixty two (62) people affirmed getting the promotion from MTN, the research shows that the big number was those who were not getting access to diminution from them. The respondents not getting promotion from MTN represent 61.0%. From researchers' point of view this could generate conflict between customers where some clients took that issue as a bias. Table 15 indicates that forty four (44) people i.e 27.7% found the access as difficult while one hundred and fifteen (115) people i.e 72.3% found accessing airtime as easy. The given reason for those that found it difficult was that some of them live in village where to obtain airtime might require them to go far from their home. That is a problem said to be caused by the development of the country. In respect to the quality of product, table 16 shows fifteen (15) people i.e 9.4% found MTN product reliable, fifty (50) i.e 31.4% found them usable, sixty (60) people i.e 37.7% found them adaptable, twenty seven (27) ) found them aesthetic.

Regarding customer satisfaction, the researchers focused on the willingness to listen customers, the customer care, the responses to requests, and the friendship between customers and MTN Rwanda-cell.

XXVI.

XXVII. Table 17 Willingness to listen customers

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Excellent | 13 | 8.2 | 8.2 | 8.2 |
| | Good | 43 | 27.0 | 27.0 | 35.2 |
| | Moderate | 69 | 43.4 | 43.4 | 78.6 |
| | Fair | 28 | 17.6 | 17.6 | 96.2 |
| | Poor | 6 | 3.8 | 3.8 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XXVIII.

XXIX. Table 18 Customer care

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Very good | 20 | 12.6 | 12.6 | 12.6 |
| | Good | 53 | 33.3 | 33.3 | 45.9 |
| | Fair | 60 | 37.7 | 37.7 | 83.6 |
| | Poor | 26 | 16.4 | 16.4 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XXX. Table 19 The way of MTN to respond request first class

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 76 | 47.8 | 47.8 | 47.8 |
| | No | 83 | 52.2 | 52.2 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

XXXI.

XXXII. Table 20 Friendship between customers and MTN Employees

| | | Frequency | Percent | Valid Percent | Cumulative Percent |
|---|---|---|---|---|---|
| Valid | Yes | 66 | 41.5 | 41.5 | 41.5 |
| | No | 93 | 58.5 | 58.5 | 100.0 |
| | Total | 159 | 100.0 | 100.0 | |

From Table 17 the willingness to listen customers was rated moderate with a percentage of 43.4% of the respondents, 27.0 % of the respondents rated it as good, 8.2% rated it as excellent while the remaining 21.4% rated it as fair and poor. The aim of this question was to recognize at which level MTN accept to understand their customers. The greater number was for moderate which translates some gap in responding to the customer wants.

In regard to the customer care, table 18 shows that customer care of MTN was not good. When researchers combined fair and poor it shows that care to the customer was low representing 54.1% of the respondents. From this point of view there were loopholes in the customer care of MTN Rwanda-cell, which needed to be addressed in order to provide good services to their customers. Table 19 points out that the way of MTN to respond request of customers was not first class. Researchers wanted knowing at which activities they did not respond to the requests, and they were told that sometimes for example when a telephone was stolen it took long time to do an investigation. Some clients told that MTN did not make an effort in responding to their requests in order to incite buying new one.

As it is summarized Table 20 indicates that there was no any relationship between customers and MTN employees. Some of the customers said that there was no activity organized by MTN to customer which could create friendship between them. There was one who told the researchers that the relationship between them leaned only to the service received from MTN. In respect to the relationship between marketing-mix and MTN customer satisfaction as indicated on Table 21, the researchers calculated the coefficient of Pearson correlation. The correlation helped to measure if there was relationship between the two variables. Normally the correlation meaning when its significance is greater or equal to 0.05 or 5%. The following table summarized the calculations of correlation that ranged between [-1 to 1].

