



# Scrutiny of Customer Satisfaction with Service Delivery of Mobile Telecommunication Networks: A Case of Navrongo

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**Abstract:** The Emerging and Frontier markets (EMs/FMs) within today's global business economy function as the central engines of growth. Populations which previously had limited access to modern technological advances have now within the telecommunications sector especially leapfrogged generations of technology, seizing the opportunity for a better quality of living standards through mobile telephony. The existing wireless telecom companies in Ghana have made the industry very competitive as each of these networks aspires to meet customer expectation, ideal service and satisfaction. Disconfirmation model, One-Sample Test as well as analysis of variance (ANOVA) were employed in this study. The majority of the respondents were males with 41(58.6%) while females were 29(41.1%) being youthful (19 years upward constitutes over 80% of the sample). The findings indicate that irrespective of mobile telecom networks in Navrongo, customer satisfaction (CS) is low or not equal to or better than desire or expectation of subscribers. With respect to mobile network, customers are not satisfied with MTN network but embraced the mobile money service. Conversely, customer satisfaction for Vodafone network is equal to desire and expectation of customers. For Tigo, Airtel and Glo mobile networks, satisfaction is at least equal to the desire and expectation of customers. Precisely, the research recommends that mobile operators should endeavour to improve upon the quality of mobile services offered to subscribers if they are interested in attracting and maintaining existing customers.

**Keywords:** Customer, Satisfaction, Expectation, Cellular Phone, Disconfirmation Model, Networks, Credit

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## 1. Introduction

Until the invention of modern technology, the use of beacons, semaphore, signal flags, optical heliograph, or audio messages such as coded drumbeat, long blown horns, and loud whistles relay runners, riders and criers, smoke signals, drum, and light signals; message-carrying pigeons, and even the postal system were the traditional long-distance communication media. In modern times, telecommunication involves the use of electrical devices such as the telegraph, telephone, and teleprinter, as well as the use of radio, microwave transmission towers, fiber optics, orbiting satellites and the internet which is the vast world-wide computer network.

The first cellular phone services in Ghana were initiated by Mobitel in 1992. In that year alone, 19,000 Ghanaians owned

mobile phones. In 1998 the number of mobile phone users in the country increased to 43,000 and by the middle of 1999 the number had increased to 68,000. Between 1999 and 2000 four companies competed for cellular customers and the number of subscribers rose from 22,000 to 132,000. Telephone users in the country increased from 218,000 in 2000 to 300,000 as at the end of 2005, showing an overwhelming popular use of mobile telephones in cities.

Indeed, the existing wireless telecom companies in Ghana have made the industry very competitive as each of these networks aspires to meet customers' expectation, ideal service and satisfaction.

The problem of this study is propelled by the need to measure customer satisfaction with service delivery of five selected mobile telecommunication brands in Navrongo. The state of customer satisfaction with service delivery is unclear as there is not enough documentation of the issue. A

discussion paper on telecom developments and investment in Ghana noted that the goals set by the government have only partly been met especially with respect to development in rural areas and the quality of service is still low and has even deteriorated on some indicators (Frempong & Henten, 2004). There is therefore a wide spread dissatisfaction with the general telecom development in Ghana among users and policy decision makers and administrators. Since the past decade, the telecom has witnessed a tremendous increase in subscriber growth rate for the entire mobile telecom operator (Gopinath, et al., 2011).

This growth rate cannot be attributed to customer satisfaction; it is fundamentally due to the substantial growth in investment and expansion of the network access during the last decade. This seems a success story, and there are high hopes that the service quality delivered by the Telecom Networks meets customer expectations, ideal service, or satisfaction. However since 2006, there have been many complaints by customers about service quality delivery of the mobile telecom networks in Ghana (Hayes, 1997) notably are Scancom Ghana Limited and the then Ghana Telecom's OneTouch. As a result, a statement released by the National Communications Authority (NCA) in Ghana profusely lamented that in spite of the appreciable growth and expansion recorded in the industry, the quality of service is anything but good (Khalifa et al, (2002). The NCA further gave some mobile networks in Ghana (MTN, Vodafone, Zain (now Airtel) and Tigo) an ultimatum to improve upon their services within thirty-days, failure was to lead to sanction. Evidently, the growth rate in the telecom industry in Ghana does not provide empirical support for the claim that customers are satisfied with the service delivery of various telecom networks. In view of the above, the main problem of this study is; *are customers really satisfied with the service delivery of Mobile Telecom Networks within the Navrongo community?*

The following are the objectives of the study: First, this study is to determine customer satisfaction of the five mobile telecom networks under study, second, to determine switching/porting pattern of subscribers of these Mobile Telecom Networks, and finally, to determine the relationship between amounts spent on credit in a month and gender by subscribers.

