



The Massive Deployment and Usage of GSM Technology for Service Delivery in Nigeria

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Abstract- GSM is an acronym for Global system for Mobile Communication which is cellular network where mobile phones connect to by searching for cells in the immediate vicinity [1]. In Nigeria, the GSM technology has changed lives since its introduction in 2001. The deployment of the GSM technology into the Nigeria market was universally embraced by stakeholders and found to be relatively efficient at inception. Over the years, operators in the industry had experienced an unprecedented growth in customer base which also had necessitated for increase facilities to accommodate the growth. With the ability of the GSM technology to give a flexible Nigeria user access to network facilities anytime (anywhere) with unlimited access to data, it is becoming a platform for mobile users to access people oriented services. This is because, today's world economy requires flexibility in every sector of the society. Corporate and individual time management has significantly improved and the general impact of the technology on Nigeria's overall economic development has been simply awesome [2]. Therefore in this paper, we critically x-rayed the deployment of GSM mobile phones for service delivery in various sectors of the Nigerian economy.

Keywords: GSM, Telecommunication, Mobile Users, GSM Technology, Mobile Phone, GSM Subscribers, GSM Operators.

I. INTRODUCTION

The world has become a global village with telecommunication an indispensable tool in the entire process of globalization [3]. However, in today's highly competitive global economy, the pressure on organizations to find new ways to creating and delivering services is growing stronger. Interestingly, Mobile Communication is a major driver in service delivery. With the introduction of GSM mobile communication into the Nigerian economy in 2001, it has created thousands of jobs while making life easier with enhanced business operations [2]. It has been established that Nigeria is the fastest growing telecoms nation in Africa and third in the world [4]. According to [9], today's world economy requires flexibility in all activities of human endeavours. Introducing mobility and flexibility in the activities of people can be greatly enhanced with the use GSM mobile phones. Hence, providing services to mobile users from any place and at any time is becoming the central requirement in the current information and communication technology market. This is also the trend in Nigeria mobile communication market. The concept is driven with the aim of providing a seamless pervasive computing environment to a mobile user anywhere globally with limitless access to data. The country had experienced a phenomenal growth from a tele-density of 0.49 in 2000 to 80.85 in year 2012. Tele-density is defined as the number of telephone connections for every hundreds of individuals living within an area, could also vary across nations, urban and rural areas within a country. This trend had brought about a monumental development in the major sector of the economy such as banking, telecoms and commerce in general [5]. GSM is one of the most explosive developments ever to have taken place in the telecommunication industry in Nigeria [6].

Recent deregulation of the mobile phone market in Nigeria has led to the introduction of network of network providers operating on the 900/1800 MHz spectrum which includes MTN Nigeria, Airtel, Globacom, Visafone, Etisalat, Multilinks among others [7]. Available statistics from the Nigerian Communication Commission as at June 2013 stated that they are One Hundred and Nineteen Million, Nine Hundred and Seventeen Nine Thousand, Five Hundred and Forty (119, 979, 540) active mobile subscribers in Nigeria. The breakdown is seen in the table below which shows that the MTN Nigeria is still leading in the number of active subscribers with a number of Fifty Five Million, Two Hundred and Thirty Eight Thousand, Four Hundred and Thirty while Glomobile coming second.

Table 1: Mobile Operators Active Subscribers in Nigeria

S/N	Mobile Operator	Network Type	Active Subscribers	Website Address
1.	MTN Nigeria	GSM/UMTS/HSDPA	56,238,430	www.mtnonline.com
2.	GloMobile	GSM/UMTS/HSDPA	25,019,862	www.gloworld.com
3.	Airtel	GSM/UMTS/HSDPA	21,591,904	www.ng.airtel.com
4.	Etisalat	GSM	15,303,647	www.etisalat.com.ng
5.	Visafone	CDMA/EVDO	2,094,785	www.visafone.com.ng
6.	Multilinks	CDMA/EVDO	151,688	www.multilinks.com
7.	Starcomms	CDMA/EVDO	209,627	www.starcomms.com