With the below table 21 it is shown that the relationship between marketing-mix and customer satisfaction was negative. Pearson correlation of -0.082 translates an inverse relationship between marketing-mix and customer satisfaction. Some of the components of marketing-mix like price, once they were increased, customer satisfaction decreased. This was also explained by the level of significance that was between 0.25 and 0.50. It was in the range of positive with moderate significance. MTN has to follow up its marketing-mix with intense attention. ensure easy access to MTN products/services. Increasing the willingness to understand customers would continue to positively impact on customer satisfaction of MTN Rwanda-cell. In short though MTN Rwanda-cell remains the market leader in the telecommunication industry in Rwanda

Table 21 Correlation between Marketing Mix and MTN Customer Satisfaction

| | | Activities of Marketing Mix | Customer Satisfaction |
|---|---|---|---|
| Activities of Marketing Mix | Pearson Correlation | 1 | -.082 |
| | Sig. (2-tailed) | | .305 |
| | N | 159 | 159 |
| Customer Satisfaction | Pearson Correlation | -.082 | 1 |
| | Sig. (2-tailed) | .305 | |
| | N | 159 | 159 |

*Significance level at 0.05

Legend:
[-1.00-0.00[: significance level is negative
[0.00-0.05[: positive but insignificant
[0.05-0.25[: positive but low significance
[0.25-0.50[: positive with moderate significance
[0.50-0.75[: positive with high significance
[0.75-1.00]: positive with very high significance

## 4. Conclusions

This study aimed at finding out the contribution of marketing-mix on customer satisfaction. Out of 164 respondents from MTN Rwanda-cell in Kicukro district, only 159 replied the self administered questionnaires. Based on the findings the researchers concluded that there was an inverse relationship between marketing-mix and customer satisfaction in MTN Rwanda-cell as a telecommunication company in Rwanda. Though most of the MTN marketing plan such as reduction of price, customization of MTN product/services, improved ways of responding to the customers' request, has progressively increased the satisfaction of its subscribers, many other measures are to be taken. Reducing price per second would be one of the keys to attract and maintain customers. The marketing initiative to put in the market cheaper and affordable handsets not only Nokia, would, it has to thoroughly revise its marketing policy minding that the market is overflowing competitors of higher caliber like TIGO.

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# Radical Terraces in Rwanda

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**Abstract:** This study was undertaken in Rwanda to assess the system of radical terraces. The erosion was the main cause for soil degradation. The results showed that several strategies and techniques were taken in order to protect the environment against effects of different natural disasters. Among them for example are the digs and hedge anti-erosion and radical terraces. It was revealed that the Radical terraces have a positive impact to increase farm productivity. The lack of materials, lack of financial supports, hard soil and straight slope were among main problems identified in region that were barriers for significant positive achievements. It was used method of whole for measuring of erosion though water flow from mountainsides. The results indicated that its speed was reduced from 1 hour in April 2007 to 7 hours 12 minutes in April 2008. The radical terrace technique is a good solution for environment protection.

**Keywords**: Environment, Erosion, Radical Terraces

## 1 Introduction

Soil erosion is a complex phenomenon involving the detachment and transport of soil particles, storage and runoff of rainwater, and infiltration (Lindstrom, 986). It has been shown that the surface effect is considered from the viewpoint of local topographic gradient on soil loss (Wischmeier and Smith, 1978). The study in Ontario indicated that there are several forms of erosion that cause the loss of large quantities of top soil and subsoil each year (Omafra and Wall, 1987). In Rwanda, rivers became brown-red during the rain seasons because of eroded soils by rainfall from mountainsides; and many nutrients are also washed away implying the decrease of soil fertility. Since most of Rwandese population lives in the rural area and 83.4% depends on agricultural production (Kaberuka, 2002), agriculture is still done artificially where the farmers use rudimentary instruments. The topography of country dominated by high mountains (Joe and Mary, 2003) is a ***big problem for environmental protection.*** The relief of Rwanda is one of the causes of soil erosion, which is a big barrier to the improvement of farm produce.