The following questions motivated the study: *How is the customer satisfied (CS) with service quality in these mobile telecom networks in Navrongo? What is the market share of the different mobile networks in Navrongo? What is the porting/switching pattern of mobile users in Navrongo?*

The study was undertaken because of its significance in diverse ways to business/marketing practitioners, policy makers and stakeholders. The findings and results that will be reported in this study will provide a more reliable scientific and perspective for describing and evaluating the level of customer contentment with the services the management of Ghana's mobile networks delivers. It will also serve as an invaluable source of information that brings to lime light the switching intentions of their respective customers. This will

provide empirical support for management strategic decisions in several critical areas in their operations, and above all, provide a justifiably valid and reliable guide to designing workable service delivery improvement strategies for creating and delivering customer value, achieving customer satisfaction and loyalty, building long-term mutually beneficial relationship with profitable customers and achieve sustainable business growth in Navrongo. To policy makers like government agencies such as the Ministry of Communications and National Communication Authority, the findings and results of this study will provide invaluable insights and more reliable guide to monitoring the impact of the operations of these telecom networks.

To stakeholders, like investors, shareholders, employees, pressure groups, customer associations, etc., the study will provide invaluable information that will allow them to provide useful suggestions to the improvement in service delivery of their respective mobile network operators.

#### Cellular (Mobile) Phone Networks in Ghana

Currently, there are six (6) cellular (mobile) phone networks in Ghana, namely: Millicom Ghana Ltd, MTN Ghana Scancom Ghana Ltd, Vodafone Ghana Ltd, Airtel Ghana Ltd, Glo Mobile Ghana and Expresso Ghana Telecom Ltd. However, this study will focus on the first five cellular (phone) networks in the Navrongo District.

#### Customer Satisfaction in Mobile Telecom Networks in Ghana

The state of customer satisfaction with service delivery is not clear as there is scanty documentation of the issue. A discussion paper on telecom developments and investments in Ghana states that, the goals set by government have only partly been met, especially with respect to the development in rural areas and the quality of service is still low and has even deteriorated on some indicators. There is, therefore, a widespread dissatisfaction with the general telecom development in Ghana among users as well as policy decision makers and administrators (Frempong et al., 2004). However, the industry has witnessed tremendous developments in the last decade as a result of the substantial growth in investment that has generated incredible increase in subscriber growth rate for all the mobile telecom operators in the industry by December, 2013 (Vodafone accessed, 2013). This seems a success story, and there are high hopes that the service quality delivered by the mobile telecom networks meets customer expectations, ideal service, or satisfaction. However, no study so far has been conducted to empirically support the claim that customers are satisfied or not with service delivery of the mobile telecommunication networks in Navrongo. In the light of this, our study hypothesizes that;

H1a: Customers are not satisfied with service delivery of MTN.

H1b: Customers are not satisfied with service delivery of Vodafone.

H1c: Customers are not satisfied with service delivery of Tigo.

H1d: Customers are not satisfied with service delivery of

Airtel.

H1e: Customers are not satisfied with service delivery of Glo.

H1f: Customers are not satisfied irrespective of network  
Determinant of customer satisfaction

A lot of factors that drive customer satisfaction (CS) need to be examined in order to reliably measure it. In the work of many scholars and practitioners, CS is found to be driven by customers "expectations, quality of service and the customer service experience" (Airtel accessed, 2013). It has been found out that expectation plays a major role in determining satisfaction. This view was heralded by the proponents of popular expectancy disconfirmation theory (Global Communications accessed, 2013). This theory states that, the customer is satisfied if the performance of product/service is equal to his/her expectations (positive disconfirmation) and he/she is dissatisfied if the product/service performance is perceived to be below his/her expectation (negative disconfirmation). If expectation exceeds perceived performance, the customer is highly satisfied.

