

# Citizens' Adoption of SMS Based E-Government Services in Lagos State, Nigeria.

F.O. Chete<sup>1\*</sup>; D. Oyemade<sup>2</sup>; R. Abere<sup>2</sup>; S.C. Chiemeké<sup>1</sup>; and I. Ima-Omasogie<sup>1</sup>

<sup>1</sup>Department of Computer Science, University of Benin, Benin City, Nigeria.

<sup>2</sup>Department of Computer Science, Federal University of Petroleum Resources, Effurun, Nigeria.

E-mail: [odichet@yahoo.com](mailto:odichet@yahoo.com)\*

## ABSTRACT

This research reports on a study carried out by Susanto and Goodwin (2010) which identified 15 (fifteen) factors influencing citizens' adoption of Short Message Service (SMS) based electronic government (E-government) services in twenty-five countries. It further reports on a paper based questionnaire survey, based on these factors, which collected responses from staff of Lagos State Ministry of Science and Technology and residents of Ikeja in Lagos State. A total of 50 (fifty) questionnaires were distributed and 47 (forty-seven) were returned and found usable. The questionnaire data was analyzed using Statistical Package for Social Sciences (SPSS). The results obtained from the analysis showed that there are considerable influences of the 15 (fifteen) factors on the citizen to use or reject the services. We found out that the mass media is the most effective means of informing and influencing citizens about the existence and benefits of SMS-based E-government services. Also, the notification services were identified as the most frequently used SMS services.

(Keywords: SMS, E-government, technology adoption, questionnaire, survey, services)

## INTRODUCTION

Despite the large number of E-government initiatives in developing countries, most of the initiatives have failed. Possible causes of the failures include: low Internet penetration, high Internet costs, and Internet illiteracy (Susanto and Goodwin, 2006).

Developing countries have many economic, political, and societal problems, which are exacerbated by their low per capita incomes. The system of government is considered to be one of the main causes of the problems. Learning from developed countries, developing countries believe

that using Information and Communications Technologies (ICT) to implement E-government has the potential to address the key barriers and challenges for achieving good governance. They believe E-government has the potential to boost efficiency, to enable new and improved services, to increase citizen participation and to create transparency. E-government is seen not just as tool or technology, but as a vehicle to deliver cultural change and a transformation that forces government to be transparent, efficient, accountable, and improve services (Ndou, 2004).

Despite the high flourish of E-government initiatives in developing countries, most of these initiatives have failed (Susanto and Goodwin, 2006). A survey by Heeks (2004) regarding the success and failure rates of E-government in developing and transitional countries, found that more than one-third of initiatives are total failures; half can be considered to be partial failures; and only about one-seventh are successful.

Heeks (2004) analysis showed that one of the critical failure factors of E-government projects is unrealistic design for the local environment. All E-government models implemented in developing countries, such as the Gartner model (Backus, 2001), the Universal Access Model, the Broadcasting/Wider-Dissemination Model, the Interactive Service Model, and the Comparative Analysis Model (Digital Governance, 2005), use the Internet as the base medium in all their phases. They recommend governments build an Internet infrastructure and urge people to use the Internet medium to access the system, even though it's found that low Internet penetration, high Internet cost, and Internet illiteracy still exist in developing countries.

Internet Illiteracy in African countries is not just limited to the uneducated people; there are a lot of university graduates and many office workers

who have never used the Internet (Chivhanga, 2005).

There are three reasons why utilizing SMS seems the logical approach for delivering E-government services in developing countries rather than the Internet: the number of SMS users is much higher, the SMS infrastructure is more extensive and the SMS price compared to the Internet is much lower (Susanto and Goodwin, 2006). In developing countries, Susanto and Goodwin (2006) argue that SMS-based E-government is more likely to increase E-government usage than the current Internet-based E-government SMS-based E-government may be defined as a strategy and its implementation involves the utilization of SMS technology, services and applications for improving benefits to the parties involved in E-government including citizens, business, and government institutions. It may address the existing design-reality gap between the commonly proposed channel (the Internet) and the real ICT situation in developing countries which is high Internet illiteracy, lack of Internet infrastructure, high Internet cost, and low affordability (Susanto and Goodwin, 2006; Basu and Norris as cited in Dada 2006).

