MODELLING ONLINE RETAILING REPURCHASE AND SWITCHING BEHAVIOUR OF NIGERIA MILLENNIALS USING CONTINUOUS TIME MARKOV CHAIN (CTMC)

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Abstract

Despite increasing online retailing momentum in Nigeria understanding and predicting online retailing consumers repurchasing and switching behaviour has continuously been a subject of interest among scholars and practitioners. This study applies Continuous Time Markov Chain (CTMC) to model millennials' repurchasing and switching behavioural intentions. The study was conducted among millennials and a sample of 380 online retailing consumers among millennials were drawn using cross-sectional research design and multi-stage sampling technique. Data generated were analysed systematically by adopting statistical tools and first order CTMC with the aid of SPSS IBM version 20 and Microsoft Excel 2010 softwares. The Steady State of the CTMC model revealed that approximately 39 percent of millennials would repurchase or switch to preferred online outlets in their next shopping endeavour. While approximately 30 percent of millennials would repurchase or switch to other online outlets in their next shopping endeavour and approximately 31 percent of Millennial online retailing consumers would repurchase or switch to offline retailing outlets in their next shopping endeavour. Based on the findings, the study concludes that CTMC have been successfully applied to understand and predict millennials online retailing repurchase and switching behaviour that will assist online retailing service providers to formulate appropriate competitive survival strategies. Hence, operators in the online retailing industry are encouraged to make use of this model in understanding, analysing and predicting online retailing consumers behavioural intentions decision for sustainable competitive advantage.

Keywords: Behavioural Intentions, Consumers, Continuous Time Markov Chain, Online Retailing, Repurchase, Switching.

1. Introduction

Owing to the growth of online retailing globally in recent years, especially in the developing countries like Nigeria, customer acquisition and retention have found an important role in business success (Tabaei & Fathian,2012). Depending on the business, Reichheld and Schefter (2000) claimed that a slight rise of 5% in reliable customers can lead to between 30% to 50% profit. While customers in virtual markets are engaged to online retailers with value added features, the precondition for value creation is the ability to understand the needs and demands of customers. Olorunniwo, Maxwell, Hsu-dan, and Godwin (2006) affirmed that customer experience and behavioural intentions

are closely related. Consumers' previous experiences with online purchase or lack thereof, as pointed out by Dillon and Reif (2004), can be a significant influence on levels of risk perception by consumers and their repurchase decisions. Negative experiences according to Boyer and Hult (2005) increase levels of risk perceptions, likely hamper the ability of business to retain customers, and can lead to other online retailers having difficulty gaining initial customers. In fact, Patterson and Speng (1997) maintained that customers repurchase decisions are based on their satisfaction or dissatisfaction evaluation in post-purchase situations. Although the first step to overall success in online retailing is customer adaptation and acceptance, companies that hope to succeed in the online retailing business must work toward creating and maintaining sustainable long-term relationship with customers. Thus, in the view of Agbata Jnr (2016), having customer trust, loyalty, retention, and referral that will further boost sales and profits is dependent on the manner online retailing sites handle transactions.
Due to the inconsistent nature of customer behaviour, the increasing product and service availability, the growth in webstores, and low switching costs, Bhattacherjee (2001b) and Crego and Schiffrin (1995) asserted that consumers, who might not have a compelling reason to choose one retailer over another, will experiment or rotate repurchases among multiple retailing firms. Thus, Reichheld and Schefter (2000) posit that there is a need among online retailing service providers to understand consumers repurchase and switching behaviour, given the reasonably high cost of acquiring new customers and the economic value of reliable customers, as such action are critical for their success and survival.