Another perspective of the disconfirmation is that customer satisfaction relates to a comparison of customer perceived quality with perceived performance, rather than comparing expectation with perceived performance (Gronroos, 2001). Again, customer satisfaction is driven by perceived value, though the concept of value is relative and has several dimensions to it. Zeithaml (1988) considers customer value as the overall assessment of the utility of a product based on perception of what is received and what is given. Dodds et al., (1991) argued that customer perceptions of value represent a trade-off between the quality or benefit they receive in the product relative to the sacrifice they perceived by paying the price. The perceived value process involves a trade-off between what the customer gives such as price/money, sacrifices, perceived risk, opportunity cost, and learning cost in exchange for what he/she gets such as quality, benefits, and utilities (BIZZ accessed, 2013). One of the most recent research in the work of Hume & Mort (2008), confirm that value is a positive predictor of satisfaction. This is consistent with the findings of Rust and Oliver (1994) who suggested that value had a direct and encounter-specific input to satisfaction. Conceptually, since what the customer gets for what he/she gives is based on the performance of the product/service, what he/she gives become a standard for comparison. In this, a sort of disconfirmation occurs in that the customer becomes satisfied if the performance of product/service is equal to what he/she gives (positive disconfirmation); he/she is dissatisfied if the product/service performance is perceived to be below what he/she gives (negative disconfirmation). If what he/she gives is less than perceived product/service performance, the customer is highly satisfied. Therefore we coin the term *value-disconfirmation*. A number of researches attest to the fact that there is some kind of intertwined relationships among all the antecedents of customer satisfaction (Ghana web, 2008).

In conclusion, it is established empirically that customer overall cognitive or affective evaluation is based on basically

the service quality, but the customer's perception of the performance of the service quality encountered is compared with some cognitive or affective standard like his/her expected quality, perceived quality or value quality. The implications of the antecedents of customer satisfaction is that managers must take effective strategies to manage customer perceived quality, customer expectations, customer perceived value in order to reap the full benefits of customer satisfaction measurement.

Customer Satisfaction and Behaviour Intentions

CS impacts the behaviour of customers in a number of ways. First CS is found to be a key determinant of customer retention. Again, CS is regarded as a necessary antecedent of customer loyalty, which in turn drives profitability and performance. Also, increasing CS and customer retention leads to improved profits, positive word-of-mouth, and lower marketing expenditures (Reichheld, 1996). In many studies, customer satisfaction is positively correlated with customer repurchase, likelihood to recommend, positive word-of-mouth, customer loyal and retention. But, CS is negatively correlated, to a large extent, with customer complaints and switching intention. It must be pointed out that customer loyalty and retention are not always attributable to customer satisfaction. It is because a customer may not be satisfied with the services/products but may find it difficult to switch to a competitor simply because of the circumstances he/she is faced with. This is usually common in most services context. For example with mobile telecommunication services, a customer may be reluctant to change his/her mobile phone number because he/she has given it to a number of key persons in his/her business or social life. Such a customer may be dissatisfied but will be forced to remain loyal to an organization. This is referred to as the network-effect; it is a forced loyalty by implication. Loyalty is therefore affected by situational factors and switching cost. It becomes deceptive and misleading to assess or use customer loyalty trends to conclude that customers of an organization are satisfied. Instead it is better a company examines, as part of its customer satisfaction study, the switching intention and likelihood to recommend. These two behaviour intentions are more reliable factors to track customer satisfaction because they are directly and strongly linked to customer satisfaction (Wang & Hing-Po, 2002). Satisfied customers are more likely to recommend services to family and friends and are less likely to switch. It is a fact that customers who are dissatisfied will bad-mouth a company and spread the news to eight to ten other people (SPSS white paper, 1996). Though switching intention is also influenced by several factors, when known it triggers management action to find out appropriate actions to take to satisfy customers. In view of the above, one of the objectives of this study is to examine the relationships that exist between customer satisfaction, likelihood to recommend and switching intention in Ghana Mobile Telecom Industry.

## 2. Research Methodology

Research Design

The survey research method is employed for this study. This was stemmed from the fact that the study intends to gather data on the views of mobile phone users on their satisfaction with service delivery of five selected telecommunication brand in Navrongo.

#### Population and Sample

The aim of this study is to measure customer satisfaction with service quality of five selected telecom networks in Navrongo. As such, the population of this study comprises all subscribers or customers who are individual users or subscribers, specifically external users of cellular (mobile) phones within the Navrongo and its environs. A convenience sampling was used to sample seventy (70) respondents. This technique was chosen based on the fact that the population is just too large that it is impossible to include every individual. Again this adopted technique was because it is fast, inexpensive and easy and the respondents are readily available.