In developing countries people are more familiar with SMS than the Internet, the number of SMS users is much higher, the SMS infrastructure is more extensive, SMS costs are lower than Internet costs and mobile phones are much more affordable than PCs. For these reasons SMS could be the more appropriate channel to deliver E-government services in developing countries (Susanto and Goodwin, 2006). Additionally, SMS-based E-government has proven benefits.

Providing public services through the SMS channel significantly reduces time and cost; introduces a cheaper, easier and faster information-accessing channel; improves transparency, accountability, communication, and the relationship between government and citizens; makes the services and procedures easier for the citizens to use; improves the political image of the district, engages more people and increases citizens participation, and promotes E-democracy (Lallana, 2004; Rannu and Semevsky, 2005; Bremer and Prado, 2006).

An SMS-based E-government system may have four types of SMS delivery (Ray as cited in Satriyantono, 2001):

- Pull SMS: Users can request services by SMS from a wireless handset then the requested service is sent back to the handset via SMS. This approach has been demonstrated in other services such as users requesting ring tones or games by SMS.
- Push: Event based SMS: an SMS message is sent to the user activated by event-based application; for example a confirmation SMS may be sent to citizens whenever their personal data in the government's database is altered.
- Push : Scheduled SMS: an SMS message is sent to a user activated by a time schedule-based application; for example a tax notification-SMS may be sent to particular citizens when nearing the due date (quarterly, half yearly or annually).
- Push: Personal Profile: an SMS message is sent to the user activated by applications based on profile and preferences of the user; for example an SMS about childcare benefit information may be sent to parents who satisfy the conditions for receiving childcare benefits.

This research reports on a study carried out by Susanto and Goodwin (2010) which identified fifteen factors influencing citizens adoption of SMS based E-government services in twenty-five countries. It further reports on a paper based questionnaire survey, based on these factors, that collected responses from staff of Lagos State Ministry of Science and Technology and residents of Ikeja in Lagos State,

## **SMS-BASED E-GOVERNMENT IN DEVELOPING COUNTRIES**

Susanto and Goodwin (2006) outlined some SMS-based E-government initiatives in developing countries as follows:

### **SMS for Work**

In Kenya, people use text messaging services to look for work. The job seeker registers with the service, then each time the system gets a new job advertisement an SMS vacancy alert is automatically sent to the job seeker's phone.

### **SMS Link to Voters**

In South Africa, Patricia de Lille, the leader of the Independent Democrats, has launched an SMS service to keep in contact with her voters. Any member of the public can participate by sending messages or queries to her on topical national issues. SMS polls are conducted whereby South Africans can instantly vote on controversial subjects. The party also contacts voters by SMS, for example to organize a rally about a public issue.

### **SMS for Public Convenience and Public Relations**

In June 2005, Indonesian President Susilo Bambang Yudhoyono created an SMS hotline for complaining directly about red tape or inept officials; the line soon crashed as it was inundated by thousands of SMS text messages and calls. In India, the government has tied up with cellular service providers to send SMSs to all their subscribers regarding the date of implementation of new laws, such as the compulsory wearing of helmets.

### **SMS for Public Health Care**

In 2005, Indonesia's Health ministry launched an SMS hotline to let the public report disease outbreaks and lodge complaints about health care using mobile phone text messages in an effort to get information as soon as possible.

### **SMS for the Environment**

In the Philippines, the TXTUSOK system lets citizens report vehicles emitting excessive smoke from their exhausts as part of the Clean Air law. Also, in Quezon, Philippines, citizens can communicate with their garbage collection services via SMS and report the need for an additional collection of rubbish in order to improve the efficiency of garbage collection.

### **SMS for Disaster Warning**

Malaysia installed 313 automated measuring devices (sponsored by the Ministry of Agriculture) in critical areas to warn of flooding. These devices send a message to the central monitoring station which then warns citizens in crisis areas by SMS

### **SMS for Tax Services**

In Sisli Municipality, Istanbul, Turkey, citizens can pay their taxes via SMS using their credit cards and ID numbers.

### **SMS for Fighting Against Crime**

In Manila, Philippines, citizens can report suspicious activities to police via SMS and receive SMS hints about increased crime in given areas.

