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Modelling brand loyalty in the Nigerian telecommunications industry

Henry Inegbedion[a] and Eseosa Obadiaru[b]

[a]Department of Business Studies, College of Business and Social Sciences, Landmark University, Omu Aran, Nigeria; [b]Department of Banking and Finance, College of Business and Social Sciences, Landmark University, Omu Aran, Nigeria

ABSTRACT

The study examined 'Modelling brand loyalty in Nigerian telecommunication Industry'. It sought to ascertain the retention capacity of major and other telecommunication service firms in Nigeria using time varying Markov chain analysis The conclusive research design was adopted and the population of the study consisted of customers of MTN, Airtel, Globacom, 9Mobile, and other telecommunication service providers in Kaduna state university, Ambrose Ali University, University of Benin, University of Abuja, University of Lagos, University of Ilorin and University of Port-Harcourt (all in Nigeria) and some online respondents from 20 different organisations across the six geopolitical zones in Nigeria. Research data were elicited from the respondents with the help of questionnaire. Out of a total sample size of 7600 respondents that were served, 4736 (62.3%) completed and returned their questionnaires. The research findings showed that on the long run if the pattern of retention and losses continues in this manner, 21% of the GSM subscribers in Nigeria will be loyal to MTN, 27% to Airtel, 35% to Globacom, 16% to 9Mobile, and 1% to others.

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KEYWORDS
Brand loyalty; brand switching; Markov Chain; GSM service providers

1. Introduction

Consumer loyalty is critical to the going concern of every business. It guarantees a firm's returns on the short-run and long-run and provides the basis for the attraction of future customers and hence, the consolidation of the firm's returns. Increasing customer disloyalty can threaten the going concern of a firm and thus precipitate its collapse. Customer loyalty subsumes attitudinal loyalty; willingness to recommend the company to others, commitment to the company, demonstrated by a resistance to switch to a competitor (Kumari & Patyal, 2017; Magatef & Tomalieh, 2015; Ramachandran, 2015), and behavioural loyalty (repeat purchasing, purchasing more and different products or services from the same company, as well as recommending the company to others (Ganiyu, Uche, & Adeoti, 2012; Kumari & Patyal, 2017; Ramli & Sjahruddin, 2015). The implication is that consumer loyalty is the foundation

CONTACT Henry Inegbedion inegbedion.henry@lmu.edu.ng, henryegbezien@gmail.com

for business success. A loyal customer is entirely devoted or faithful to the usage or patronage of a particular brand irrespective of the competition from the other brands.

Telecommunication is a vital infrastructure that contributes to success of businesses through the facilitation of communication between individuals and groups within and outside organisation premises in any economy. The introduction of the global system of telecommunication (GSM) at a time the orthodox telecommunication system, anchored by Nigeria Telecommunications (NITEL), had become moribund was greeted with widespread optimism by all and sundry in Nigeria. The widespread consumer optimism was informed by NITEL's failure to meet scustomers' expectations coupled with their disregard for quality customer services even before it became moribund. However, barely two decades after the introduction of the GSM, it is doubtful if GSM customers in Nigeria have any reason to be loyal to any particular brand, given the rate at which consumers change brand and the number of mobile telephone (GSM) lines that many consumers control. Furthermore, there seems to be a persistent price war between the major service providers in the industry in Nigeria which may not be unconnected with the oligopolistic nature of the industry and the perceived high switching rate among consumers (Chidiebere, 2017; Obayemi, 2014; Penelope, 2016). To this end, this study sought to investigate the proportion of consumers (subscribers) that will remain loyal to the various GSM service providers in the Nigerian telecommunication industry on the long run.

Research has shown that loyal customers are very important to business enterprises and the telecom sector is not excluded. The importance of brand loyalty has made the topic to attract the attention of many researchers overtime. Among those that examined the problem in recent times are Aamir, Ikram, and Zaman (2010), Adeyeye, Smart, and Kehinde (2012), Afzal et al. (2013). Ashfaq (2015), Hussain and Rizwan (2014), Bairagi and Kakaty (2016), Lam, Ahearne, Hu and Schillewaert (2010), Saleh, Althonayan, Alhabib, Alrasheedi, and Alqahtani (2015), Shaban, Yao, Bin Daru, and Alkateeb (2017), Susanti (2015), Uslu and Cam (2014), Uturestantix and Gallato (2013), Venkatesh, ShankarKrishna and Murthy (2004), and Gezane (2004). However, most previous studies on consumers loyalty employed homogeneous Markov modelling (Aamir et al., 2010; Adeyeye et al., 2012; Bairagi & Kakaty, 2016; Gezane, 2004; Uslu & Cam, 2014) while regression (Afzal et al., 2013; Susanti, 2015 and Shuklar, 2004) and correlation (Njoku, Nduka, & Okocha, 2015) were employed to determine the factors that influence brand loyalty. Despite the time varying influence of consumers' attitude on brand loyalty owing to changes in consumers' taste and influence of competitors, it is doubtful whether any of the recent studies utilised time varying Markov model in investigating brand loyalty; besides, studies on brand loyal customers in the Nigerian telecommunications industry are virtually non-existent. For a sector that contributes a quarterly average monetary value of about N1.580Trillion, representing 9.8% to the Nigerian GDP (National Bureau of Statistics, 2016) and an annual average value of N6.32 trillion to the GDP, it is important to know the structure of subscribers' loyalty behaviour to GSM service providers in Nigeria; this will enhance the implementation of proactive actions in the interest of the GSM firms. The non-availability of such studies is a significant omission. This study sought to fill these gaps.