#### Research Instruments

A self-administered structured questionnaire was used to collect data from respondents. The questions sought to identify respondents' position on mobile phones, purchase behaviour, respondents' mobile usage habit and their switching intentions as well as respondents' feelings about customer satisfaction. In all, the questionnaire had seven (7) parts consisting of forty (40) items; five (5) related to respondents' identification data, customers' position on mobile phone, and customer satisfaction with service delivery respectively, eight (8) related to purchase behaviour, calls and SMS section, and promotions and internet service respectively and four (4) for mobile usage habits.

#### Data Analysis

The study employed disconfirmation model. Customers were asked to rate their satisfaction with service quality using desired disconfirmation (DD), expectation disconfirmation (ED) measures and overall customer satisfaction (OCS) measures. The ED measure had a five-point likert scale: "much worse than expected", "worse than expected", "equal to expectation", better than expected and "much better than expected". The scale for DD measure was also five-point likert scale from "much worse than desired" to "much better than desired". OCS measure used a five-point likert scale: "very dissatisfied", "dissatisfied", "neutral", "satisfied", and "very satisfied".

Also, we performed analysis of variance (ANOVA) or F-test on the model. The F-test tells us whether the amount of variation in the dependent variable that explained by the model is greater than the amount left unexplained. In establishing the relationship between the amount of credit used by male and female counterparts, correlation and regression analysis were employed. Regression Analysis for Amount spent on credit;

$$Y_{\text{Credit}} = \beta_0 + \beta_1 X_{\text{Gender}} + \epsilon$$

Where

Y: Predicted score of the dependent variables (amount spent on credit per month).

$\beta_0$ : The intercept (the average credit spent by a male customer per month).

$\beta_1$ : Change in amount spent on credit by customers, also known as regression coefficient.

$\epsilon$ : Random/error of predictor.

#### Hypothesis

H0: Amount spent on credit per month is not dependent (independent) on gender.

H1: Amount spent on credit per month is dependent on gender.

### 3. Results and Discussions

Socio-demographic characteristics: As indicated on Table 1 below, the majority of the respondents happen to be males with 41(58.6%) while females were 29(41.1%). Perhaps this is an indication that in Ghana although the ratio of men to women is 95/100 (see Population and Housing Census, 2010), with respect to the use of mobile phone in Navrongo, men appear to dominate their female counterparts.

Approximately 29(41.1%) had their ages ranging from 19 to 30 years; those whose ages ranged from 31 to 45 years, 46 to 60 and 13 to 18 constitute 18(25.7%), 10(14.3%) and 9(12.9%) respectively of the sample; and 4(5.7%) were more than 60 years old. Taken as a whole, the sample is quite youthful (19 years upward constitutes over 80 percent of the sample), which is consistent with the overall age structure of the Ghanaian population (see also Population and Housing Census, 2010).

With regards to occupation class, most of the respondents were students with 32(45.7%) followed by businesspersons, having 14(20.0%) and civil servants also, 11(15.7%). Other categories (Farmers, Private security personnel, Hairdressers, Petty traders, Mechanics) found were 13(18.6%).

Interestingly, 32(45.7%) were people from the third-cycle institution (tertiary) followed by the second cycle leavers having 25(35.7%) while 8(11.4%) were those without formal education but mobile users. The least record on the education category were the first cycle (basic school leavers), 5(7.1%).

A relatively larger number of the respondents were in very low income groups, of which 27.1% earned below GH¢200 per month and 31.4% were non-income earners, probably because they come from the student group. About one-third constituting 21.4% of the respondents were earning between GH¢200 and GH¢500 per month, 18.6% of the respondents earn between GH¢500 and GH¢1000 and only one person (1.4%) earns above GH¢1000.

*Table 1. Breakdown of socio-demographic characteristics.*

| Variable  | Characteristic | Number of Respondents (%) |
|-----------|----------------|---------------------------|
| Gender    | Male           | 41(58.6%)                 |
|           | Female         | 29(41.4%)                 |
| Age(yrs.) | 13 - 18        | 9(12.9%)                  |
|           | 19 - 30        | 29(41.4%)                 |
|           | 31 - 45        | 18(25.7%)                 |
|           | 46 - 60        | 10(14.3%)                 |

| Variable          | Characteristic         | Number of Respondents (%) |
|-------------------|------------------------|---------------------------|
| Occupation        | >60                    | 4(5.7%)                   |
|                   | Civil Servant          | 11(15.7%)                 |
|                   | Students               | 32(45.7%)                 |
|                   | Businessperson         | 14(20.0%)                 |
| Academic level    | Others                 | 13(18.6%)                 |
|                   | None                   | 8(11.5%)                  |
|                   | First cycle (Basic)    | 5(7.1%)                   |
|                   | Second Cycle (SHS)     | 25(35.7%)                 |
| Income level(GHC) | Third Cycle (Tertiary) | 32(45.7%)                 |
|                   | <100                   | 8(11.4%)                  |
|                   | 100 – 200              | 11(15.7%)                 |
|                   | 200 – 500              | 15(21.4%)                 |
|                   | 500 – 1000             | 13(18.6%)                 |
|                   | >1000                  | 1(1.4%)                   |
|                   | Non-income earners     | 22(31.4%)                 |