### **SMS for Education**

SMS applications have been developed for education in developing countries, such as in De La Salle University, Manila. Via SMS students can find out whether their lesson is cancelled or get more information about dates/times of their tests, examinations.

### **SMS Auctions**

In China, the SEO4 Mobile service provides an auction system for public. Via their mobile phone, bidders can join the auction by running a search using keywords and receive an MMS message with suitable products; then they can use SMS to place their bids.

## **CLASSIFICATION OF SMS-BASED E-GOVERNMENT SERVICES**

By investigating currently existing SMS-based E-government applications among local authorities in developed and developing countries, Susanto, Goodwin and Calder (2008) proposed a model to represent the available SMS-based E-government services. The model suggests that SMS-based E-government services can be classified into six levels based on the service offerings: Listen, Notification, Pull-based Information, Communication, Transaction, and Integration.

Instead of stage or step, the proposed model uses the term level since it represents the available service offering and not the direction of the systems' evolution, each level is independent of the others and can be complementary each

other (one/more level can be added into another level). The authors submitted as follows:

### **Listen Level**

Here, current SMS-based E-government applications which have been widely used by governments can be classified to listen to citizens' opinions, reports, and complaints. Most of the systems in this level use SMS to enable citizens to send messages directly to government authorities. However, these systems are not designed to reply to the input-messages or to inform the sender of the following actions. This one-way communication mode from citizens to government is categorized as the Listen level.

Citizens can bring their concerns directly to relevant government authorities by sending messages such as complaints about government services, projects, opinions about new policy; enquiries about new programs; or reporting about corruption. All of the input-messages are classified and forwarded to the right departments or officials to take action. However, most of the systems do not acknowledge receipt or inform the senders about the following actions.

The main benefit contributed by this level is accessibility. Citizens have a channel to share or broadcast their views on important issues directly to their government. It contributes to the citizens' empowerment. However, the lack of responsiveness and transparency, as well as protection for the senders' privacy and security prevent the public from actively participating in using these services (Signo, 2006).

### **Notification Level**

In this level, current SMS-based E-government systems have enabled one-way communication from government to citizens. The government is able to notify citizens about their personal information and to broadcast important public information. This model classifies these applications as Notification level in this level using Push-based mechanism, which sends the messages to citizens activated by data on the server, not by a user's request.

Delivering notification services to the public in this level makes citizens in the place as customers. The systems enable citizens to get the information

easily, conveniently, on time, cheaply, and often free. In addition, citizens are informed about and more involved in the activities of government (the transparency benefit), making the government more accountable to its citizens. Privacy is a common issue in this level should all mobile phone users be included in the services automatically or only with their permission. Another issue is that information services may not match the needs of citizens.

### **Pull-Based Information Level**

Current SMS-based E-government systems also provide two-ways communication that enables citizens to access public or personal information by sending a request-message. The services use the pull method: citizens send a 'request SMS' to the service and the replied service is sent back to the sender's handset via SMS. The information options provided by services in this level are limited and the request-text must be in a certain format.

The dominant benefits delivered by this level are accessibility, availability, responsiveness, and timeliness. Citizens can access their personal or public information any time anywhere. Some challenges in this level include how to provide cheap or even free notification services, how to choose the information services which are really needed by citizens and how to provide a simple, easy to use and remember request message formats.

### **Communication Level**

There are some existing SMS-based E-government systems that provide two-way communication between government and citizens in which the people can inquire, complain or report about anything (without worrying about the text format) and get responses/replies immediately. This level is the Communication level.

Since it enables citizens to express their opinion, comment or query to the government using sentences without worrying about the text format and getting the reply immediately, this level offers more benefits in accessibility, availability, responsiveness, courtesy and helpfulness, usability, timeliness, accountability, and transparency. Potential issues at this level are

low protection for privacy and security of the senders, and lack of the assurance of fast and effective response to any input-messages.

### **Transaction Level**

Some SMS-based E-government systems can process transactions. Through these systems citizens can pay bills and send or update their personal data through SMS.

Since citizens can do any transaction (money and data) with the government agencies anytime anywhere in a secure channel, this level offers more benefits in the accessibility, availability, accuracy, responsiveness, courtesy and helpfulness, timeliness, trust, privacy, and security. However, trust and security are still the dominant issues.