Although customer retention is particularly difficult in virtual market as customers have various online and offline options from which to patronize; Bhattacherjee (2001b) and Crego and Schiffrin (1995) remarked that the loyalty of a customer to an online retailing service provider's survival and success is critical. Thus, even though online retailing sector in Nigeria is being ranked second among the fastest growing in Africa (Unctad.org,2018), there exist scepticism among Nigerian consumers about buying goods online (Omoneye, 2019). This may be due to consumers conscious and unconscious perception of risk when judging products online (Meng-Hsiang, Li-Wen, & Cheng-Se, 2014). Hysterical tales of returns, no refunds or replacement, the attitude of the online retail platforms who do not claim responsibility for loss of fund, and data security are reducing frequency of online purchases (Alotaibi, 2012).

Also, the e-commerce boom has brought about two significant changes in consumer shopping behaviours which are showrooming and webrooming. For years, offline outlets feared the potential effect of showrooming reducing their profits and the inability of them to avoid or reduce its impact (Khan, 2018).

However, studies have shown that webrooming is growing in popularity and has been responsible for the loss of customers on massive sales among online retailing service providers (E-commerce Nation, 2019). Hence, there is a need to attempt to understand and predict consumers repurchase or switching behaviour in the Nigerian online retailing industry. Thus, the study aims to add to the existing body of research by applying the CTMC model to understand and predict Millennials repurchasing and switching behavioural intentions. Therefore the study seek to identify the factors that can be used in evaluating Nigerian online retailing service providers by online retailing consumers, assess the use of CTMC in modelling Millennials repurchase and switching behavioural intentions, and predict Millennials repurchase and switching behaviour in the Nigerian online retailing industry.

2. Review of Literature

Repurchase and switching behaviours, which are consumers' behavioural intentions, have become an area of interest in relationship marketing and a concern for online retailing service providers and academics (Kura, Mat, Gorondutse, Magaji, & Yusuf, 2012). This is because both affect online customer retention as there are various online and offline options to patronize. Customer loyalty, an offshoot of customer retention, is critical to the online retailing outlets survival and success. A review of literature showed that while some research into consumer online behaviour has been descriptive in nature (Modahl 2007); some studies have expanded beyond simple descriptions to detailed hypothesis testing with regards to factors that influence online buying (Phau & Poon 2000); and other studies have attempted to develop models of online buying (Limayem, Khalifa, & Frini, 2000). A review by the researcher of studies on online retailing and behavioural intentions (BI) also revealed that other studies had used Pearson Correlation, Multiple Linear Regression Analysis, Hierarchical Cognitive Structural Model, Partial Least Squares, Structural Equation Modelling to model, understand and predict online retailing customers' behaviour. On the other hand, study like Adekoya and Oyatoye (2020) had used AHP to evaluate online retailing and behavioural intentions among Nigeria consumers, however, there has been lacuna of studies that has applied the CTMC model to study consumers repurchase and switching behaviour in developing countries like Nigeria. As observed by the researchers, most research on online retailing in Nigeria had focused on adoption with few or dearth of studies on post-adoption. This study recognized this by proposing a model of Millennials repurchase and switching behaviour using the CTMC model.

2.1 Theoretical Framework

Online retailing, as pointed out by Cao and Mokhtarian (2005), is a complex decision-making process which incorporate economic and technical issues and requires the need to use not one, but more than one models to capture its

complex behaviour. Thus, three online consumer behaviour theories -TAM, updated ECT and extension of updated Delone and Maclean model- underpin this study. The study proposes the use of extension of updated Delone and Maclean model (Ho, See-To, Chiu, & Wu, 2013) and extended ECT (Bhattacherjee, 2001a) that integrates the TAM to understand and predict consumers switching and repurchase behaviour in the Nigerian online retailing industry. This study extended beyond online retailing adoption by consumers and includes online retailing repurchasing continuance.