Irrespective of mobile telecom network

Table 2 depicts the mean rating of customer satisfaction using DD measure is 2.91 with standard deviation of 0.062 while using ED measure the mean is 2.63 with standard deviation 0.192. Using OCS, the mean rating was 2.70 with standard deviation 1.121 being the highest. This means that the mean rating of customers using(ED and DD) were all below their desire cut of point of three (3), and mean rating using OCS was also below the expected cut off value of four (4), with a wider deviation than the other DD and ED measure.

Table 3. Satisfaction ratings irrespective of network.

|     | Much Worse/ Very dissatisfied | Worse/ dissatisfied | Equal to desire/expectation/Neutral | Better/ satisfied | Much better/very satisfied |
|-----|-------------------------------|---------------------|-------------------------------------|-------------------|----------------------------|
| DD  | 2.9%                          | 37.1%               | 37.1%                               | 12.9%             | 10.0%                      |
| ED  | 8.6%                          | 31.4%               | 35.7%                               | 17.1%             | 5.7%                       |
| OSC | 8.6%                          | 12.9%               | 31.4%                               | 34.3%             | 12.9%                      |

CS with respect to Telecom network

Table 4, presents the mean satisfaction rating for five selected used mobile networks in Navrongo and its environs. Mean overall satisfaction for MTN was 2.48 whereas the mean desire and expectation disconfirmation was 2.51 and 2.53 respectively, meanwhile, the mean overall satisfaction for Vodafone was 2.74 though the mean desired and expectation disconfirmation was 3.22 and 3.13 respectively. Tigo mean overall satisfaction was 3.00 although the mean desired and expectation disconfirmation was 2.86 and 3.86 correspondingly.

For Airtel, mean overall satisfaction was 3.60 while mean satisfaction desired and expectation disconfirmation was 3.00 and 3.20 respectively.

Interestingly, Glo had mean overall satisfaction to be 4.00 even though mean satisfaction for desired and expectation disconfirmation was 3.25 and 2.75 respectively.

At this stage, it would be inappropriate for us to conclude prematurely that the mean values for the variables. However, this will be confirmed after the independent samples test table had been considered.

Table 2. Descriptive Statistics of Satisfaction Measures.

|     | Statistic | Mean Std. Error | Std. Dev. Statistic | Variance Statistic |
|-----|-----------|-----------------|---------------------|--------------------|
| DD  | 2.91      | 0.122           | 1.018               | 1.036              |
| ED  | 2.63      | 0.119           | 0.192               | 0.985              |
| OCS | 2.70      | 0.134           | 1.121               | 1.257              |

Customer Satisfaction rating irrespective of Mobile Network

This shows that using DD measure, while 37.1% of the respondents rated their satisfaction as equal to expectation 2.9% and 37.1% (representing 40.0% rated their satisfaction as much worse than desired and worse than desired respectively, and 22.9% (representing 12.9% and 10.0%) of respondents rated their satisfaction as better and much better than desired respectively. Also using ED while 35.7% of respondents rated their satisfaction as equal to expectation, 8.6% and 31.4% (representing 40%) rated their satisfaction as much worse than expected and worse than expected respectively, and 17.1% and 5.7% (representing 22.8%) rated their satisfaction as better and much better than expected respectively. Finally, using OCS measure, 47.2% (representing 34.3% and 12.9%) rated that overall they were satisfied and very satisfied respectively while 52.9% (representing 31.4%, 12.9% and 8.6%) maintained their satisfaction as neutral, either dissatisfied or very dissatisfied respectively.

