Seamless Roaming Solution Services for Multi-National Telecommunication Companies (A CASE STUDY OF MTN - GHANA)

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ABSTRACT: ***Roaming services is seen as an expensive service, but with the advent of Seamless roaming solution roaming has become affordable. The principal intent of this project work is to demonstrate the capability of Seamless Roaming solutions. The availability of local recharge, network traffic steering and Welcome SMS as part of the value added service for MTN Ghana provided by Huawei Technologies Limited. The objective of this study is to examine how the adoption of SRS affects the telecom industry, specifically MTN Ghana in terms of competitiveness, customer satisfaction, effectiveness and revenue generation. Questionnaire was the main instrument used for data collection while the simple frequency percentage was adopted as the statistics. The study shows that SRS improves roaming services, contributes to customer satisfaction, and gives MTN Ghana a competitive advantage over other operators in Ghana. The research recommends that MTN Ghana should invest more in the advertisement of SRS service, improve and expand on the service. A strong communication bond should be established with roaming subscribers using Welcome SMS. A good service needs to be advertised.***

GENERAL TERMS
Roaming
KEYWORDS: Seamless Roaming Solution (SRS), Network Traffic Steering (NTS)

I. INTRODUCTION

International roaming means that a subscriber uses their mobile telephone abroad, outside their operator's network and area of coverage, that is to say the subscriber is a visitor within another network abroad. Mobile operators conclude 'roaming contracts' between themselves in order to provide opportunities for making calls and receiving calls from abroad, and in this way the operators can charge the call on the ordinary telephone bill without the foreign operator needing to send any bill to the end user. Roaming contracts govern, among other things, the compensation the operators charge each other for allowing other operators' foreign subscribers to use telephone in their own network.

Phone coverage can be a regular problem for people constantly on the move. This is especially true for travelling business people who take frequent trips internationally.

Seamless roaming is the term used to describe technology that helps solve this problem.

A. Basics of Mobile Roaming

When a subscriber travels to a foreign country, and the mobile phone keeps working it means the subscriber is roaming. The subscriber can make and receive phone calls, write text messages (Short Message Service – SMS) or surf the internet and download content.

Calls, SMS, and other data services are operated by the visited network because the subscribers' home network provider does not operate in the country. For providing this service, the visited network operator charges the home operator and home operator passes this additional cost on to the subscriber.

B. Scenario in Roaming

When an SMS roamer sends an SMS while abroad, the subscriber's home operator will charge a higher fee than normal cost of an SMS. This fee includes additional cost for using the visiting network and transferring the SMS back to the home network. Operators do not charge for receiving an SMS abroad.

All other services are value added services for which this project will focus on Seamless Roaming Solutions (SRS).

This roaming research gives an overview of seamless roaming solutions, its significance to MTN Ghana in terms of revenue generation and the subscriber as a value added service.

This reviews literature on the value added service for mobile roaming service used by MTN Ghana, Huawei Seamless Roaming Solutions (SRS), types of SRS services, customer satisfaction, effective service delivery and the impact of LR, WSMS and NTS.

II. HUAWEI SEAMLESS ROAMING SOLUTION (SRS)

Huawei SRS solution is based on the system named Huawei ISG (International Service Gateway), a multifunctional services platform with truly telecom-class performance, availability, and reliability, which is designed to integrate on GSM/WCDMA networks.

MTN Afghanistan perceives SRS as a service that will enable all MTN subscribers using prepaid lines in Seamless Roaming solution provides a comprehensive range of roaming solutions and services for mobile roaming. The solution provides inter-standard roaming solution for roaming between different networks, for both prepaid and postpaid services (MTN Ghana, 2008)

the 6 MENA (Middle East and Northern Africa) operating countries to move freely (inbound or outbound) across geographic borders while making seamless local recharges to make, receive calls and SMS at prevailing roaming rates. Seamless Roaming Local recharge service will enable subscribers recharge their roaming prepaid account with airtime vouchers from any visited MTN Operating Countries (MTN AF, 2008).

A. Local Recharge Service (LRS)

Prepaid subscribers constitute the greater population of mobile subscribers in Ghana and MTN Ghana is not an exception.

In order to top-up a prepaid account whilst roaming, a mobile subscriber needs to be their home network making it virtually impossible to recharge their mobile accounts during sometimes extended times away from home, including work travel or vacations.