This study was based on the Markov Chain Process developed by Professor Andrei A. Markov (1856-1922). Hiller and Lieberman (2001) remarked that while the Markov Chain Process assumed that the time parameter t was discrete (that is, t = 0, 1, 2, ….) and such assumption is suitable for many problems, but there are certain cases where a continuous time parameter (say t') is required as the evolution of the process is being observed continuously over time. Despite that online retailing consumers do not always repurchased goods from online retailing service providers in certain discrete intervals (Uslu & Cam ,2001); these behaviours can be observed continuously over a period. Hence, Markov chain definition can be extended to such continuous processes (Hiller & Lieberman, 2001). These Markov processes with a continuous time set X_t, $t \geq 0$ and discrete (that is finite or countable) state space S are referred to as Markov Jump processes (or Continuous Markov Time Chain) (The Actuarial Education Company [TAEC], 2007). Much of the theory is analogous to that of discrete Markov chains. The only way in which the jump chain differs from a standard Markov chain is when the jump process $\{X_t, t \geq 0\}$ encounters an absorbing state (TAEC, 2007). This study also considered Markov processes on discrete state space but continuous in time. Most of the basic notions and definitions for discrete-time Markov chains applies to a continuous Markov time chain (Schuette, & Metzner, 2009).

A CTMC X(t) is defined by a jump chain and a set of holding time parameter. This study considered the time-homogeneous case, where probabilities $P (X_t = j \; X_s = i)$ depend only on the length of the time interval, t – s. The transition probabilities of the CTMC: $P_{ij} (t) = P (X_t = j \; X_0 = i)$ obey the Chapman-Kolmogorov equations which in continuous time is identical to the derivation in discrete time. If the transition matrix P(t) and the initial probability distribution $q_i = P (X_0 = i)$ is known, the general probabilities involving the process X_t by can be found using the Markov property (TAEC, 2007). Also, this study considered the standard time-homogeneous Poisson process as a counting process in continuous time, $\{N_t, t \geq 0\}$, where N_t is the number of occurrences of some type of event within the time interval from 0 to t. The events of interest that is Millennial online retailing consumer's repurchasing or switching behaviour occur singly and may occur at any time (TAEC, 2007).

3. Methods

3.1 Research Design

The exploratory research design using quantitative approach was employed for this study.

3.2 Population and Sample Size

The population of this study is made up millennial online retailing consumers. The population of this age bracket group in Nigeria is approximately 47,942,340 (Statista, 2021). The sample size for the study was computed using the Cochran (1963) model- $n_0 = \frac{z^2pq}{e^2}$ - for determining sample size of large population and was used to derive a sample of $n_0 = \frac{(1.96)^2(0.5)(0.5)}{(0.05)^2}$ = 380.25 ≡380 Millennials online retailing consumers. Moreover, Crouch (1984) recommends that minimum sample sizes for quantitative consumer surveys are of the order of 300 to 500 respondents. A readily accessible cluster of millennials as observed by the researcher is found among MBA part time students. 380 questionnaires were administered among MBA part-time students drawn from four universities namely, University of Lagos, Lagos State University, Lagos Business School and Caleb university in Lagos state based on a multi-stage sampling technique. The respondents were selected by employing convenience and snowballing sampling technique.

3.3 The CMTC Model Development and Measurement of Variables

Markov Model Development

The model developed in this study is guided by the assumptions, definition of notations, variables, parameters, and probabilities.

Model Assumptions

The assumptions below were used in this study to develop the CTMC model for Millennial customers repurchase and switching behaviour in the Nigerian online retailing industry:

(i) There are three finite possible states namely: Preferred Online Retailing Outlet, Other Online Retailing Outlets and Offline Retailing Outlets.

(ii) The states are collectively exhaustive and mutually exclusive. Preferred Online Retailing Outlet exist and is mutually exclusive that is among consumers, in terms of meeting their shopping expectations, there is always the preferred retailing outlet.

(iii) The transition probabilities of switching or repurchasing from one outlet to another by Millennial consumer only depends on the current state of the system.