The study in 2008 showed that over 1 tone of soil per hectare was swept away by erosion of rivers and lakes every month. Erosion has been responsible of soil degradation with the soil nutrients losses estimated at 945200 T of organic materials, 41210 T of nitrogen, 200T of phosphorus

and 3055 T of potash annually. An estimation of 39.1% of land in the country has been affected by erosion (PMI Country Profile, 2009). It was indicated that between 1930 and 1950, the land of Rwanda was sufficient for cultivation because the population was estimated to about 1 million, and the soil erosion was not a serious problem due to the vegetation cover. The population grew to 10.5 million (PMI Country Profile, 2009) and the needs of soil cultivation increased hence led to complete destruction of vegetation cover. From 1980, erosion has been affecting agricultural activities (MINIPLAN, 1991; Encyclopedia of the Nations, 2008; MINITERE, 2003). In order to mediate these problems, different strategies have been taken with the aim of increasing farm productivity. For instance, the population has been mobilized and enlightened about the system of radical terraces in the whole country especially for those who live on highlands. The radical terraces were introduced in Rwanda in 1972 at Kisaro on ex Buyoga District in ex Byumba Province by a religious person named Syrille Wieme in 1979. This method was recognized by the Government of Rwanda and was officially encouraged; it was counted around 900ha of radical terraces in 1990 and was noted that the achievement of radical terraces required many processes. Since Rwanda is a hilly and rainy country, measures have been taken to control erosion with an estimation of 23% of land having no risk of erosion, but 39% are highly risky of erosion. It was showed that the erosion is the cause of the loss of 1.4 millions tones of fertile soils through water flow along the rivers. The study in CAMERO JIEJO (North western Iberian system, Spain) showed that, since $1950_s$ the Spanish Mediterranean Mountains have become a marginal territory and erosions were a big problem, the farmers constructed the terraces consisting of the small plot with stone walls and used them for intensive cultivation. The walls retained the soil and the damage caused by collapsing walls due to heavy rainfalls was quickly repaired by farmers in order to prevent further intense erosion (FAO, 1984; Theodore-Lasanta et al., 2001). Radical Terraces was among the strategies taken to protect land in order to increase farm productivity through mobilization of the population living in highlands.

## 2 Materials and Methodology

During this study taken at Kaniga Sector in Gicumbi district, a survey method was applied on five units called cells. 9 farmers per unit with a total of 45 people were interviewed. A questionnaire was used to get information about different activities regarding the system of radical terraces. This questionnaire was sent to different farmers sampled during 30 day period from 1st to 30th June 2008. After getting information from farmers, we interviewed some local governors for confirmation and finally we proceeded by searching different documents concerning this case. The method used for erosion measurement was proceeded with water flow measurement when it was raining. Water was captured through digging of 1 $m^3$ on three different locations for determinate the speed of water flow from the mountain. The three $1m^3$ holes were located in three different zones, two holes were located at the foot of the mountain where the activities of terracing of radical terraces had a high intensity and another was placed where the evolution of Radical terraces was limited

*Study area:*

*Relief:* Its relief is characterized by a high altitude of 2500m. The region experiences heavy rainfall with an annual average between 1400-1500mm; the annual average temperature varies between 15-20°C


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with four seasons: rainy season from mid-September to December and March to May, a dry season from January to February and June to September.

*Soil and Vegetation*: Most of its soil is acidic with pH varying between 4 and 5.5 and characterized by much organic matter, potted on mountainsides. In Mulindi valley, which had been covered by Papyrus in the past, bracken and others weed; the surface is filled up because of the growing rate of population. Previously, it has been shown that between 1983 and 1993, Rwanda lost 4.8% of its forest and woodland areas (Mupenzi, 2010; Mupenzi et al., 2009).

*Hydrology*: A big part of Kaniga sector is supplied by ground water from Mulindi valley, which crosses Mulindi River; with many small stream rivers identified in this regions.