This means subscribers will have to depend on family and friends back home to recharge their accounts on their behalf.

SRS local recharge has come to provide a certain hub that allows MTN prepaid roaming subscribers to recharge their accounts using the visited MTN network's recharge voucher. This service is currently available in all MTN's 21 operations this resolving the issues of MTN prepaid subscribers running out of talk time whilst roaming.

Accessibility and Customer Retention – According to Edch (2010) prepaid subscriber need to easily recharge their accounts while roaming. The "out of credit" problem becomes a real challenge for subscribers while roaming. The purchase of a local SIM card might be the only solution to overcome prepaid account limitations. Recharge anywhere service can offer operators a true differentiator in the international business and thus competi8tive advantage, confirming market leadership and a reputation for innovation and customer retention due to subscriber satisfaction.

According to(MTN Roaming Marketing,2011) financial reports shows that revenue generated by MTN Ghana in terms of local recharge ever since its commencement in 2008 has increased considerably adding a boost to roaming revenue as a whole, even though targets have not been met In contract, inbound subscriber base for local recharge has not seen any significant increase.

This can be attributed to the fact that information or advertisement available on SRS local recharge is only available on MTN Ghana's website.

Inbound prepaid subscribers, who did not get prior information from their home country about local recharge service being available when they roam, are unlikely to know about the service if they do not visit the website. Thus revenue for the service has not shoot up significantly.

B. Key Benefits of Welcome SRS for MTN Ghana

The benefits of Welcome SRS for MTN Ghana includes but not limited to:

(a) Reduction of "unintentional roaming" in border areas

(b) Reduction of "bill shock" especially for postpaid subscribers

(c) Higher phone usage through reassurance on tariff costs

C. Benefits to Subscribers – Customer experience

The cost of using the phone, the number to dial to call home and the way to access the services may all be unknown to roaming subscribers, both inbound and outbound. The result may be an inability or reluctance to use roaming services, which will cause a revenue loss to both the visited and home operator. Subscriber through welcome SMS are educated on the following below:

(i) To realized that they are roaming

(ii) Be aware of the tariffs that apply

(iii) Understand how to phone home

(iv) Understand how to access voice mail and other key service

D. Network Traffic Steering (NTS) or Steering Of Roaming

Network Traffic Steering or "preferred roaming" is the process by which a mobile operator decides which partner their subscribers will use whilst roaming.

These choices of roaming partners are usually made in order to take advantage of better prices from partners or to allow bi-lateral agreements with partners to be honored. Increasing, select partners based on quality concerns (Evolved Intelligence, 2011)

Today there are two main methods in use: network based and SIM based steering. Both approaches have advantages and disadvantages. Some operators use both approaches together.

Operators who see that traffic is being steered away from them feel that steering is somehow "unfair". However the Global System for Mobile Communications Association (GSMA) views steering as both "legal" and desirable. In particular it enables a market in roaming to develop and promotes competition between operators (GSMA, 2005)

E. Network Based Steering

MTN Ghana's Huawei SRS NTS is a network based steering tool. This approach uses a system installed in the home network. When an MTN subscriber attempts to register to a foreign network, the foreign network asks for permission from the home network (MTN).

The NTS system decides whether that registration is "wanted" or not.

If it is, the request is accepted. If it is not wanted, the system issues a message to decline connection.

Generally a steering system will reject attachments up to three times in an attempt to "find" a desired network. This is the recommendation of the GSM in order to avoid steering having too great an impact on the customer experience. Some platforms attempts to defeat anti steering systems by issuing continued rejects until a desired network is found. However this can lead to the subscriber getting no service at all.

F. Impact of NTS

Due to the impact that steering has no subscriber experience and because of the cost of signaling intelligent steering systems will not attempt to steer an individual attach request if the overall steering targets are being achieved. Usually this is subject to a variety of business rules to optimize this process.

Network based steering is highly dynamic; target can be changed instantly. It is also easy to roll out as it works with any type of handset.

However it is a probabilistic based system. This means that, depending upon network coverage and the number of network available, there are limits the steering "accuracy" that can be achieved. These concerns about only become significant when there are more than 3 operator partners to choose from in a territory.