8.	ZoomMobile	CDMA/EVDO	111,077	www.zoomnigeria.com
	Total		119,979,540	

Source: NCC, 2013

From the table1 above, GSM operators in Nigeria have a combined active lines of about 117 million, while the remaining operators had a combined active lines of 2.56 millions including 382,678 fixed wired and wireless operators. A recent survey by the Nigerian Communication Commission indicates that as at April 2014 the number of active subscribers had increased rapidly as shown in table 2 below. This result shows with a total increment in the active subscriber base to 129,391,392, that GSM technology is going through revolution and is becoming available everywhere in Nigeria. As a result it is widely deployed by flexible Nigerian mobile phone users in accessing various services for their day to day activities.

Table 2: Mobile Operators Active Subscribers in Nigeria

S/N	Mobile Operator	Network Type	Active Subscribers	Website Address
1.	MTN Nigeria	GSM/UMTS/HSDPA	58,355,855	www.mtnonline.com
2.	GloMobile	GSM/UMTS/HSDPA	24,015,713	www.gloworld.com
3.	Airtel	GSM/UMTS/HSDPA	25,475,672	www.ng.airtel.com
4.	Etisalat	GSM	19,111,664	www.etisalat.com.ng
5.	Visafone	CDMA/EVDO	2,004,010	www.visafone.com.ng
6.	Multilinks	CDMA/EVDO	35,381	www.multilinks.com
7.	Starcomms	CDMA/EVDO	108,235	www.starcomms.com
8.	ZoomMobile	CDMA/EVDO	111,077	www.zoomnigeria.com
	Total		129,391,392	

Source: NCC, 2014

From the table 2 above, GSM operators in Nigeria have a combined active lines of about 126 million, while the remaining operators had a combined active lines of 2.25 millions including 382,678 fixed wired and wireless operators. According to [10], the sporadic growth in the acceptability of GSM services has however led to the need to address the ever-growing complexity in the management of GSM telecommunication networks, which is sequel to expansion in size cum complexity in the delivery of services to the flexible user. With strong growth of both internet and mobile telecommunication, there is a migration to market end-user applications. It is entirely a new class of wireless infrastructure where everyone and everything is always connected and interoperating. Interestingly, as this trend develops the range of services available to a mobile user grow.

II. AREAS OF USAGE OF GSM FOR SERVICE DELIVERY

They are several areas of human endeavor where GSM mobile device platform is used for service delivery in Nigeria.

a) SMS broadcast services

The government (Federal and State) periodically uses SMS broadcast services to propagate information especially during election campaigns and festive periods [8]. They massively use it for election campaigns as it is one of the most cost effective means of propagating their campaign messages to their audience. Recently, Nigerian mobile users also deploy the usage of Web SMS to also disseminate messages in bulk to it's intended recipients because of the cheap rate of sending messages in bulk.

b) M-farming

[8] The government of Nigeria lunched m-farming initiative in September 2012 that gives farmers fertilizer and seed support through the electronic wallet on their mobile phone which is heavily deployed in the agricultural sector today.

c) Cashless Economy

The proposed cashless economy initiative of the Central Bank of Nigeria, (CBN) is on the platform of mobile devices which will seamlessly integrate mobile money technology, e-banking and mobile payment for the benefit of Nigerian mobile phone users.

d) E-commerce

The electronic commerce marketplace which is pioneered by notable e-commerce store in Nigeria like Jumia, Konga, Dealday, Gidimall and Kaymu is mostly deployed to Nigerians on the platform of mobile devices. These e-commerce stores heavily deploy their mobile version of their websites for Nigerian users thereby making it possible to access their stores from any location. It is believed that electronic commerce (e-commerce) would be an important driver of Nigeria's Gross Domestic Product (GDP) with its' population of over 170 million [11].