*Agriculture and Livestock farming*: 90% of the population practice a subsistence agriculture dominated by living cultivation land (beans, maize sorghum potatoes, wheat, cassava, banana and soya bean), it has also an agricultural industrial area dominated by tea and coffee. The livestock farming does not have a good infrastructure, but some farmers possessed domestic animals like cows, goat, pigs, chicken and rabbit.

*Environment and forest*: This involves the action to protect, preserve and improve the quality of environment. The Government's major responsibility is to mobilize and teach the population on the effects of land degradation on the country's economy. The biggest problems are deforestation and soil erosion, which have a negative impact on human health. The presence of Mulindi tea factory in Kaniga sector appears to be the main cause of environmental degradation because of the use of different pesticides on tea plantation, and then the factory uses a high quantity of wood fuel; around 100 ha of forest were cut in 2008. It is noted that pollution is also caused by domestic and industrial wastes, agro-pastoral activities and luck of modern sanitation facilities.

*Erosion*: The rainfall and topography are the major causal factors of soil rosion. Among others causal factors are; human activities such as deforestation, fire bush, pasture, extensive agriculture, and high demography. All those factors contributed to soil and environment degradation by loss of a large amount of nutrients element, water pollution and augmentation of flood on lowlands (SESA, 1986). It is indicated that between 1987_1990, the loss of soil fertility was a big problem that caused the decrease in farm productivity of maize and sorghum. Table 1 shows that a total of 516T/ha were lost through soil erosion; the production of maize was decrease from 1.2T/ha in 1987 to 0.09T/ha in 1990 and the production of sorghum reduced from 1.3T/ha in 1987 to 0.06 T/ha in 1990 (ISAR 1991). This situation is not only the specialty of Rwanda, the study held in India showed that 6 million tones of fertilizers were lost every year because of soil erosion ( FAO, 1984)

Table 1 Soil Lost and Reduction of Production of Maize and Sorghum

| year | soil lost (t/ha) | production of maize | production of sorghum |
|---|---|---|---|
| 1987 | 10 | 1.2 | 1.3 |
| 1988 | 100 | 0.4 | 0.4 |
| 1989 | 124 | 0.3 | 0.5 |
| 1990 | 282 | 0.09 | 0.06 |
| Total | 516 | | |

## 3 Results and Discussion

Table 2 *Importance of Radical Terraces*

| importance | Frequency | % |
|---|---|---|
| Fight against erosion | 20 | 44.4 |
| retained water | 1 | 22 |
| getting forage | 4 | 8.8 |
| increase of farm productivity | 10 | 22 |
| reduction of poverty | 7 | 15.6 |
| increase of cultivation soil | 3 | 6.6 |
| total | 45 | 100 |

The study showed that the biggest importance of radical terraces is to fight against erosion as it was an opinion of 44.4% of farmers. This hypothesis was confirmed by the decrease of floods in Mulindi valley; it was indicated that the soil is no longer washed away by rainfall after installation of radical terraces. It was also reveled through Table 2 that the importance of radical terraces is to increase the farm productivity as it was an opinion of 22% of farmers, and 15.6% of farmers esteemed that the importance of radical terraces is to reduce the poverty. Other importance of radical terraces are to get a forage by conifer which is planted between two radical terraces for retain of soil, increase of cultivation soil that represent an opinion of 8.8% and 6.6% of farmers respectively. However, the other importance of radical terraces is to retain water, which was an opinion from few members of farmers.