1.1. Objective

This study aimed to examine consumer brand loyalty in the Nigerian telecommunication industry using Markov modelling. Specifically, it sought to use Markov chain modelling to

investigate consumers' loyalty to major and other telecommunications service providers in Nigeria. Thus, it sought to determine: the retention capacity of major (MTN, Airtel, Globacom and 9Mobile) and others(Starcom, Visafone and Multilinks) telecommunication service providing firms in Nigeria through the computation of transition probability matrices for seven consecutive years (2011–2017) as well as the computation of the ultimate market shares of these firms using time varying Markov chain analysis.

Research questions

(i) To what extent are the customers of GSM loyal to any service provider in Nigeria?

(ii) To what extent is the retention capacity of GSM service providers in Nigeria adequate?

Hypotheses

Hypothesis 1: Retention capacity of the GSM service providers in Nigeria is low

Hypothesis 2: GSM Customers in Nigeria are not very loyal to any service provider

2. Literature review

2.1. Conceptual review

Loyalty has been defined by several authors but the central theme remains the same. Mellens, DeKimpe, and Steenkamp (1996) see it as a biased response towards a brand or product expressed over a period of time and which is reflective in the purchase pattern of a decision-making unit. This decision-making unit may be an individual, a household or a firm. Brand loyalty is a consumer's preference to buy a particular brand in a product category owing to his perception that the brand offers the right product features, images or level of quality at the right price. Such perception may translate into repeat purchase resulting in loyalty (Ishak & Abd Ghani, 2009). Brand Loyalty is therefore related to a customer's preference and attachment to a brand. It may occur due to a long history of using a product and trust that has developed as a consequence of the long usage. To this end, the concept of brand loyalty has a close relationship with the preferences of consumers or their buying behaviours.

Setyawan and Imronudin (2015) see brand loyalty as a component of brand equity and brand equity has five categories; brand loyalty, name, awareness, quality, and brand association. Furthermore, Nenadal (2015) as well as Lau and Lee (2000) opine that loyalty is a behaviour of buying intention. Loyalty is continued used of a company's product or service and the attitude of customer toward that particular organisation given its product and services. Kumar and Shan (2004) classified consumer loyalty into attitudinal and behavioural loyalty. The difference between attitude and behaviour relates to the selection of particular product and services. Many other authors agree that consumer loyalty consist of the attitude and behaviour of customer; they include Chaudhary and Holbrook (2001), Bowen and Chen (2001), Ramli and Sjahruddin (2015), as well as Kumari and Patyal (2017). Attitudinal Loyalty is defined as customers' positive feeling about product and service they use and attempt to influence others to use it by recommending it to them (Chaudhary & Holbrook, 2001). Flowing from this reasoning, consumer Loyalty can be measured through consumer intention to recommend positive things about the service provider, intention to encourage friends and relatives to do business with the service provider, intention to carry on purchasing