Table 4. Breakdown of customer satisfaction ratings.

| Mean                 | MTN  | Vodafone | Tigo | Airtel | Glo  |
|----------------------|------|----------|------|--------|------|
| Desired              |      |          |      |        |      |
| Disconfirmation      | 2.81 | 3.22     | 2.86 | 3.00   | 3.25 |
| Expectation          |      |          |      |        |      |
| Disconfirmation      | 2.52 | 3.13     | 2.86 | 3.20   | 2.75 |
| Overall Satisfaction | 2.48 | 2.74     | 3.00 | 3.60   | 4.00 |

Irrespective of network

It could be emphasized from Table 5 below, that with a cut-off value of three (3), the mean differences in satisfaction using ED and DD (-0.086 and -0.171 respectively) and p-values of (0.048 and 0.035 respectively) which imply that the means are significantly less than the cut-off value (3). We therefore reject the null hypothesis that customer satisfaction is at least equal to expectation or desire of customers. Hence we can conclude with 95% confidence that, using ED and DD measures, customer satisfaction is much worse than expectation/desire of customers irrespective of mobile network.

**Table 5.** One Sample Test Irrespective of Network using ED and DD.

| Measures                    | t      | df | p-value | Mean Difference | 95% confidence interval of the Difference |       |
|-----------------------------|--------|----|---------|-----------------|---|-------|
|                             |        |    |         |                 | Lower                                     | Upper |
| Desired Disconfirmation     | -0.705 | 69 | 0.048   | -0.086          | -0.33                                     | -0.16 |
| Expectation Disconfirmation | -1.445 | 69 | 0.035   | -0.171          | -0.41                                     | -0.07 |

Results from Table 6, indicate that, with a cutoff point of four (4), the mean difference in satisfaction using OSC measure (-1.300) with p-value (0.000) imply that the mean is significantly less than the cut-off value (4). Therefore we have strong evidence to reject the null hypothesis that customers are at least satisfied. Hence we can safely conclude with 95% confidence that, using overall satisfaction measure, customers are not satisfied.

**Table 6.** One sample Test Irrespective of Network using OCS.

| Measures             | t      | df | p-value | Mean Difference | 95% confidence interval of the Difference |       |
|----------------------|--------|----|---------|-----------------|---|-------|
|                      |        |    |         |                 | Lower                                     | Upper |
| OCS                  |        |    |         |                 |   |       |
| Overall Satisfaction | -9.703 | 69 | 0.000   | -1.300          | -1.57                                     | -1.03 |

CS with respect to network

Table 7 depicts the one sample Test with respect to mobile network using Desired and expectation disconfirmation measure respectively. It indicates that with a cutoff point of (3), the mean difference in satisfaction using DD and ED measures for MTN is (-0.194 and -0.484) with p-values of 0.036 and 0.020 respectively implying that the means are significantly less than the cut off value (3). Hence providing strong evidence to reject the null hypothesis and conclude with 95% confidence that using DD and ED measures customers are not satisfied with the service quality delivery of MTN.

Also in the case of Vodafone, the mean differences in satisfaction using DD and ED is (0.217 and 0.130) with p-values of 0.285 and 0.544 respectively implying that using DD measure the mean significance is more than the cut off value of (3) providing strong evidence in support of null hypothesis that customer satisfaction is better than desired. However, using ED measure the p-value is 0.544 implying the mean difference (0.130) is not significant but the positive upper limit of the confidence interval (0.57) provides strong evidence in support of the null hypothesis that customer satisfaction is at least equal to expectation. Hence we can

conclude with 95% confidence that for Vodafone customer satisfaction is better than ideal/ desired service quality but equal to customers' expectation.

For Tigo, the mean difference in satisfaction ratings using DD and ED is (-0.143 and -0.143) respectively with p-value 0.736 implying that the means are significant but the positive upper limit of the confidence interval (0.85) provides strong evidence in support of the null hypothesis that customer satisfaction is at least equal to desired/expectation. We can therefore conclude with 95% confidence that for Tigo, customers rated their service quality as equal to as or better than expectation or desire.

Finally for Airtel and Glo the p-values (1.000, 0.621, 0.638, 0.391) are more than the significant level (0.05) which imply that the mean differences using both ED and DD measures (0.000, 0.200, 0.250, -0.250 respectively) are not significant. However, the corresponding positive upper limits of the confidence intervals (0.88, 1.24, 1.77, and 0.55) provide strong evidence in support of the null hypotheses. Hence we can safely conclude with 95% confidence that, for Airtel and Glo customer satisfaction is at least equal to the expectation and desire of the customers.