*Radical Terraces in increasing the farm productivity*

Table3 Production of potatoes gotten before and after terracing radical terraces

*Before terracing of radical terraces*

| production (t/ha) | frequency | % |
|---|---|---|
| >25 | 0 | 0 |
| 25-20 | 3 | 6.6 |
| 20-15 | 5 | 11 |
| 15-10 | 8 | 16 |
| <10 | 29 | 64.4 |
| total | 45 | 100 |

*After terracing of Radical terraces*

| production (t/ha) | frequency | % |
|---|---|---|
| >25 | 2 | 4.4 |
| 25-20 | 8 | 18 |
| 20-15 | 20 | 44.4 |
| 15-10 | 12 | 27 |
| <10 | 3 | 6.6 |
| total | 45 | 100 |

The potatoes were tested in order to compare the importance of radical terraces on farm productivity before and after terracing of radical terraces. It was showed through Table 3 that before the terracing of radical terraces any farmer was able to get the production > 25tones per hectare; 6.6% were the farmers who got between 25-20tones of potatoes per hectare and a big part of farmers produced less that 10tones of potatoes per hectare. However, it was showed that around 4.4% of farmers produced plus 25tones per hectare after terracing the radical terraces in their plots; 18% of farmers produced between 25-20tones per hectare and 44.4 of farmers were able to produce between 20-15tones per hectare; 27% of farmers got 15-10tones by hectare, but only 6.6% of farmers harvested less than 10tones of potatoes per hectare.

In general, it was revealed that 66.8% of farmers produced more than 15tones of potatoes per hectare after the terracing of radical terraces.

*Difficulties in terracing of radical terraces*

Even if the radical terraces contributed positively on environment protection, but many problems were big barriers for their achievement as indicated on Table 4 below:

Table 4 Difficulties which blocked the progress of terracing of the radical terraces

| difficulties | frequency | % |
|---|---|---|
| heavy soil | 15 | 33 |
| raid slope | 6 | 13.2 |
| lack of means | 15 | 33 |
| negligence | 2 | 4.4 |
| lack of methods | 3 | 6.6 |
| lack of supervisor | 2 | 4.4 |
| lack of ownership | 2 | 4.4 |
| total | 45 | 100 |

It showed that 66% of farmers were facing the problem of heavy soil and lack of means in their activities, 13.2% of farmers were confronted by the problem of raid slope; 6.6% of farmers faced the problem of lack of methods. Other problems which blocked the farmers in their activities to terrace the radical terraces were negligence and luck of supervision. It was revealed through Table 4 that many farmers failed to achieve the terracing of radical terraces because of they worked separately, yet this activity needs to put the force together; it was better if the farmers have been putting their forces together and worked in groups or associations for good achievement

*Radical Terraces in Poverty Reduction*

Table 5 Contribution of radical terraces on reduction of poverty

| ways | frequency | % |
|---|---|---|
| giving job | 4 | 9 |
| augmentation of production | 38 | 84 |
| Program cow "Girinka" | 3 | 7 |
| Total | 45 | 100 |

The reduction of poverty was one of the main objectives fixed by the Government of Rwanda in 2020 vision program. Many ways were tried and it was showed that the use of radical terraces had a positive impact on poverty reduction. The results in Table 5 showed that 84% of farmers confirmed this hypothesis where the radical terraces contributed to increase the farm productivity; the radical terraces help the population to get jobs or occupation as an opinion of 9% of farmers; the persons who achieved their radical terraces completely benefited by receiving a cow from National program called “Girinka” or a cow per family, this was the opinion of 7% of farmers.

## 4 Conclusions

The radical terraces have a positive impact on environment where it contributed to limiting water flow, which was the main cause of soil degradation. The results of the study showed that the radical terraces contributed to increase in the farm productivity, fight against erosion and also contributed to poverty reduction. Many difficulties such as heavy soil, raid slope, luck of means and lack of qualified supervisors were a big barrier to achieving aims of radical terraces. In order to protect


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the environment and to increase the farm productivity, it was recommended:

- A appropriate mobilization of population about the importance of radical terraces must be a good method for convincing the farmers
- Soil study and analysis are necessary to determine the type of soil before taking a decision on terraces in order to help the farmers in their activities
-The creation of associations or cooperatives must be good solution to achieve the radical terraces, and intensify the training of engineers and other technicians about radical terraces for capacity building.

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