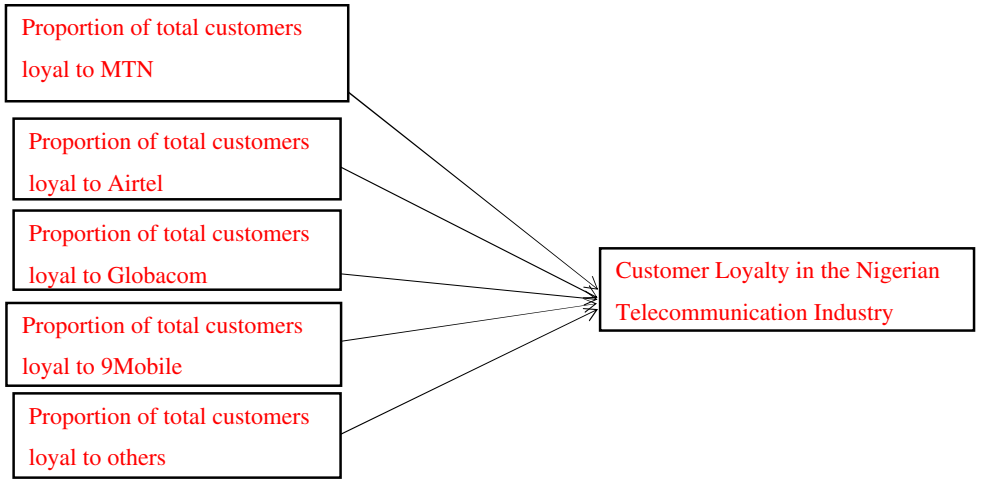

Figure 1. Conceptual model (Authors' proposition, 2017).

services from existing service provider and intention to purchase additional service from same service provider (Ramli & Sjahruddin, 2015). Attitudinal Loyalty can be a commitment or trust to a company which may not have to result in any purchase (Kumari & Patyal, 2017). Customer Loyalty becomes important to an organisation when its results in repurchase behaviour and thus generates indirect and tangible returns which attitudinal loyalty does not (Ramli & Sjahruddin, 2015). This dimension of loyalty is the behavioural loyalty and it is critical to a company's propensity to generate profitability. Thus, behavioural loyalty refers to the customers' intention to repurchase and patronise the product or service (Chaudhary & Holbrook, 2001).

2.1.1. Conceptual framework

This study investigates the proportion of the market shares owned by the GSM service providers in Nigeria on the long run. The value of this equilibrium proportion to a particular service provider is enhanced by consumers' repeated patronage or repurchases behaviour; which is a function of their behavioural loyalty. Therefore, this study adopts the behavioural dimension of loyalty as its framework (Figure 1).

2.2. Empirical review

A number of authors have explored brand switching and brand loyalty in recent times and examined the problem from various dimensions. Bairagi and Kakaty (2016) used homogeneous Markov Model to explain the Brand Loyalty of consumers towards the different brands of beverages in Nagaon district in Assam. They forecasted that on the long-run the brand Horlicks will dominate the future market share with 48.58%, Bourn vita will have the second highest market share with 19.86%, and Complan will have 12.77%; while Boost, Viva, and Others brands will have 8.17, 3.92, and 6.70% market share, respectively. Uslu and Cam (2014) analysed brand loyalty to sports shoes using Markov chains in line with its use for forecasting long-term market shares in oligopolistic markets. They were able to predict customer loyalty through the computation of ultimate market shares of the different brands of sport shoes

with homogeneous Markov chains method using a sample of 531 undergraduate students in Istanbul, Turkey. Adeyeye et al. (2012) modelled brand switching behaviour towards soft drinks in Nigeria examining the relevance of product attributes to switching rates with reference to three brands of soft drinks. They employed homogeneous Markov chains to determine the brand loyalty of the consumers of the soft drinks and the future market shares on the long run. They found that the consumers exhibited highest brand loyalty towards Fanta. Aamir et al. (2010) investigated customers' switching in four mobile phone service providers (Ufone, Telenor, Zong, Mobilink, and Warid) in Pakistan focusing on the marketing strategies used to enhance customer loyalty/satisfaction in five major mobile services providers in Pakistan. A random sample of 292 respondents was used. Results showed that the market shares were 48.3, 17.1, 14, 5.8, and 8.9% for Ufone, Telenor, Zong, Mobilink and Warid, respectively. Furthermore, it was found that customer satisfaction ultimately results into customer retention.

Susanti (2015) modelled brand switching of blackberry smartphone in Indonesia to examine the influence of consumer dissatisfaction and brand loyalty and generation on brand switching using 100 respondents of Blackberry users from three generations and using logistic regression model. Results showed that consumer dissatisfaction and generation significantly affect brand switching behaviour.

Shaban et al. (2017) reviewed important brand loyalty influencing factors. They found that trust and perceived quality were the most frequently researched factors in previous studies. Other factors were satisfaction, benefits of using the product, brand awareness, brand commitment, switching cost, attitude towards brand and perceived value.

Saleh et al. (2015) investigated customer satisfaction and brand switching intention of mobile services in Saudi Arabia with a view to ascertaining the relationship between customer satisfaction and brand switching intention in the Saudi Arabian mobile-service market. Survey method was used on a convenience sample of 350 online respondents. The results showed that customer satisfaction significantly influences brand switching intention. Service pricing, service quality and customer service were found to be critical determinants of customer satisfaction with mobile-services.