e) Mobile advertising

The mobile phone is heavily used for advertising in the country today. It is heavily used to promote brands, ringtone, ring-back tones and other types of advertisement. Also mobile web advertising is the beginning to attract business to

customer brands. The growing momentum around mobile money and payment had attracted financial institutions to mobile ads [8].

f) Healthcare Delivery

[12] In his work, he was able to establish the fact the GSM mobile device platform has been of immense benefits in the areas of healthcare service. The area of usages includes the following: receiving public health alerts, health monitoring, medical reminder, make contact with health workers, call/text for emergency, monitor menstrual cycle, to access internet services for prescription and medication, to access financial help during health challenge.

g) Internet

A recent survey by the Nigerian Communication Commission, (NCC) showed that over 65 million Nigerian users access Internet on their GSM mobile communication platform for their day-to-day activities. The statistics showed the telecommunication operators in Nigeria (MTN Nigeria, Globacom, Airtel Nigeria, and Etisalat) all have an installed capacity of sixty five million, eight hundred and thirteen thousand, eight ninety (65, 813, 890) subscribers who access Internet facilities using GSM mobile communication device.

To established that there is increased usage of GSM mobile communication platform for service delivery, we embarked on the following experiment below to help us substantiates our claims.

III. RESEARCH OBJECTIVES

The following research objectives are stated for the study:

- Examine the opinion of Nigerian mobile phone users on what the use their GSM mobile phone device for.
- To find out applications areas of GSM phone to a mobile Nigerian user of GSM mobile device

IV. MATERIALS AND METHODS

The study adopted descriptive survey research design to describe the massive deployment and usage of GSM mobile device for service delivery in Nigeria. The study is drawn from GSM mobile phone users in the city of Abakaliki in Nigeria. The researcher administered a total of 200 copies of questionnaires and 110 of the copies were completed and returned. The collected data is as shown in the tables below in line with the questions in the research instrument.

Table 3: Sex of the Respondents

Opinion	Frequency	Percentages
Male	68	61.8
Female	42	38.2
Total	110	100

From the above table, 68 respondents representing 61.8 percent are males; while 42 respondents representing 38.2 percent are females.

Table 4: Age range of Respondents

Opinion	Frequency	Percentage
(a) Under 20 years	6	5.5
(b) 21-30 years	38	34.5
© 31 -40 years	52	47.3
(d) 41-50 years	12	10.9
(e) 51 and above years	2	1.8
Total	110	100

From the above table, the greatest number of respondents was within the age bracket of 31-40 years, representing 47.3 percent of the total number of respondents. It is closely followed by the respondents within the age brackets of 21-30 years (34.5 percent); 41-50 years (10.9 per cent) just like that of 51 years and above (1.8 percent), and under 20 years which represents 5.5 percent of the population. This is an indication that more of the mobile device users used for the research work is within the 31-40 years age bracket.

V. RESULTS

Table 5: Distribution of Respondent on ‘What Nigerian GSM Mobile phone Users use GSM for’

Questions	SA	A	U	D	SD	Total
News	46 (41.80)	44 (40.00)	4 (3.64)	6 (5.45)	10 (9.09)	110 (100)
Calls	105 (95.50)	5 (4.50)	0 (0.00)	0 (0.00)	0 (0.00)	110 (100)
Sports	16 (14.54)	63 (57.27)	6 (5.46)	20 (18.18)	5 (4.55)	110 (100)
Pornography	25	45	10	5	25	110