NTS solution also handles manual attachment request network. This is important because the subscriber may experience some local difficulty with the preferred network (Huawei, 2009). The solution also ensures that voice and data services are attached to the same operator. If this is not done, the phone resets with a loss of connectivity for the subscriber. This has led to the view amongst some operators that certain phones "lock up" if you attempt to steer them. For a long time Blackberry handsets were quoted as suffering from this "problem".

MTN has concluded from test analysis conducted that is experience has nothing to do with the handset but is purely down to a design in the steering platform itself (MTN and Huawei, 2010).

The solution also addresses intermittent coverage issues correctly. These can cause difficulty in attachment if coverage drops during the procedure. A classic example of this subscriber who boards the train to the city from the airport, as the train goes under bridges etc. there are momentary drops in network connection. The phone might not complete the steering and attachment approval process in the time between drops and so the subscriber never gets a connection.

According to (ITU, 2010) traffic steering has enabled a range of more attractive roaming offers to market. However (Roam ware, 2008) considers the benefits for an operator performing the role of a visited network or VPMN (Visited Public Mobile Network) as:

Identifying deployed steering mechanisms
Helping the roaming team in decision and negation on network or group behavior
Showing impact on subscriber performance
Helping identify the signaling Cost Impact

While benefits for an operator performing the role of a home network or HPMN (Home Public Mobile Network) also includes:

- *Identifying partner networks for deploying steering mechanisms*
- *Assessing performance of deployed steering mechanisms*
- *Identifying partner networks violating accepted norms*

III. SIGNIFICANCE OF THE STUDY

The telecom industry is growing at a great pace and the growth rate is expected to double with every passing year.

There are many new developments in the telecom sector, including the ingress Value Added Service technology that the Ghanaian market is witnessing at present.

The Ghanaian market currently has 6 Operators (MTN, Vodafone, Tigo, Airtel, Expresso, and

Glo). Each of these operators is trying hard for a good proportion of the telecom market share. The operators have gone beyond servicing the local market to also serving the international market resulting in providing International roaming services for both inbound subscribers. Inbound roaming allows international subscribers to roam on local operators' network, when a roaming agreement is established. For example: MTN Ghana subscriber roaming in the USA on AT & T.
The four operators in Ghana have agreement with same operators globally. In other to compete with competitors, telecom operators have introduced various Valued Added Services to provide other alternatives of revenue generation and also to attract more Subscribers.
This is the main reason why MTN Ghana introduced the Seamless Roaming Solution (SRS). International roaming traffic increases quickly but roaming tariff is cut down continuously. Mobile operators speeded up alliance to reduce cost, and try to find new revenue sources based on expedite roaming.
Roaming Solutions like SRS has become the best way to retain subscribers when they roam as most subscribers purchase local SIMs at their visited locations in order to cut down roaming cost.

V. PRESENTATION OF RESULTS

The findings of the study are organized as follow: Demographic profile of MTN staffs and subscribers (customers)
Analysis of survey made with MTN staffs and subscribers (customers) on SRS roaming knowledge and experience.

VI. RESEARCH METHOLOGY

Research methodology refers to the process, procedures or guidelines used to systematically conduct a research project. This section is a presentation methodology used which includes the research design, sample population, data collection instruments and administration procedures.

A. Research Design

Michael S. Carriger (2010) defined research design as the strategy, plan and the structure of conducting a research project.
The aim of this research is to test the proposed hypothesis. In this regard, the quantitative method is chosen to achieve this objective having used questionnaires in data collection.

B. Population

A research population is a well-defined collection of individuals or objects known to have similar characteristics. All individuals or objects within a certain population usually have a common, binding characteristic or trait (Joan J. Castillo, 2009).
For the purpose of this research, all staff and subscribers (customers) of MTN Ghana who have a roaming experience will constitute the research population.

C. Sampling Procedures

Sampling is the process of selecting units (e.g. people, organizations) from a population of interest so that by studying the sample the researcher may fairly generalize the result back to the population from which the sample is chosen (William M.K. Trochim, 2006). In line with this research, purposive sampling method is used to select the sample group which consist of MTN subscribers (customers) and staffs with roaming experience. Due to the challenge of getting roaming subscribers for the research project the sample size is restricted to 50 comprising 20 staffs from the Graphic road and Ridge tower offices and 30 MTN subscribers with roaming experience. The sample is intended to obtain suitable and varied views regarding Seamless Roaming solution services for multi-national telecommunication company case study MTN.