### **Integration Level**

The ultimate level of this model is when all the SMS-based systems are integrated and organized in a single portal so people just send messages to a single service number for all services. This level predicts the integrated-SMS systems will be also integrated with the Internet/web-based E-government systems so citizens have options whether accessing the services by sending SMS to one number or through the Internet at one web address. The SMS and the Internet may complement each other in a service, for example: a citizen may send form or pay a public service electronically by Internet and get notification via SMS, or pay the services through SMS and get the receipt by email.

This level, as the ultimate level is expected to accommodate all of the benefits of mobile governments including value for money, high quality of service, efficient transaction, and strategic data benefits. Interoperability among the SMS-based systems, databases, and the Internet-based systems will be a potential issue

## **FACTORS INFLUENCING CITIZENS ADOPTION OF SMS-BASED E-GOVERNMENT SERVICES**

Susanto and Godwin (2010) conducted a web-based survey, paper-based questionnaires, and phone-call interviews that collected 159

responses from 25 countries. The results indicated that there are 15 perceptions toward using SMS-based E-government services that may influence citizens to use or to reject the services. They submitted as follows:

### **Simplicity**

Citizens use SMS-based E-government services because they believe that the services are easy to use. The degree to which an individual perceives that an SMS-based E-government service is free of difficulty to use is defined as perceived ease of use. That is the services are simple, easy to access and easy to use. The more citizens perceived that an SMS-based service is easy to use the more likely they are to use the service (Susanto and Goodwin, 2010). The simplicity of SMS-based E-government services, the authors submitted, should cover the procedure to register for and to unsubscribe from the services, the information on how to use the services, the steps taken to get the information, and the reply message.

To make sure the registration for an SMS-based E-government service is easy for all citizens; the system should enable people to register through various channels such as SMS, Internet (web-based form) or phone. The registration data should be simple and easy to fill in. A number of options for unsubscribing from receiving Notification services should also be available for users.

### **Perceived Value for Money: Citizens are Sensitive to SMS Cost**

Some of the respondents had perceptions that SMS is cheap; this is one of the reasons why they used SMS-based services. This explains why some respondents rejected services which charged users more than the standard SMS cost. The Perceived value for money factor also relates to the perceived comparison between SMS and phone call cost. Some respondents did not use the SMS-based service if they could make a phone call at low cost for unlimited time.

They expect SMS-based E-government services to be free or cheaper than phone calls. The degree to which an individual perceives that an SMS-based E-government service is better value

for the amount paid is defined as perceived value for the money.

### **How much Time and Effort Could be Saved by using the Service?**

This is the degree to which an individual perceives that the service will reduce the time spent and effort to go to the public service office or to use another channel. Respondents said that they prefer to use SMS-based services because they are quick, take less time and provide faster services than the traditional services and the Internet channel. In order to be accepted government should ensure that their SMS-based services require less time and effort compared to other E-government channels.

### **Perceived Responsiveness: People do not Want to Talk with a Machine**

One of the advantages of SMS-based E-government channel is that people feel that they communicate with the government person-to-person. Some respondents used the service because they perceive they communicate directly with the decision makers. However, as a consequence of the person-to-person perception, users of SMS-based services expect a quick reply. When they do not get any replies or responses, they reject the services. The degree to which an individual believes that his or her SMS will be responded by government quickly, appropriately and satisfactorily is defined as the perceived responsiveness. The higher the perceived responsiveness toward an SMS-based service, the more likely the person will use the service.

### **Perceived Usefulness: Does the Service Really Address Citizens' Needs?**

This factor is defined as the degree to which a citizen believes that using the SMS-based E-government service will help them to get what they want and make their life easier. Before deciding to use a service, the respondents wondered whether or not the SMS-based service provides information or functions relevant to their needs. If the service is relevant and satisfied their needs, they are likely to use the service.

### **Perceived Convenience: Is the Service Easy to Access Anywhere and Anytime?**

A factor that influences citizens to use SMS-based E-government services is perceived convenience. It is associated with the degree to which a citizen perceives that the services can be accessed anytime and anywhere.