(iv) The long-run probability of being in a particular outlet will be constant over time given that in the long-run, online retailing service providers

would have learnt a lesson as to put factors responsible for consumers repurchase behaviour right to ensure steady patronage and reduce or discourage switching behaviour,

(v) The transition probabilities of switching to alternative states (other online outlets) in the next shopping endeavour, given the current period (state), would sum to unity (1.0).

Definition of Notations

Let Si denotes the preferred state i, where i = I, O_t, O_f, the current state where Millennial online retailing consumer preferred most at a particular time.

I denote customer repurchasing from preferred online outlets state.

O_t denotes customer switches to other online outlets state.

O_f denotes customer purchasing from offline outlets state

P denotes the transition probability matrix.

Π_{it} denotes the proportion of Millennial online retailing consumers who purchased goods from a retailing outlet i at time t.

Π_{i0} denotes the initial proportion of Millennial online retailing consumers who purchased goods from a retailing outlet i at time 0.

By the above definition, the proportion of Millennial online retailing consumers who purchased goods from a retailing outlet initially is.

$\Pi = (\Pi_{I0}, \Pi_{Ot0}, \Pi_{Of0})$

Definition of probabilities

P_{ij} denotes the probability that a consumer who currently preferred a particular online retailing outlet i (i - I, O_t, O_f) would switch or repurchase from another retailing outlet j (j - I, O_t, O_f) in the next shopping endeavour. By this definition, when i = j, it means that a consumer is not switching or repurchasing from an alternative retailing outlet, thus retaining the online retailing outlet and continues the patronage.

The CTMC Model (transition probability [TP] matrix, P)

The TP matrix, P_ij, of Millennial online retailing consumers' behaviour to repurchase or switch in its abstract form is presented as:

$$P_{ij} = \begin{array}{c} \\ S_I \\ S_{Ot} \\ S_{Of} \end{array} \begin{array}{c} \begin{array}{cccc} S_I & S_{Ot} & S_{Of} \end{array} \\ \begin{bmatrix} P_{II} & P_{IOt} & P_{IOf} \\ P_{OtI} & P_{OtOt} & P_{OtOf} \\ P_{OfI} & P_{OfOt} & P_{OfOf} \end{bmatrix} \end{array}$$

Figure 1: CTMC Model for Millennial online retailing consumers repurchase or switch behaviour among Nigeria online retailing outlets.

3.4 Data Collection Instrument

A self-completion questionnaire designed by the authors to gather data for the study consists of three sections. Section A consists closed-ended and multiple-choices response structures for gathering demographic data from the respondents. Section B sought for data about factors for evaluating online retailing service providers by consumers using the Likert scale of 1(strongly disagreed) to 5 (strongly agreed). Section C was designed to gather data for input into the CTMC model. The instrument was validated through content analysis with alpha value of 0.934 and is deemed acceptable according to Hair, Black, Babin, and Anderson (2010) who remarked that an alpha of 0.60 and over is acceptable.

3.5 Data Analysis and Techniques

Data obtained from Section A and B was analysed using descriptive statistics. Data from Section C was analysed using the Microsoft Excel 2010 software.

4. Results

4.1 Response rate

A total number of 295 instruments were returned revealing a response rate of 77.63%. After data editing process 266 (70%) were properly filled and found valid for the analysis.

4.2 Demographics

Analysis reveal that male respondents were 153(57.5%) while 113(42.5%) were female. Significant number of respondents were Millennials, as 215 (90.8%) were between the ages of 21 – 40 years; 117 (54.67%) patronized one online retailing service provider while 127 (59.3%) purchased goods online once a while. 236 (88.7%) of the respondents indicated purchasing goods offline.

4.3.1 Analysis of data according to research objectives

4.3.2 Identify the factors used in evaluating Nigerian online retailing service providers by online retailing consumers.

From Table 1 below, the results reveal the respondents significantly agreed that all the factors identified are used in the evaluation of Nigerian online retailing service providers (M=3.66, SD=0.896) and the responses were deemed adequate (KMO=0.789, Bartlett's Test of sphericity ≤ 0.05).