	(22.73)	(40.91)	(9.09)	(4.55)	(22.72)	(100)
Entertainment	27	46	7	20	10	110
	(24.55)	(41.82)	(6.36)	(18.18)	(9.09)	(100)
Academic Research	50	36	2	18	4	110
	(45.46)	(32.73)	(1.82)	(16.36)	(3.64)	(100)
Spamming	26	46	8	9	21	110
	(23.64)	(41.82)	(7.27)	(18.18)	(19.09)	(100)
Retrieving Information	28	36	6	25	15	110
	(25.46)	(32.73)	(5.46)	(22.73)	(13.64)	(100)
SMS/MMS	78	26	6	0	0	110
	(70.90)	(23.64)	(5.48)	(0.00)	(0.00)	(100)
Literacy	28	38	6	16	22	110
	(25.46)	(34.56)	(5.46)	(14.55)	(20.00)	(100)
Electronic Mailing	46	37	7	11	9	110
	(41.82)	(33.64)	(6.36)	(10.00)	(18.18)	(100)
Internet	38	50	4	9	9	110
	(34.55)	(45.46)	(3.64)	(8.18)	(8.18)	(100)
Internet Business	15	44	17	14	20	110
	(13.64)	(40.00)	(15.45)	(12.73)	(18.18)	(100)
Ebanking	14	46	10	14	26	110
	(12.73)	(41.82)	(9.09)	(22.73)	(23.64)	(100)

Result from table 10 shows that 41.8% of the respondents strongly agreed that Nigerian GSM users use GSM phones read news, 44% agreed to it; 4% of the respondents were indifferent to it; while 6% percent of the respondents disagreed to the question; and lastly only 10% of the respondents strongly disagreed. The table also indicated that Nigerian users use GSM mobile phone for calls: 95.46% of the respondent indicated that they strongly agreed to it; 5% agreed to it; 0% were indifferent to it; while 0% of the respondents disagreed to the question; and lastly 0% of the respondents strongly disagreed to the question. Table 10 revealed that Nigerian GSM mobile phone users use GSM for sports events. 14.56% of the respondents strongly agreed with it; 57.27% of the respondents agreed to it; 5.46% were indifferent to it; 18.18% of the respondents strongly disagreed to the question; while lastly 4.55% of the respondent strongly disagreed to the question. Result on investigation on whether Nigerian GSM mobile phone users use it for pornography were presented in table 10 that up to 22.73% of the respondent strongly agreed to it; 40.91% of the respondents agreed; 9.09% were indifferent about it; 4.55% of the respondents disagreed with the question; while lastly 22.73% of the respondent strongly disagreed to the question. Table 10 also revealed that Nigerian GSM users use GSM phones for entertainment. Indications came from opinion that the respondents were 24.55% strongly agreed to it; 41.82% of the respondents agreed to it; 6.36% of the respondents were indifferent to it; 18.18% of the respondents disagreed with the question; while lastly 9.09% of the respondents strongly disagreed with the question. Likewise, the table revealed the result of investigation into the usage of GSM phone in academic research which showed that 45.46% of the respondents strongly agreed that GSM phone is used by Nigerians for academic research; 32.73% of the respondents agreed to it; 1.82% were indifferent to it; 16.36% of the respondents disagreed to the question; while 3.64% of the respondents strongly disagreed to the question.

More so, the result from the table also revealed that Nigerian mobile phone users deploy GSM phones in sending spam messages. Investigations from the opinion of the respondents showed that 23.64% of the respondents strongly agreed; 41.82% of the respondents agreed that GSM phones are used for spams; 7.27% were indifferent to it; 8.18% of the respondents disagreed to the question; while 19.09% of the respondents strongly disagreed to the question. Also from the table, result showed that 25.46% strongly agreed that Nigerian mobile phone users use GSM phones for retrieving of information; 32.73% of the respondents agreed to it; 5.46% of the respondents were indifferent to the question; 22.73% of the respondents disagreed to the question; while 13.64% of the respondents strongly disagreed to the question. Also, the result of the investigation of the opinion of the respondents revealed that 70.09% of the respondents strongly agreed that Nigerian mobile phone users use GSM phones for sending of SMS/MMS; 23.64% of the respondents agreed to it; 5.48% were indifferent to it; 0% of the respondents disagreed and strongly disagreed to the questions respectively. Investigations of respondents opinion as indicated in table 5 also showed that 25.46% of the respondents strongly agreed that Nigerian mobile phone user deploy GSM phones for literacy; 34.56% of the respondents agreed with it; 5.46 of the respondents were indifferent to it; 14.55% of the respondents disagreed to the question; while 20% of the respondents strongly disagreed to the question.