**Table 7.** One sample Test with respect to mobile network using OCS.

| Telecom Network |     | Test value = 4 |    |         | Mean Difference | 95% confidence interval of the Difference |       |
|-----------------|-----|----------------|----|---------|-----------------|---|-------|
|                 |     | t              | df | p-value |                 | Lower                                     | Upper |
| MTN             | OCS | -7.156         | 30 | 0.000   | -1.516          | -1.95                                     | -1.08 |
| Vodafone        | OCS | -5.319         | 22 | 0.000   | -1.261          | -1.77                                     | -0.77 |
| Tigo            | OCS | -4.583         | 6  | 0.000   | -1.000          | -1.53                                     | -0.47 |
| Airtel          | OCS | -0.784         | 4  | 0.477   | -0.400          | -1.82                                     | 1.02  |
| Glo             | OCS | 0.000          | 3  | 1.000   | 0.000           | -2.25                                     | 2.05  |

Market share of Mobile Telecom Networks in the Navrongo

MTN topped the market with a share of 44.3% which almost corresponds with the one released by the Ghana National Communications Authority (NCA) in November 2012 where MTN had a subscriber base of 45.33%, followed by Vodafone with 35.9% against national (20.20%), Tigo with only 10.0% as against national (14.34%), while Airtel and Glo had subscriber base of 7.1% and 5.7% against

national share (12.3% and 6.14%) respectively as depicted on Table 8 below.

**Table 8.** Mobile networks and their individual market share.

| Mobile connections | Frequency | Percentage (%) |
|--------------------|-----------|----------------|
| MTN                | 31        | 44.3           |
| Vodafone           | 23        | 32.9           |
| Tigo               | 7         | 10.0           |
| Airtel             | 5         | 7.1            |
| Glo                | 4         | 5.7            |

Switching Intentions of Mobile Network Subscribers in Navrongo

As recorded in Table 9, relatively greater number of subscribers representing 61.4% does not intend to switch/port to a different network while about 38.6% subscribers wish to switch to a better network probably because they feel their service providers have not met their desired satisfaction and

expectation or because they want to experience a new network.

Table 9. Switching intentions of mobile phone subscribers.

| Switching/porting intentions | Frequency | Percentage (%) |
|------------------------------|-----------|----------------|
| YES                          | 27        | 38.6           |
| NO                           | 43        | 61.4           |

Table 10. Cross Tabulation of switching intentions of subscribers as against networks they intend switching to.

| % within which Mobile Telecom Network subscribers intend switching |         |     |       |            |      |    |       |          |    |       |
|--|---------|-----|-------|------------|------|----|-------|----------|----|-------|
| Mobile Telecom Network   |         |     |       |            |      |    |       |          |    |       |
| Switching intention  | Ratings | Yes | Count | Percentage | MTN  | 1  | 3.7%  | Vodafone | 3  | 11.1% |
|  | No      |     |       |            | Tigo | 1  | 3.7%  | Airtel   | 12 | 44.4% |
|  |         |     |       |            | Glo  | 10 | 37.1% | Total    | 27 | 100.0 |
|  |         |     |       |            |      |    |       |          | 43 |       |

Below is a transition diagram of the five selected mobile networks which depicts the switching intentions of network subscribers.

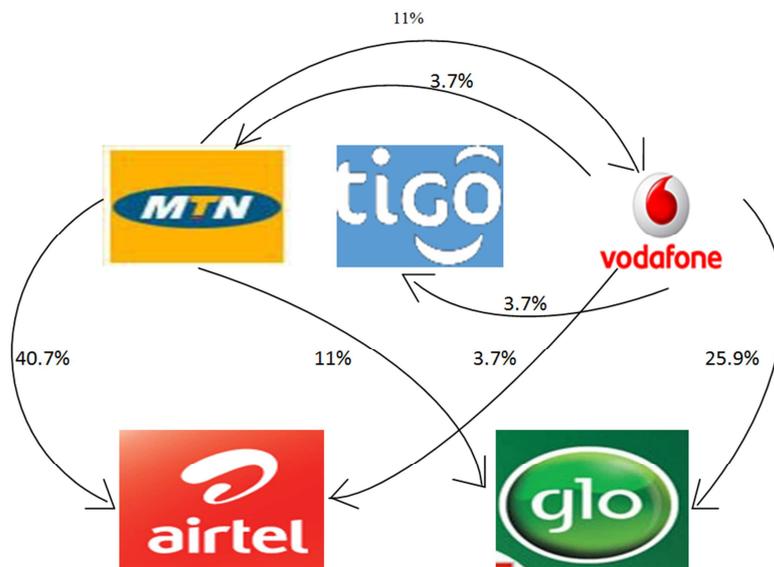


Figure 1. Transition diagram of switching intentions of subscribers of mobile networks.