4.3.3 Assess the use of CTMC in modelling Millennials repurchase and switching behavioural intentions.

To achieve this objective, frequency analysis was used to analyse the data collected and the yes response is presented in table 1 below was used to derive the One Step TPM in figure 2 for the consumer CTMC model. This is in line with the proposition by Whitt (2014). It reveals the behavioural intentions of the millennial online retailing consumers in the study area to online retailing

service providers in Nigeria that induced their repurchasing or switching behaviour.

Table 1 Observed Yes Frequency

	I	O_t	O_f	Total
I	224	172	180	576
O_t	224	172	133	529
O_f	186	147	197	530

Source: Field Survey, 2020

The One Step Derived Transition Probability Matrix (TPM) for CTMC

$$\begin{array}{c} \\ I \\ O_t \\ O_f \end{array} \begin{array}{c} \begin{array}{ccc} I & O_t & O_f \end{array} \\ \begin{bmatrix} 0.38889 & 0.29861 & 0.31250 \\ 0.42344 & 0.32514 & 0.25142 \\ 0.35094 & 0.27736 & 0.37170 \end{bmatrix} \end{array}$$

Figure 2: The Derived One Step TPM of consumers to repurchase or switch among retailing outlets in Nigeria.

Table 1 Descriptive statistics of identified factors used in evaluating Nigerian online retailing service providers by online retailing consumers (n=266)

Total (n = 266, 100%)	Strongly Agree		Agree		Not Sure		Disagree		Strongly Disagree		Mean	Mode	Standard Deviation
Factors use to evaluate Online service providers in Nigeria	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%			
Perceived usefulness	57	21.4	147	55.3	47	17.7	8	3.0	7	2.6	3.90	4	0.861
Perceived ease of use	48	18.0	142	53.4	49	18.4	19	7.1	8	3.0	3.76	4	0.932
Perceived trust	29	10.9	111	41.7	94	35.3	19	7.1	13	4.9	3.47	4	0.952
Empathy	16	6.0	128	48.1	93	35.0	28	10.5	1	0.4	3.49	4	0.778
System quality	37	13.9	121	45.5	63	23.7	44	16.5	1	0.4	3.56	4	0.939
Information quality	45	16.9	92	34.6	95	35.7	24	9.0	10	3.8	3.52	3	0.999
Service quality	35	13.2	127	47.7	80	30.1	19	7.1	5	1.9	3.63	4	0.869
Perceived satisfaction	24	9.0	108	40.6	103	38.7	26	9.8	5	1.9	3.45	4	0.860
Information adequacy	51	19.2	101	38.0	74	27.8	40	15.0	-	-	3.61	4	0.962
Information timeliness	41	15.4	135	50.8	75	28.2	15	5.6	-	-	3.76	4	0.778
Reliability	43	16.2	116	43.6	73	27.4	28	10.5	6	2.3	3.61	4	0.954
Personalization	40	15.0	116	43.6	94	35.3	11	4.1	5	1.9	3.66	4	0.851
Efficiency	62	23.3	134	50.4	50	18.8	17	6.4	3	1.1	3.88	4	0.876
Information understandability	54	20.3	133	50.0	51	19.2	27	10.2	1	0.4	3.80	4	0.892
Perceived security	65	24.4	102	38.3	63	23.7	24	9.0	12	4.5	3.69	4	1.076
Perceived performance expectancy	48	18.0	129	48.5	58	21.8	31	11.7	-	-	3.73	4	0.891
Responsiveness	41	15.4	131	49.2	62	23.3	32	12.0	-	-	3.68	4	0.877
Brand awareness	29	10.9	147	55.3	74	27.8	15	5.6	1	0.4	3.71	4	0.750
Payment system	38	14.3	153	57.5	55	20.7	18	6.8	2	0.8	3.78	4	0.801
Firm reputation	44	16.5	111	41.7	77	8.9	25	9.4	9	3.4	3.59	4	0.984
Perceived price	59	22.2	112	42.1	59	22.2	29	10.9	7	2.6	3.70	4	1.016
Perceived enjoyment	29	10.9	117	44.0	81	30.5	28	10.5	11	4.1	3.47	4	0.964
Perceived reliance	29	10.9	104	39.1	101	38.0	32	12.0	-	-	3.49	4	0.843
Perceived integrity	41	15.4	99	37.2	94	35.3	26	9.8	6	2.3	3.54	4	0.944
Delivery option	71	26.7	118	44.4	57	21.4	20	7.5	-	-	3.90	4	0.881
Navigability	36	13.5	151	56.8	61	22.9	18	6.8	-	-	3.77	4	0.765
Response time	48	18.0	117	44.0	74	27.8	26	9.8	1	0.4	3.70	4	0.891
Overall online service providers evaluation factors											3.66	4	0.896