A. Data Collection Instrument (S)

Healey (1977) defined data as any information collected as part of a research project and expressed as numbers. Data for the research was obtained from both primary and secondary sources. Primary data was sourced through subscriber survey using a self-completion questionnaire with closed questions. Two sets of questionnaire were designed for staff and subscribers (customers) of MTN.
The secondary data source was gathered from MTN Ghana's Huawei seamless roaming solution service documentation, textbooks relating to the topic, extracts from journals, reports, newsletters and articles gathered from the internet.

Table 5.1 Demographic Factor

	Staffs		Subscriber	
Variable Response	Freq	Per	Freq	Per
Gender				
(Male)	8	40	17	57
(Female)	12	60	13	43
Age 20 - 25 year	1	5	2	7
26 - 30 years 31 -	5	25	10	33
35 years 36 - 40	7	35	5	17
years 41–above	2	10	3	10
	5	25	10	33
Working Experience				
1-5	10	50	0	0
6-10	6	30	0	0
11-15	4	20	0	0
Educational Qualification				
HND	1	5	0	0
First Degree	10	50	0	0
Master's Degree	5	25	0	0
Professional	4	20	0	0
SIM card usage experience				
1 – 5 years	0	0	11	37
6 – 10 years	0	0	15	50
11 – 15 years	0	0	4	13
SIM subscriber Type				
Postpaid	10	50	25	83
Prepaid	10	50	5	17
Advertisement about SRS				
Print Media	0	0	0	0
Radio	0	0	0	0
Commercial	0	0	0	0
TV Commercial	14	70	20	67
By word of mouth	6	30	10	33
MTN's website				
Satisfactory Level of SRS				
Strongly Agree	15	75	11	37
Agree	4	20	15	50
Indifferent	1	5	3	10
Disagree	0	0	1	3

The distribution of respondent by gender is shown in Table 5.1. The number of female respondents (60%) and the male is (40%) with a total number of female and 8 for male are MTN staffs. While Subscribers (customers) respondent by gender is represented male respondents (57%) is closed to the female (43%) with a total of 17 male and 13 females. This shows a comparatively equal footing in terms of representation of gender in terms of roaming experience.

The table also explained Seventy five percent (15 people) of MTN staffs who responded to the questionnaires were age between 20-40 years old and twenty five percent (5 people) of the respondents were above 41 years. Sixty seven percent (20 people) of the Subscribers (Customers) who responded to questionnaires were 20-40 years old and thirty three (10 people) of the respondents were above 41 years. This shows that the roaming population consist mostly young adults.

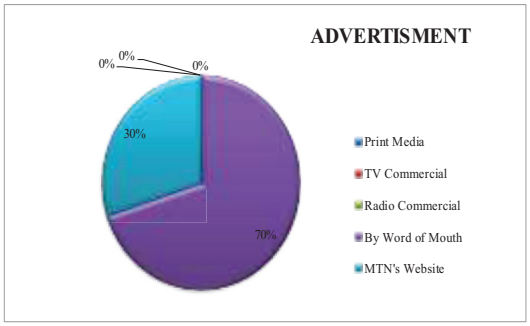
Likewise, the respondents were asked for their educational achievement and the report shows 5% are university graduates, with 25% having a second degree (Master's) while 20% hold Professional qualification leaving 5% of respondents with Higher National Diploma (HND).