Results of the empirical review indicate that consumer brand loyalty can be investigated through Markov chain modelling (Aamir et al., 2010; Adeyeye et al., 2012; Bairagi & Kakaty, 2016; Uslu & Cam, 2014); and the major factors that influence customers' brand loyalty are customer service (Saleh et al., 2015), service pricing (Ashfaq, 2015; Saleh et al., 2015), customer satisfaction (Aamir et al., 2010; Hussain & Rizwan, 2014; Susanti, 2015; Venkatesh et al., 2004), service quality (Saleh et al., 2015), Utilitarian value (Hussain & Rizwan, 2014), brand image (Ashfaq, 2015), as well as relative customer–brand identification and perceived value of the incumbent (Lam et al., 2010).were transformed into a Markov Matrix

2.3. Theoretical framework

Markov chain model served as the framework of the study because the transition probability matrix which has the Markov property is useful in the determination of retention and hence, customer loyalty and switching. Besides, Markov chains, applied in marketing problems, are principally used for brand loyalty studies and Markov chains are strong techniques for forecasting long term market shares in oligopolistic markets (Uslu & Cam, 2014).

A Markov Process is a Stochastic Process whose dynamic behaviour is such that probability distribution of its future development depends only on its present state and not how the process arrived in that state. Stochastic matrices are closely connected with Markov chains.

If S is a finite set with n elements $\{X_1, X_2 \ldots, X_n\}$, then, S; is called the state space; while the elements $\{X_1, X_2 \ldots, X_n\}$ are the state values

In a Markov model, random variables move among a finite set of states in a sequence of trials at discrete points of time. For the brand switching problem, the variables are subscribers or customers. The finite set of states, denoting the set of service providers or competitors, is defined as the state space, S (Chan, Lenard, & Mills, 2013).

$$s \in S,\ S = \{s_1, s_2, \ldots, s_{m-1}, s_m\},\ M < \infty$$

A Markov chain $\{X_t\}$ on S is a sequence of random variables on S that have the Markov property. This means that, for any date t and any state $y \in S$,

$$\mathrm{P}\{X_{t+1} = \mathrm{y} | X_t, X_{t-1}, \ldots\} = \mathrm{P}\{X_{t+1} = \mathrm{y} | X_t\}$$

In other words, knowing the current state is enough to know probabilities for future states.

In particular, the dynamics of a Markov chain are fully determined by the set of values.

$$\mathrm{P}(\mathrm{x}, \mathrm{y}) = \mathrm{P}\{X_{t+1} = \mathrm{y} | X_t = \mathrm{x}\}; (\mathrm{x}, \mathrm{y} \in \mathrm{S})$$

Applying the Markov property to consumers' patronage implies that customers brand choices in a given time period depends only upon their choices in the previous time period.

2.3.1. Homogeneous Markov model (M1)

There are M service providers. The discrete points of time referred to as epochs (time steps) are defined by a set of time steps, T

$$\mathrm{t} \in \mathrm{T}, \mathrm{T} = \{1, 2, \ldots, t_{\max}\},\ t_{\max} < \infty$$

A customer is with a service provider at each time step and will stay or move to another service provider at the next time step. Let X_t be the service provider of a particular customer at time step t; and let X_t be a random variable taking values in the state space S. The sequence is a Markov chain if the following equality holds:

$$\mathrm{P}\{X_{t+1} = \mathrm{j} | X_t = \mathrm{i}, X_{t-1} = i_{t-1}, \ldots X_1 = i_1\} = \mathrm{P}\{x_{t+1} = \mathrm{j} | X_t = \mathrm{i}\}, \forall \mathrm{t} = P_{ij}$$

This equality is the so-called Markov condition that states that, if the system is in state i at time step t, then the probability that it will be in state j at time step $t + 1$ does not depend on the states of the system in earlier times (Awogbemi, Oloda, & Osama, 2012; Chan et al., 2013).

The probability, P_{ij}, ($i = 1, 2, \ldots, k$; $j = 1, 2, \ldots, k$) shows the probability of customers' switching from brand i to brand j in one step, hence it is called the one-step transition probability (Awogbemi et al., 2012; Bairagi & Kakaty, 2016; Chan et al., 2013; Umoh, Awa, & Ebitu, 2013);

that is, the probability, P_{ij}, represents the chance that a customer of a service provider *i* at time step *t* will change to service provider *j* at the next time step $t + 1$.