Source: Field Survey, 2020

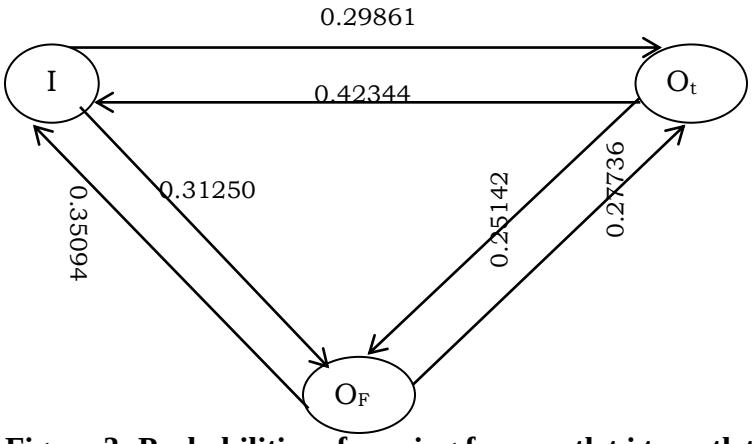

Figure 3: Probabilities of moving from outlet i to outlet j.

For a time-in homogenous CTMC, the probability that an online consumer goes into say state P_{OtOt} (j) when it leaves say state P_{II} (i) is given below:

$$P_{ij} = \frac{The\ force\ of\ transition\ from\ i\ to\ j}{The\ total\ force\ out\ of\ state\ j\ (\lambda)}$$

The total force out of state j denoted with λ_i (where i = I, O_t, O_f) is derived by summing all the probabilities of leaving the state as indicated in Fig. 3.

λ_I = 0.29861 + 0.31250 = 0.61111

λ_{O_t} = 0.423444 +0.25142 = 0.67486

λ_{O_f} = 0.35094 + 0.27736 = 0.62830

This means that the probability that an online retailing consumer who originally purchased from the preferred online retailing provider would switch in the next shopping endeavour is 0.61111. On the other hand, the probability that an online retailing consumer who originally purchased from the other online and offline retailing providers would switch in the next shopping endeavour is 0.67486 and 0.62830, respectively.

Thus, the probability of an online retailing consumer switching from *i* to *j* using the above formulae is:

$P_{IOt} = \frac{0.29861}{0.61111}$ = 0.48864

$P_{IOf} = \frac{0.31250}{0.61111}$ = 0.51136

$P_{OtI} = \frac{0.42344}{0.67486}$ = 0.62745

$P_{OtOf} = \frac{0.25142}{0.67486}$ = 0.37255

$PO_{fI} = \frac{0.35094}{0.62830}$ = 0.55855

$P_{OfOt} = \frac{0.27736}{0.62830}$ = 0.44145

From the above computation, it shows that the probability that a Millennial online retailing consumer will switch from preferred online retailing outlet to other online and offline retailing outlets in the next shopping endeavour is approximately 0.49 and 0.51, respectively. Whereas the probability that a Millennial online retailing consumer will switch from other online retailing outlet to preferred online and offline retailing outlets in the next shopping endeavour is, respectively, approximately 0.63 and 0.37. Consequently, the probability that a Millennial online retailing consumer will switch from offline retailing outlet to preferred and other retailing outlets in the next shopping endeavour is approximately 0.56 and 0.44, respectively.