The table also revealed the investigations of GSM mobile users in Nigeria concerning the usage of GSM mobile phones for electronic mails. The investigation revealed that 41.82% of respondents strongly agreed that GSM phones are used for electronic mails; 33.64% of the respondents agreed to it; 6.36% were indifferent to it; 10% of the respondents disagreed to the question; while 18.18% of the respondents strongly disagreed to the question. Investigations from the opinion of the respondents as shown in the table revealed that 34.55% of respondents strongly agreed that Nigerian mobile users deploy GSM phones in accessing the Internet; 45.46% of the respondents agreed to it; 3.64% of the respondents were indifferent; 8.18% of the respondents disagreed and strongly disagreed respectively. Also, results from the table indicated that 13.64% of the respondents use GSM phones for Internet business; 40% agreed to it; 15.45% were

indifferent; 12.73% and 18.18% disagreed and strongly disagreed respectively. Lastly, investigation into if GSM users deploy GSM phones for e-banking revealed that 12.73% of the respondents strongly agreed; 41.82% of the respondents agreed to it; 9.09% were indifferent; 12.73% and 23.64% disagreed and strongly disagreed respectively. This implies that the majority of Nigerian GSM mobile users as indicated by the respondents believe that GSM mobile phones are used for service delivery in this areas of human endeavor.

Table 12: Respondents views on GSM Usage and Applications in Nigeria

Questions	SA	A	U	D	SD	Total
There is an explosive usage of GSM mobile phones in every areas of human endeavor?	42 (38.18)	58 (52.73)	6 (5.46)	2 (1.82)	2 (1.82)	110 (100)
That the usage of GSM mobile phones offers user anytime, anywhere access to network resources and information provided there is network connectivity without restricting them to fixed network infrastructures?	40 (36.36)	46 (41.82)	4 (3.64)	12 (10.91)	8 (7.27)	110 (100)
The evolving nature of GSM technology brings uncertainties and challenges to users as well as opportunities to provide new services and supplementary information to users in the locations where they find themselves?	46 (41.82)	60 (54.54)	2 (1.82)	2 (1.82)	0 (0.00)	110 (100)
With strong growth of both the internet and mobile telecommunication, there is migration to market end users applications on mobile devices?	66 (60.00)	34 (30.91)	2 (1.82)	6 (5.46)	2 (1.82)	110 (100)
As mobile devices increase in sophistication, the value of data that they carry is making them more valuable than many computers?	40 (36.36)	45 (40.91)	4 (3.64)	12 (10.91)	9 (8.18)	110 (100)
Providing services to mobile users from any place and at anytime is becoming the central requirement in the current information and communication technology market?	59 (53.64)	36 (32.73)	2 (1.82)	10 (9.09)	3 (2.73)	110 (100)
That GSM operators still have some products which they have to integrate to their network to make it more robust?	62 (56.36)	32 (29.09)	6 (5.46)	6 (5.46)	4 (3.64)	110 (100)
Nigerians are using GSM mobile devices in sending of spams messages which includes (phish, scam, adverts, jokes, chain letters) which is already constituting nuisance to an average mobile user?	44 (40.00)	48 (43.64)	2 (1.82)	8 (7.27)	8 (7.27)	110 (100)
That so many Nigerians are now using GSM mobile devices negatively for evil intent which includes sending dubious email an SMS messages with the intention of duping innocent Nigerian mobile users?	46 (41.82)	46 (41.82)	4 (3.64)	14 (12.73)	0 (0.00)	110 (100)