2.3.2. The transition probabilities

$$P\{X_{t+1} = j | X_t = i\} = P_{ij}$$

are independent of *t*. and can be placed together in a matrix *P*, called the transition probability matrix, where $P(i,j) = P_{ij}$. The one-step transition probability matrix, P_{ij}, is a stochastic matrix

$$P_{ij} = \begin{bmatrix} P_{11} & P_{12} & \cdots & P_{1k} \\ P_{21} & P_{22} & \cdots & P_{2k} \\ \vdots & \ddots & \ddots & \vdots \\ P_{k1} & P_{k2} & \cdots & P_{kk} \end{bmatrix}$$

$P_{i1}, P_{i2}, \ldots, P_{ik}$ are conditional probabilities of mutually exclusive and exhaustive states of the system. Therefore, $0 \leq P_{ij} \leq 1$ and $\sum_i^k P_{ij} = 1$.

Transition probability matrices are usually estimated based on historical data.

Let W_t, at time $t \geq 1$ be denoted as W_t (at time $t \geq 1$) = $[\pi_t (S_1), \pi_t (S_2), \ldots, \pi_t (S_{M-1}), \pi_t (S_M)]$ be the vector of market shares of the service providers. Then, the components of W_t, $\pi_t (S_1)$ to $\pi_t (S_M)$ represent the market shares of providers π_1–π_m at time *t*. The market shares of service providers (W_t) are aggregates of individual customers (X_t). For brand switching, brand loyalty and competition analysis, the market shares of all service providers at the next time step can be determined by:

$\pi_{t+1} = \pi_t P$, where *P* is the transition probability matrix.

Consequently, to forecast market shares at time $t + 1$ based on the vector of initial market shares at time step $t = 1$, we obtain

$\pi_2 = \pi_1 P$

$\pi_3 = \pi_2 P = \pi_1 P^2$

In general, $\pi_t = \pi_{t-1} P$ or $\pi_1 P^{t-1}$.

2.3.3. Time varying Markov model (M2)

If *P* is assumed to be non-stationary, them the above formula will need to be adjusted to reflect this non-stationarity.

$\pi_2 = \pi_1 P$

$\pi_3 = \pi_2 P = \pi_1 P_1 P_2$

In general, $\pi_t = \pi_{t-1} P$ or $\pi_1 P_1 P_2 .. P_{t-1}$.

This is known as the time varying Markov model (M2). It is applicable when the transition probability matrix is not constant.

The actual number of customers for all providers at time step t can be represented by the vector

$$Y_t = M_t W_t$$

Where M_t is the total number of customers of all the service providers, at time step *t*.

2.3.4. Limitations of the Markov model

It is pertinent to mention that there are some limitations inherent in the Markov model summarised as: (i) Customers do not always buy products in certain intervals and neither do they always buy the same amount of a certain product; which implies that two or more brands may be bought simultaneously in the future; (ii) Markets are never stable because customers always enter and leave markets; (iii) The time between different buying situations may be a function of the last brand bought. *The above limitations notwithstanding, this study adopts the Markov model because it very handy in determining the steady state equilibrium of a stochastic process, which is the major thrust of this paper.*

3. Research design

Owing to our desire to forecast customers' brand loyalty through the estimation of switching and retention capacities of the service providers, quantitative research design, specifically the conclusive research design, was adopted. The population of the study consisted of students who are customers of MTN, Airtel, Globacom, 9Mobile, and others (Starcom, Visafone and Multilink) in seven Nigerian universities (Kaduna State University, Ambrose Ali University, University of Benin, University of Abuja, University of Lagos, University of Ilorin and University of Port-Harcourt) and 20 other organisations across the six geopolitical zones in Nigeria. Research data were elicited from the respondents with the help of questionnaire designed by the authors. Cronbach alpha was used to determine the reliability of the instrument while research data were analysed using time varying Markov chain analysis technique.

Random samples were taken from the population. Specifically, the first sample consisted of 5600 randomly selected respondents made up of students while the second sample consisted of 2000 MBA Alumni members who graduated from the University of Benin within the period 2000–2010. Research instrument was administered to respondents from the Universities through a face to face administration while the participation of online respondents in the study was requested via email and social media (Facebook and WhatsApp) and they received the questionnaires via email and social media. Their contact information was collected from the association of Business Administration, University of Benin. A total of 3340 respondents completed and returned their questionnaires out of 5600 that were served at the seven universities while 1396 out of 2000 online respondents that were contacted electronically completed and returned their questionnaires. Thus, from a total sample size of 7600 respondents that were served, 4736 (62.3%) completed and returned their questionnaires. The coefficient of reliability, using Cronbach alpha, was found to be .875, which indicated a highly reliable instrument.