### **Trust in SMS Technology**

Some respondents perceive that the SMS channel is concise and accurate. On the contrary, respondents who did not use the services had perceptions that SMS is an informal channel so government would not pay serious attention to their messages, the number of characters in an SMS message is too limited to send a message, and they do not trust SMS security. The degree to which a citizen believes that using an SMS channel is safe and will not initiate any problems for him or her is one of the factors that influence citizens to use SMS-based E-government services and it is defined as the trust in the SMS technology.

### **Perceived Relevance, Quality and Reliability of the Information**

People tend to reject Notification and Pull SMS services when they find that the information is not updated, is not relevant to their needs, unclear, imprecise, insufficient in detail, not accurate, and of no value. The degree to which a citizen perceives that the information is relevant for him or her, reliable and of high quality is another factor which influences citizens to use or to reject an SMS-based E-government service.

### **Perceived Risk to User Privacy**

Respondents who used SMS-based services for sending complaints and reports to local authorities said that they used the services because they do not have to meet person-to-person and disclose their names or other personal information. People who did not use the service were worried that the agency or the SMS service provider will sell their mobile numbers or data to other organizations and businesses or use the information for other purposes. The degree to which a citizen perceives that using SMS-based E-government services and dealing

with the government agencies may divulge his or her personal information and pose problems for his or her privacy (perceived risk to user privacy).

### **Perceived Reliability of the Mobile Network and the SMS-Based System**

The degree to which a citizen is confident that his or her mobile network is reliable when using an SMS-based E-government service and the SMS-based system is also reliable are other determinants toward using SMS-based E-government services.

Some respondents did not use the services because they were not confident that mobile networks provided the coverage and good connection performance needed to use SMS-based E-government services. The performance of the SMS-based system itself also influences citizens, especially the response time and reliability of the services.

### **Trust in the Government and Perceived Quality of the Public Services**

Some respondents of the survey did not use the service because they did not trust on the government and perceived that the quality of public services is poor. Since they found that the traditional public services were poor, they were skeptical that the electronic-services would be better. Moreover, the low accountability of the government made citizens afraid of sending reports, suggestions or even complaints. Instead of getting solutions from government, they believed that their messages might cause problems for them.

### **Perceived Risk to Money**

This refers to individuals' belief that using the service might cause some financial problems. Respondents stopped using SMS-based E-government services when they had the experience of receiving an unwanted SMS message for which they were charged. They are also worried about SMS fraud and risks.

### **Availability of Device and Infrastructure**

Respondents pointed out that they used the SMS-based E-government services because they have a mobile phone and a mobile network is available for it. The degree to which an individual believes that the device and infrastructure for using SMS-based E-government services is available for them is another determinant of the services' usage.

### **Perceived Compatibility**

The degree to which a citizen perceives that the service is consistent with the existing public service channels and the popular communication media is referred to as perceived compatibility. Some respondents rejected available SMS-based E-government services simply because they do not use SMS; they use the Internet. People tend to use a new technology or service when it is consistent with the existing values and past experience of users.

### **Self-Efficacy in using SMS**

The degree to which an individual perceives his or her ability to use SMS is one of the factors which influence a citizen to use or not use an SMS-based E-government service. Some respondents did not use the services simply because they had no idea of how to use SMS.

## **RESEARCH APPROACH**

In this study, the descriptive survey design was used as a research design in which a sample of subjects was drawn to sample opinions from the population. The population for this study includes citizens of Lagos State and Lagos State Ministry of Science and Technology. The reason for choosing these populations is because the online government platform in Lagos State is the responsibility of the Ministry of Science and Technology, while the citizens make use of the services provided by the government.

The sample size consists of 50 subjects of whom questionnaire were distributed to, but only 47 questionnaires were returned, filled correctly and found usable for the analysis 47 subjects consists of 20 (42.6%) of respondents from the citizens of Lagos State and 27 (57.4%) of respondents from

the Ministry of Science and Technology, Lagos State.

The research instrument used in this study is the Questionnaire. The questionnaire was designed to help get answers to the questions raised in this study. The questionnaire designed for this study consists of four (4) sections.

**Section A:** consists of questions which contain background information (such as sex, age and highest educational level) of the respondents.