Result from table 12 shows that 38.18% of the respondents strongly agreed that there is an explosive usage of GSM mobile phones in every areas of human endeavor in Nigeria, 52.73% agreed to it; 5.46% of the respondents were indifferent to it; while 1.82% percent of the respondents disagreed and strongly disagreed respectively. The table also indicated that the usage of GSM mobile phone device offers users anytime, anywhere access to network resources and information provided there is network connectivity without restricting them to fixed network infrastructures: 36.36% of the respondent indicated that they strongly agreed to it; 41.82% agreed to it; 3.64% were indifferent to it; while 10.91% of the respondents disagreed to the question; and lastly 7.27% of the respondents strongly disagreed to the question. Table 12 revealed that the evolving nature of GSM technology brings uncertainties and challenges to users as well as opportunities to provide new services and supplementary information to users in the locations where they find

themselves. 41.82% of the respondents strongly agreed with it; 54.54% of the respondents agreed to it; 1.82% were indifferent to it; 1.82% of the respondents strongly disagreed to the question; while lastly 0.00% of the respondent strongly disagreed to the question. Result on investigation on whether with the strong growth of both internet and mobile telecommunications, there is migration to market end users applications on mobile devices were presented in table 12 which showed that up to 60.00% of the respondent strongly agreed to it; 30.91% of the respondents agreed; 1.82% were indifferent about it; 5.46% of the respondents disagreed with the question; while lastly 1.82% of the respondent strongly disagreed to the question. Table 12 also revealed that as mobile device increase in sophistication, the value of data that they carry is making them more valuable than many computers. Indications came from opinion that out of the respondents 36.36% strongly agreed to it; 40.91% of the respondents agreed to it; 3.64% of the respondents were indifferent to it; 10.91% of the respondents disagreed with the question; while lastly 8.18% of the respondents strongly disagreed with the question. Likewise, the table revealed that providing services to mobile users from any place and at any time is becoming the central requirement in the current information and communication technology market which showed that 53.64% of the respondents strongly agreed; 32.73% of the respondents agreed to it; 1.82% were indifferent to it; 9.09% of the respondents disagreed to the question; while 2.73% of the respondents strongly disagreed to the question.

More so, the result from the table also revealed that GSM operators still have some products which they have to integrate to their network to make it robust. Investigations from the opinion of the respondents showed that 56.36% of the respondents strongly agreed; 29.09% of the respondents agreed to it; 5.46% were indifferent to it; 5.46% of the respondents disagreed to the question; while 3.64% of the respondents strongly disagreed to the question. Also from the table, result showed that 40.00% strongly agreed that Nigerians are using GSM mobile devices in sending of spam messages which includes (phish, scam, adverts, jokes, chain letters) which is already constituting nuisance to an average Nigerian mobile user; 43.64% of the respondents agreed to it; 1.82% of the respondents were indifferent to the question; 7.27% of the respondents disagreed and strongly disagreed to the question respectively.

Lastly, investigation revealed that 41.82% of the respondents strongly agreed that so many Nigerians are now using GSM mobile devices negatively for evil intent which includes sending dubious email and SMS messages with the intention of duping innocent Nigerian mobile user; 41.82% of the respondents agreed to it; 3.64% were indifferent; 12.73% disagreed to the question and 0.00% strongly disagreed to the question. This implies that the majority of Nigerian GSM mobile users as indicated by the respondents believe that all the questions as indicated in the questionnaire above constitute GSM usage and applications in Nigeria.

VI. DISCUSSIONS AND FINDINGS

From the Tables above, it is evident that there is massive deployment of the usage of GSM mobile phone technology in day to day activities of a Nigerian flexible mobile phone user. Findings from the experiment also showed that the evolving nature of GSM technology brings uncertainties and challenges to users as well as opportunities to provide new services and supplementary information to users in the locations where they find themselves. However, in as much as GSM mobile communication can be used in the following areas of human endeavor which includes: news, calls, sports, pornography, entertainment, academic research, spamming, retrieving information, SMS/MMS, literacy, electronic mailing, internet business, e-banking, it is also necessary to observe from the findings that it's usage cut across both the negative and positive aspect of its' usages in the activities of a Nigerian mobile device user. Findings also revealed that as mobile devices increase in sophistication, the value of data that they carry is making them more valuable than many computers. That providing services to mobile users from any place and at any-time is becoming the central requirement in the current information and communication technology market. As a result, with strong growth of both the internet and mobile telecommunication, there is migration to market end users applications on mobile devices. One disturbing trend from the findings is the migration of Nigerian spammers and scammers to the usage of GSM mobile device platform to perpetrate all forms of fraud activities. This is shown in the findings from the experiment where many Nigerians are now using GSM mobile devices negatively for evil intent which includes sending dubious spam email and SMS messages with the intention of duping innocent Nigerian mobile users. With all this findings, results still shows irrespective of the negative usage of GSM mobile device that the Nigeria mobile market is still a harvesting ground for investors to deploy most of their mobile applications with the explosive usage of the technology in all areas of endeavor of a Nigerian mobile device user.