With the assumption that the pattern of switching and retention is consistent with Markov chain, a time varying Markov chain analysis was used to determine the long-run equilibrium (ultimate) market shares. Here, the leading diagonal elements of the transition probability matrix indicate the retention elements; thus the elements in the leading diagonal were used to measure the loyal customers in this study (Table 1).

Table 1. Market shares in 2010.

GSM service provider	MTN	Airtel	Glo	9Mobile	Others	Total
Subscribers	2208	1204	680	220	424	4736
Proportion	0.47	0.25	0.14	0.05	0.09	1

Table 2. Respondents' history of Brand preference (2011).

Network	MTN	Airtel	Glo	9Mobile	Others	Total
MTN	1880	101	160	60	7	2208
Airtel	33	992	80	78	21	1204
Glo	11	51	589	25	4	680
9Mobile	10	12	19	177	2	220
Others	17	24	53	15	315	424
Total	1951	1180	901	355	75	4736

Table 3. Respondents' history of Brand preference (2012).

Network	MTN	Airtel	Glo	9Mobile	Others	Total
MTN	1794	44	81	27	5	1951
Airtel	13	1012	78	58	19	1180
Glo	11	21	844	18	7	901
9Mobile	10	19	22	302	2	355
Others	8	14	28	22	277	349
Total	1836	1110	1053	427	310	4736

Table 4. Respondents' history of Brand preference (2013).

Network	MTN	Airtel	Glo	9Mobile	Others	Total
MTN	1754	25	21	26	10	1836
Airtel	13	1018	38	33	8	1110
Glo	14	41	960	33	5	1053
9Mobile	4	13	5	403	2	427
Others	8	14	28	22	238	310
Total	1793	1111	1052	517	263	4736

Table 5. Respondents' history of Brand preference (2014).

Network	MTN	Airtel	Glo	9Mobile	Others	Total
MTN	1670	34	36	51	2	
Airtel	24	980	38	63	6	1793
Glo	17	13	984	32	6	1111
9Mobile	12	34	49	420	2	517
Others	11	14	21	40	117	263
Total	1734	1075	1128	606	193	4736

Table 6. Respondents' history of Brand preference (2015).

Network	MTN	Airtel	Glo	9Mobile	Others	Total
MTN	1580	34	66	52	2	174
Airtel	24	964	56	28	3	1075
Glo	31	43	1012	39	3	1128
9Mobile	4	8	46	546	2	606
Others	8	4	30	49	102	193
Total	1647	1053	1210	714	112	4736

Table 7. Respondents' history of Brand preference (2016).

Network	MTN	Airtel	Glo	9Mobile	Others	Total
MTN	1401	85	106	54	1	1647
Airtel	90	940	12	8	3	1053
Glo	87	20	1020	77	6	1210
9Mobile	54	22	98	538	2	714
Others	8	13	4	3	84	112
Total	1640	1080	1240	680	96	4736

Table 8. Respondents' history of Brand preference (2017).

Network	MTN	Airtel	Glo	9Mobile	Others	Total
MTN	1218	201	160	58	3	1640
Airtel	67	902	80	27	5	1080
Glo	37	81	1054	58	10	1240
9Mobile	41	66	59	510	4	680
Others	7	20	13	5	51	96
Total	1350	1350	1366	708	75	4736

4. Analysis of results

There are five states (four major Global systems of telecommunications service providers in Nigeria and other GSM service providers, also in Nigeria) in this study; consequently, the state space is of the form below:

$$S = \{\text{MTN, Airtel, Glo, 9Mobile, Others}\}$$

Results of the survey on the GSM subscribers showing the relationships between existing and next purchase brand preference were transformed into a Markov Matrix. See Tables 2–8.

Transition probability matrices of customers of GSM service providers in Nigeria from 2011–2017 (P_1–P_1) are given below:

2011

$$P_1 = \begin{bmatrix} .85 & .05 & .07 & .03 & .00 \\ .03 & .82 & .07 & .06 & .02 \\ .016 & .075 & .866 & .037 & .006 \\ .05 & .05 & .09 & .80 & .01 \\ .04 & .055 & .125 & .04 & .74 \end{bmatrix}$$

2012

$$P_2 = \begin{bmatrix} .92 & .022 & .042 & .014 & .002 \\ .011 & .857 & .066 & .05 & .016 \\ .012 & .023 & .937 & .02 & .008 \\ .028 & .054 & .062 & .85 & .006 \\ .023 & .04 & .08 & .063 & .794 \end{bmatrix}$$

2013

$$P_3 = \begin{bmatrix} .955 & .014 & .011 & .014 & .006 \\ .01 & .92 & .03 & .03 & .01 \\ .01 & .04 & .91 & .03 & .01 \\ .01 & .03 & .01 & .94 & .01 \\ .03 & .04 & .09 & .07 & .77 \end{bmatrix}$$