**Section B:** consists of questions requiring information about knowledge of E-government of respondents. The respondents were provided with a set of questions which had answers (options) and were required to choose the one that closely represents their view.

**Section C:** consists of questions requiring information about knowledge of SMS. The respondents were also provided with a set of answers and were also required to choose the one that closely represents their view.

**Section D:** consists of questions requiring information about factors that may influence citizens to use or reject the services. The respondents were provided with a set of answers for each question and were required to choose the one that closely represented their view.

All questions in the questionnaire are close-ended and the respondents made judgments based on responses ranging from Yes, No; to the kinds of services that they (respondents) have used in Section C.

Data collected was analyzed using statistical software known as Statistical Package for Social Sciences (SPSS) version 17.0.

## RESULTS AND DISCUSSIONS

Results revealed that many respondents are aware of E-government and also that it is a more accessible way of public interaction with government for delivery of services which may be expensive. The study also revealed that a majority of the respondents have mobile phones and mobile network available to them. The respondents also know what an SMS is and can use it. The study also revealed that receiving SMS

notification, such as bills, news update is one of the commonest kinds of services offered by SMS-based E-government. It also showed that mass media is the major influencer for citizens' use of the service. It revealed that the SMS-based E-government service is free of difficulty of use, time and effort efficient, it addresses the needs of the citizens, easy to access anywhere and anytime, it can also deliver internet-based E-government services and could also fulfill the typical E-government use and also that SMS cost is cheap. While the SMS-based E-government services have the above advantages, it faces some challenges: SMS requests are not promptly attended to, citizens don't trust the SMS technology as regards privacy of personal information, amongst others.

## CONCLUSION

To design and thereafter deliver SMS-based E-government services, the government should consider the hopes and perceptions of citizens toward the services. This study revealed that SMS-based E-government services is influenced by the fifteen (15) factors identified by Susanto and Goodwin (2010) which include: perceived ease of use; perceived efficiency in time and distance; perceived value of money; perceived usefulness; perceived convenience; perceived relevance, quality and reliability of the information; trust in the SMS technology; perceived risk to user privacy; perceived reliability of the mobile network and the SMS-based system; trust in government and perceived quality of public services; perceived risk to money; perceived availability of device and infrastructure; perceived compatibility; and perceived self-efficacy in using SMS.

Government should focus on the following factors to promote and influence the use of SMS-based E-government services; perceived ease of use, perceived efficiency in time and distance, value for money, perceived convenience and perceived availability of device and infrastructure. In addition, they should also address the following factors that may discourage citizens from adopting the SMS-based E-government services; perceived usefulness, perceived responsiveness, perceived relevance, quality and reliability of the information, trust in the SMS technology, perceived risk to user privacy, perceived reliability of the mobile network and the SMS-based system, trust in the government and



perceived quality of public services, perceived risk to money, perceived compatibility and self-efficacy on using SMS.

The research found that mass media is the most effective means of informing and influencing citizens about the existence and benefits of SMS-based E-government services. To improve the effectiveness of advertising, government should involve families and friends of the target users and use opinion leaders such as experts, public figures, teachers (lecturers) and government officials.

The Notification services are the most frequently used followed by Pull SMS, Listen and Transaction SMS Services. Notification services could be an appropriate starting point for government who want to establish SMS-based E-government services.

In conclusion, the study shows that the challenges faced by the SMS-based E-government are not enough reasons why the SMS-based E-government service cannot be implemented, because on the long run the gains of SMS-based E-government services will outweigh these challenges. With the existence of the present e-government service, it is expected that within a short time, SMS-based E-government service will be implemented.

## RECOMMENDATIONS

Though SMS-based E-government services are still developing, in the present system, government can put into effect a functioning SMS-based e-government platform that would enable effective service delivery.

In order to increase the usage of SMS-based E-government services, government should make citizens aware of and provide information about the services by organizing advertising campaigns on in all mass media channels. The advertising campaign should involve family and friends of the target users and be delivered by experts, public figures and teachers (lecturers).

Government should address the fifteen (15) perceptions ("belief factors") about SMS-based E-government services. This should give citizens positive attitudes towards using the services which will lead to intention to use of SMS-based E-government services.

With the above recommendations put into effect, government can now deliver services effectively.

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