With regards to a time-in homogenous CTMC, the probability that an online consumer goes into say state P_{II} (i) when it leaves state P_{II} (i) that is the staying or holding rate is given by:
P_{ii} (s, t) = $e^{-\lambda i(t-s)}$ where e = 2.71828.
For instance,
$P_{II} = 2.71828^{-0.61111} = 0.54275$
$P_{OtOt} = 2.71828^{-0.67486} = 0.50923$
$P_{OfOf} = 2.71828^{-0.62830} = 0.53350$

The above analysis shows that the probability that a Millennial online retailing consumer who currently purchased from a preferred online outlet would repurchase from it in the next shopping endeavour is 0.54, while the probability that if the Millennial who currently purchased from other retailing outlet(s) would still repurchase from it in the next shopping endeavour is approximately 0.51. On the other hand, a Millennial who currently purchased from offline retailing outlet will still repurchase from the offline retailing outlet in the next shopping endeavour is 0.53.

4.4. Predict Millennials repurchase and switching behaviour in the Nigerian online retailing industry.

The Steady State analysis of the Millennial online retailing consumers' behavioural intentions

The initial derived transition probabilities matrix $\left[P_{ij}^{(1)}\right]$ for the online consumers repurchase and switching behaviour intentions as at the first period of purchases was used to derive the next repurchase or switching period for the next purchase of goods (Note: $P_{ij}^{(2)}$ means the next N-Step transition for the online consumer corresponding to the next purchase/shopping endeavour). Below transition probability matrices show the possible outcomes of Millennial online retailing consumers at the next shopping endeavour(s):

$$P_{ij}^{(2)} = \begin{array}{c} \\ I \\ O_t \\ O_f \end{array} \begin{array}{c} \begin{array}{ccc} I & O_t & O_f \end{array} \\ \begin{bmatrix} 0.38735 & 0.29989 & 0.31276 \\ 0.39058 & 0.30189 & 0.30752 \\ 0.38437 & 0.29807 & 0.31756 \end{bmatrix} \end{array}$$

Figure 4: Online Retailing Consumers Two-Steps Transition Matrix

$$P_{ij}^{(3)} = \begin{array}{c} \\ I \\ O_t \\ O_f \end{array} \begin{array}{c} \begin{array}{ccc} I & O_t & O_f \end{array} \\ \begin{bmatrix} 0.38738 & 0.29992 & 0.31270 \\ 0.38765 & 0.30008 & 0.31226 \\ 0.38714 & 0.29977 & 0.31309 \end{bmatrix} \end{array}$$

Figure 5: Online Retailing Consumers Three-Steps Transition Matrix

$$P_{ij}^{(4)} = \begin{array}{c} \\ I \\ O_t \\ O_f \end{array} \begin{array}{c} \begin{array}{ccc} I & O_t & O_f \end{array} \\ \begin{bmatrix} 0.38739 & 0.29992 & 0.31269 \\ 0.38741 & 0.29994 & 0.31266 \\ 0.38737 & 0.29991 & 0.31272 \end{bmatrix} \end{array}$$

Figure 6: Online Retailing Consumers Four-Steps Transition Matrix

The results of the analysis suggest that the percentage of the repurchase and switching behaviour of online consumers among the millennials in the study area were changing as they embark on subsequent shopping endeavours. To ascertain this trend in the behaviour of the consumers, the steady state or equilibrium condition was computed. Thus, solving the below three equations arrived at as a result of equating the parameters of the variables at present state to be same for future state that is:

(π_I π_{O_t} π_{O_f}) = (π_I π_{O_t} π_{O_f}) P in the long run (at period 6 using 5 decimal places).