VII. CONCLUSION

The mobile telecommunication industry has and is still undergoing extraordinary changes globally. The coverage of the world's mobile networks is constantly on the increase as many more base stations are being deployed. It had been estimated in [12] that mobile phones and personal computer systems (PCs) subscriptions would reach above 8 billion by 2006. Interesting as the mobile industry expands, also the Nigerian mobile market with opportunities for ethical usage of it for service delivery in Nigeria. This ethical usage of GSM for service delivery will continue to increase while unethical usage could be curbed through government policies, technology and enabling laws to protect an innocent Nigerian mobile user. This study dealt with the increase usage of GSM mobile technology for service delivery in Nigeria. Based on the result, we can deduce that there is an increase usage of GSM mobile technology for service delivery in all areas of human endeavor in Nigeria. This implies that the growth in mobile technologies cum network expansion with the deployment of various apps would facilitate service delivery to Nigeria flexible mobile users where effort be made to curb the unethical usage through technology and government policies.

REFERENCES

- [1] G. Ibitola, "An Investigation into Multiple Service Provision Subscription among Global System for Mobile Communication Users in Nigeria", *Journal of Computing, Information Systems and Development Informatics*, vol. 3, No 4. 2012.
- [2] C. Albinus, "Perspective of GSM Technology", Vanguard Newspaper. 2013.
- [3] K. Gold, "Aggregate of the Impacts of Telecommunication Infrastructural Development on Nigeria Economy", *Proceedings of the 1st International Technology, Education and Environmental Conference*. 2010.
- [4] K. Ayo, and O. Babagide, "Designing a Reliable E-payment System: Nigeria a Case Study", *Journal of Internet Banking and Commerce*, vol. 11, No 2. 2007.
- [5] T. Akanbi, "Customer Perceptions of GSM impart on Service Delivery of Small and Medium Enterprises (SMEs) in Nigeria", *Journal of Emerging Trends in Economics and Management Sciences*, Vol. 4, No 1. 2013.
- [6] J. Wojuade, "Impact of Global System for Mobile Telecommunication in Nigeria Economy: A Case of some Selected Local Government Area in Oyo State Nigeria", A med thesis, University of Ibadan, Nigeria. 2005.
- [7] O. Andrew, "Impact of Mobile Phones on Rural Livelihoods Assets in Rural Nigeria", A case study of Ovia North East Local Government Area. 2011.
- [8] E. Moronfolu, "The Insider's guide to Mobile Web and Marketing in Nigeria", MobiThinking. 2012.
- [9] C. Monique, and L. Thomas, "An Agent-Based Middleware for Adaptive Roaming in Wireless Networks", 2006
- [10] F. Onifade, and B. Longe, "Mobile Agent Technology Enabled Recharge Systems for Efficient Bandwidth Utilization on Mobile Networks", *International Journal of Soft Computing*. 2009.
- [11] S. Oluwabusayo, "E-commerce will drive Nigeria's IGDP" <http://www.ventures-africa.com/2014/4/e-commerce-will-drive-nigeria-igdp-konga-ceo/> 2014.
- [12] I. Joseph, "Harnessing Telecommunications Revolution in Nigeria: A Case Study." *Wireless and Mobile Technologies* 1.1. 2013.