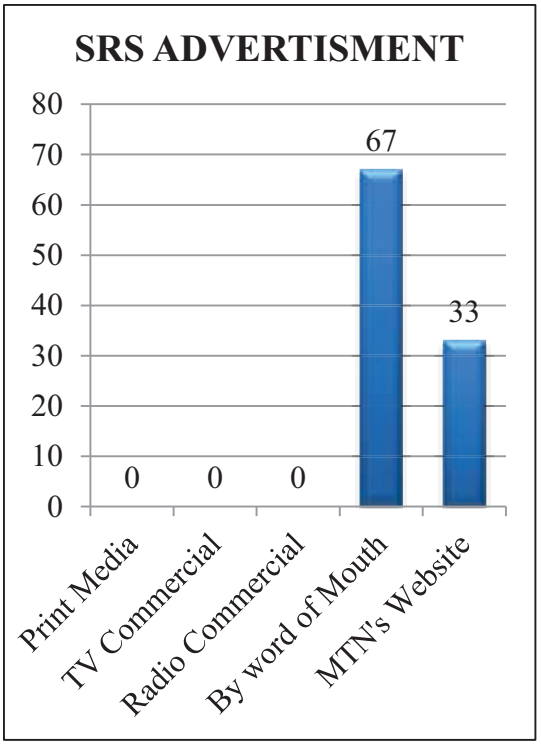
This shows education qualification among MTN staff is high.

Table 5.1 still shows the number of years the respondents have been employed in MTN Ghana 50% (10 people) of the total number of respondents have been with MTN 1-5 years, following 30% (6 people) who have been with the company for 6-10 years while the remaining 20% people) have been with the company for 11-15 years, that is form the start. This concludes most of the respondents were with the company before the SRS service was deployed.

The table shows an equal distribution (50-50%) of SIM subscription for both postpaid and prepaid than used by MTN staffs. 83% (25 people) of respondents are prepaid while 17% (5 people) are postpaid for customer subscription. This goes to predict that MTN has more (pay-as-you-go) customer subscription than postpaid.

The table clearly shows that 70% (14 people) staffs got to know about SRS by word while remaining 30% (6 people) respondents got to know about the service from the website. This shows that the service is not advertised through the print media, television and radio commercials.





Out of 30 respondents, 67% (20 people) found out about SRS services through word of mouth from family and friends, while 33% (10 people) learnt about the services from MTN's website. This goes to implies that the service is not being advertised in the print media, TV or radio commercials. Out of the respondents, 75% (15 people) strongly agree that seamless roaming solution service has given MTN Ghana a competitive advantage in the telecom industry, 20% (4 people) agree to the fact while remaining 5% (1 person) was indifferent. Likewise, Out of 30 respondents, 37% (11 people) strongly agreed that SRS has improved their customer satisfaction level, 50% (15 people) agreed, 10% (3 people) were indifferent while 3% (1 person) disagree with this notion.

VI. CONCLUSION

The purpose of the study was to describe the seamless roaming solution service and explore ways to enhance the service. From questionnaires presented to respondents, it can be deduced that 65% (13 people) staffs had official knowledge about the SRS service while remaining 35% (7 people) did not have any knowledge any about the service even though respondents were MTN staff. This is in closer par with the results from MTN customers as well.

It is obvious that MTN is not advertising the service to attract new subscribers.

The analysis of literature review shows that there is more to explore with the seamless roaming solution. Currently Welcome SMS service is under-utilized. Out of the 7 service that can be offered by the Welcome SMS service only three of these services are in use, leaving room for more opportunities for MTN to communicate with its roaming subscribers. It was also noted from additional comments from respondents that some subscribers did not receiving the Welcome SMS at all.

With regards to network traffic steering, subscribers do not know the reason why they are steering to specific networks when they roam on. It was also noted from additional comments provided that some subscribers experienced roaming difficulties on the network they roamed on.

Based on finding for this research work the highest percentage of Subscribers believed Seamless roaming services provided by MTN has improved the convenience and efficiency of roaming services.

Recommendations

The purpose of this paper was to describe the seamless roaming solution service and explore ways to enhance the service. Based on the findings of the study, the following are recommended to policy makers.

a) To promote the Seamless Roaming Solution service to attract new subscribers, the service must be advertised. This could be done periodically in the print media, TV, radio, internet, via SMS and WSMS inclusive.

b) Advertising is especially good for the SRS local recharge service as it is a direct revenue generating service, with regard to WSMS and NTS the subscriber has no control over the service, as welcome SMS is pushed to the subscriber after the subscriber has been successfully steered to the preferred network.

c) All the services available on the Welcome SMS system should be explored as it is a good medium of communication with roaming subscribers, both inbound and outbound. This will also attract more subscribers (customers) as they would realize MTN cares about them and their roaming experience.

d) System pitfalls should also be worked on, as from the sample respondents some percentage

of the subscribers did not receive any Welcome SMS when they roamed.

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