The figure 1 above indicates customers rating of intentions of switching to a different network. Out of the 27 customers who wish to switch/port to a more better network, 40.7% of subscribers of MTN wish to switch to Airtel, 25.9% of Vodafone subscribers wish to switch to Glo, 11% of subscribers of MTN wish to switch to Vodafone and Glo respectively and 3.7% of subscribers of Vodafone wish to

switch to MTN, Airtel and Tigo respectively. These statistics therefore indicate that majority of subscribers of both MTN and Vodafone intend switching to Airtel (44.4%) and Glo (37.1%) respectively probably because they (MTN and Vodafone) had not met their satisfaction desires or expectations or because they wish to experience a new service offered by the other mobile network competitors.

Table 11. ANOVA table for relationship between amounts spent on credit and gender.

| Model      | Sum of Squares | df | Mean Square | F     | Sig.  |
|------------|----------------|----|-------------|-------|-------|
| Regression | 178.752        | 1  | 178.752     | 0.501 | 0.048 |
| Residual   | 24253.833      | 68 | 356.674     |       |       |
| Total      | 24432.586      | 69 |             |       |       |

a. Predictors: (Constant), Gender b. Dependent Variable: Amount spent on credit per month

Table 12. Coefficients.

| Model      | Unstandardized Coefficient |           | Standardized Coefficient | t      | Sig.  | Collinearity Statistics |           |
|------------|----------------------------|-----------|--------------------------|--------|-------|-------------------------|-----------|
|            | B                          | Std Error |                          |        |       | Beta                    | Tolerance |
| (Constant) | 32.690                     | 2.914     |                          | 11.218 | 0.000 |                         |           |
| Gender     | -3.262                     | 4.608     | 0.086-                   | 0.708  | 0.48  | 1.000                   | 1.000     |

a. Dependent variable: Amount Spent on credit per month

Table 12 indicates that the p-value (0.048) is less than the significance level (0.05) and the parameter estimate is positive (0.086) which is significant. Hence we have strong evidence to reject the null hypothesis that it is independent. Therefore, we can conclude with 95% confidence level that amount spent on credit is dependent on gender. As a matter of fact, male customers buy credit more than their female counterparts.

#### Testing

Males were coded zero (0) while females were coded one (1) on SPSS data.

$$Y_{\text{Credit}} = \beta_0 + \beta_1 X_{\text{Gender}} + \epsilon$$

Males

$$Y_{\text{Credit}} = 32.69 - 3.262(0) = \text{GH}\text{¢} 32.69$$

Females

$$Y_{\text{credit}} = 32.69 - 3.262(1) = \text{GH}\text{¢} 29.43$$

On average, amount spent on credit in a month by males is GH¢32.69 which is greater than that of females thus GH¢29.43. We can therefore conclude with strong evidence that males buy credit more than females.

## 4. Conclusions

The studies establish that customers are not satisfied with MTN network nevertheless they embraced their mobile money service. Customer satisfaction for Vodafone network is equal to desire and expectation of customers. Similarly, for Tigo network customer satisfaction is at least equal to the desire and expectation of customers. Moreover, for Airtel and Glo mobile networks, customer satisfaction is at least equal to the desire and expectation of customers.

Indeed, overall customer satisfaction is significantly different among mobile telecom networks in Navrongo. Customers of Airtel and Glo rated their satisfaction with service quality as higher than that of MTN, Vodafone and Tigo.

Furthermore, the studies came out that switching intention (though not tested hypothetically) but per the descriptive statistics made revealed that customers of MTN and Vodafone are more willing to switch than Tigo, Airtel and Glo customers.

Last but not the least, the study revealed that MTN has a larger subscriber base followed by Vodafone, Tigo and Airtel respectively with Glo having the lowest subscriber base in Navrongo.

Finally, the study revealed that amount spent on credit significantly depends on gender where males buy credit more than their female counterparts.

To draw the curtain down on this study, it has been proven beyond doubt that generally customers are not satisfied with service quality delivered by mobile networks in Navrongo or in other words their satisfaction is very low, nevertheless customer satisfaction is equal to or better than expected for Vodafone and Tigo networks respectively, at least equal to expectation for Airtel and Glo respectively and worse than expected for MTN network. Precisely, the research

recommends that mobile operators should endeavor to improve upon the quality of mobile services offered to subscribers if they are interested in attracting and maintaining existing customers.

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