2014

$$P_4 = \begin{bmatrix} .93 & .019 & .02 & .03 & .001 \\ .02 & .88 & .03 & .06 & .01 \\ .02 & .01 & .935 & .03 & .005 \\ .02 & .07 & .09 & .81 & .01 \\ .042 & .053 & .08 & .152 & .673 \end{bmatrix}$$

2015

$$P_5 = \begin{bmatrix} .91 & .02 & .04 & .03 & .00 \\ .02 & .90 & .05 & .03 & .00 \\ .027 & .038 & .897 & .035 & .003 \\ .007 & .01 & .08 & .90 & .003 \\ .04 & .02 & .16 & .25 & .53 \end{bmatrix}$$

2016

$$P_6 = \begin{bmatrix} .851 & .052 & .064 & .033 & .00 \\ .09 & .89 & .01 & .01 & .00 \\ .07 & .02 & .84 & .06 & .01 \\ .08 & .03 & .14 & .75 & .00 \\ .07 & .12 & .04 & .02 & .75 \end{bmatrix}$$

2017

$$P_7 = \begin{bmatrix} .74 & .12 & .098 & .04 & .002 \\ .06 & .84 & .07 & .025 & .005 \\ .03 & .065 & .85 & .047 & .008 \\ .06 & .097 & .087 & .75 & .006 \\ .07 & .21 & .14 & .05 & .53 \end{bmatrix}$$

The ultimate market shares were computed using the formula:

$$Wi = U1 * \left[P_1 * P_2 * P_3 * P_4 * P_5 * P_6 * P_7\right]^n$$

where W_i = Ultimate market shares of the GSM Service providers in Nigeria; U_1 = initial market shares of the service providers, which represents the market shares in 2011; and $P_1, P_2, P_3, P_4, P_5, P_6$ and P_7 are the market shares of the service providers for the period 2011–2017.

$$\text{With } U_1 = [.4700 \cdot .2500 \cdot .1400 \cdot .0500 \cdot .0900] \tag{1}$$

$$\left[P_1 * P_2 * P_3 * P_4 * P_5 * P_6 * P_7\right]^n = \begin{bmatrix} .2061 & .27 & .3467 & .1641 & .0131 \\ .2061 & .27 & .3467 & .1641 & .0131 \\ .2061 & .27 & .3461 & .1641 & .0131 \\ .2061 & .27 & .3461 & .1641 & .0131 \\ .2061 & .27 & .3461 & .1641 & .0131 \end{bmatrix}$$

$$W_i = [.4700 \cdot .2500 \cdot .1400 \cdot .0500 \cdot .0900] \begin{bmatrix} .2061 & .27 & .3467 & .1641 & .0131 \\ .2061 & .27 & .3467 & .1641 & .0131 \\ .2061 & .27 & .3461 & .1641 & .0131 \\ .2061 & .27 & .3461 & .1641 & .0131 \\ .2061 & .27 & .3461 & .1641 & .0131 \end{bmatrix}$$

$$= [.2061 \quad .2700 \quad .3467 \quad .1641 \quad .0131] \cdots \tag{2}$$

4.1. Discussion of findings

The results of the time varying Markov chain analysis shows that on the long run, if the pattern of retention and losses continues in this manner, 21% of the GSM subscribers in Nigeria will be loyal to MTN, 27% to Airtel, 35% to Globacom, 16% to 9Mobile and 1% to others (see Equation (2)). By loyal customers we are referring to the customers who are expected to engage in consistent repurchase behaviour. The implication is that on the long run, Globacom is expected to have the highest share of the Nigerian telecommunication (GSM) market followed by Airtel, MTN, 9Mobile and lastly, others. Given the initial market shares of 2011, MTN is expected to concede a net loss of 26.39% of its market shares on the long run while Globacom is expected to make a net gain about 20.67% market shares. Furthermore, 9mobile will also make a net gain of 11.41% on the long run (see Equations (1) and (2)). While some of the GSM service providers are expected to make net gains in market shares on the long run, others are expected to make net losses. Thus, the customers of some of the GSM service providers are loyal to some extent while those of some other service providers are not. Furthermore, the retention capacity of some of the GSM service providers can be said to be adequate given the expected net gains on the long run, The results are not consistent with the results of previous studies in Nigeria because while the previous studies; Abiodun, Oyeniyi, and Osibanjo (2012), Adeleke and Aminu (2012), Oghojafor, Ladipo, Ighomereho, and Odunewu (2014), Adekiya (2016), and Olotewo (2017), among others, investigated the determinants of customer loyalty, this study investigated

the long-run retention capacity of the GSM service providers. For this reason, while the previous studies identified the critical factors perceived to influence customer loyalty, this study identified the long-run structure of customer loyalty to the key GSM service providers in the telecommunication industry.

5. Policy implications/recommendations

Results of the study indicate that the initial market shares of the telecommunication service providers are significantly different from the ultimate market shares; this is an indication that the pattern of retention and loss will affect the fortunes of the telecommunication firms significantly on the long-run. Negative changes in a companies' market share indicate lapses in a company's offerings vis-à-vis competitors' offerings and hence customers' dissatisfaction with the offerings. A low long-run market share vis-à-vis the initial market share should attract management attention for urgent corrective action while a high long-run market share vis-à-vis the initial market share should attract management attention for consolidation strategies. In view of the foregoing, policy-makers and strategic managers in the GSM service companies should make strategic plans to respond to the outcomes of this study to forestall the materialisation of unpleasant consequences. Specifically, they should take deliberate actions to enhance service delivery as well as implement strategies that will attract new customers while enhancing the loyalty of their current customers. Furthermore, they should undertake regular competitor analysis to find out what competitors are doing better so that they can improve as well as ensure that they get adequate feedback from their customers.

5.1. Conclusion

Given the current pattern of retention and losses, the structure of the telecommunication industry in Nigeria will change considerably and the current market leadership will be reversed on the long run if the current pattern of retention and losses continue. Such change in structure may translate to better services to subscribers as it reflects their dissatisfaction with the offerings of the current market leadership.

The study is not without some methodological imperfections which suggest the need for further research opportunities. First, although the study advances knowledge of consumers' loyalty to GSM service providers in Nigeria, there is need to further examine the possibility of including and testing data from a larger sample size to establish whether the results will be consistent with those of this study. This will help to ascertain the degree of representativeness of the sample used in this study. A second limitation is that other areas of the marketing environment such as sales promotions, advertising, competition, etc., are not included in this model. For this reason, consumer loyalty may sway in response to aggressive sales promotion, advertisement and intense rivalry within the telecommunication industry; this may alter the predicted long-run equilibrium. Thirdly, the predicted ultimate market shares of this study are without prejudice to any unforeseen circumstances or financial obligations of the GSM service providers which may jeopardise their going concern if not properly managed. This is important because the ultimate market shares determined in the study depend on the going concern of the firms.

Contributions to knowledge

Previous studies on customer loyalty in the Nigerian telecommunications sector investigated the factors that influence customer loyalty. The point of departure of this study from previous studies is its use of time varying Markov chain model to determine the proportion of customers that will be loyal to each GSM service providers in the Nigerian telecommunication industry on the long-run. It has therefore bridged the gap of knowledge regarding the long-run structure of subscribers' loyalty (repurchase behaviour) to GSM service providers in Nigeria. Determination of the long-run structure of loyalty will prove useful for strategic planning.

Disclosure statement

No potential conflict of interest was reported by the authors.

ORCID

Eseosa Obadiaru http://orcid.org/0000-0002-9678-2486

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Appendix 1

Section A

Instruction**:** Mark X in the box as appropriate **[X]**

(1) Age category in years: Under 30 [ ] 31 – 40 [ ] 41 – 50 [ ] 51 and above [ ]
(2) Sex: Male [ ] Female [ ]
(3) Highest academic qualification: Student [ ] HND/first degree [ ] Higher degrees [ ] Professional qualification [ ]
(4) Organisation: University [ ] NGO [ ] Private [ ] Public [ ] Multinational [ ]
(5) How many GSM Lines do you have? 0ne [ ] two [ ] three [ ] four [ ]
(6) Which was your preferred network in 2011? MTN [ ] Airtel [ ] Glo [ ] 9Mobile [ ] Others [ ]
(7) Which was your preferred network in 2012? MTN [ ] Airtel [ ] Glo [ ] 9Mobile [ ] Others [ ]
(8) Which was your preferred network in 2013? MTN [ ] Airtel [ ] Glo [ ] 9Mobile [ ] Others [ ]
(9) Which was your preferred network in 2014? MTN [ ] Airtel [ ] Glo [ ] 9Mobile [ ] Others [ ]
(10) Which was your preferred network in 2015? MTN [ ] Airtel [ ] Glo [ ] 9Mobile [ ] Others [ ]
(11) Which was your preferred network in 2016? MTN [ ] Airtel [ ] Glo [ ] 9Mobile [ ] Others [ ]
(12) Which was your preferred network in 2017? MTN [ ] Airtel [ ] Glo [ ] 9Mobile [ ] Others [ ]

Source: (Constructed by Authors).