Where P is the initial derived TPM.

$\pi_I = 0.38889\pi_I + 0.42344\pi_{O_t} + 0.35094\pi_{O_f}$ ……. 4.1

$\pi_{O_t} = 0.29861\pi_I + 0.32514\pi_{O_t} + 0.27736\pi_{O_f}$ ……. 4.2

$\pi_{O_f} = 0.31250\pi_I + 0.25142\pi_{O_t} + 0.37170\pi_{O_f}$ ……. 4.3

π_I π_{O_t} $\pi_{O_f} = 1$ ……. 4.4

Eliminating one of the equations but not the last one, the results obtained for the unknown variables are: ($\pi_I = 0.38739$; $\pi_{O_t} = 0.29992$; $\pi_{O_f} = 0.31269$.

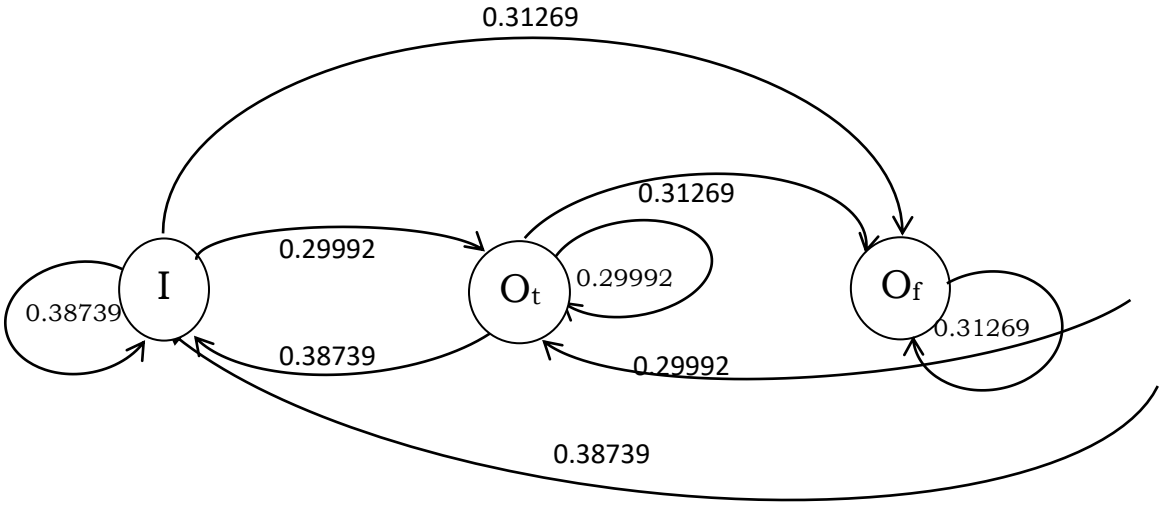

Figure 7: Online Retailing Consumers Steady State Transition Diagram

The implication of this is that in the long run approximately 39 percent of consumers would repurchase or switch into preferred online outlets in their next shopping endeavour. While approximately 30 percent of consumers would repurchase or switch into other online outlets in their next shopping endeavour and approximately 31 percent of online or offline retailing consumers would remain with offline outlets.

5. Discussion of Findings

This study aims to provide an insight into the repurchase and switching behaviour of Nigerian Millennial using CTMC model. First, the researchers believe that significant theoretical and practical contributions can be made by identifying post-purchase factors used to evaluate online retailing outlets that affects the repurchase and switching behaviours of Millennials. The result revealed that Millennials evaluate their post purchase experience with an online retailing outlet with all the factors identified in this study. This shows that their evaluative factors are also in partial consistent with the studies of Dillion and Reif (2004) and Ho et al. (2013). The different is that while their studies were on pre-purchase factors, this focused on post-purchased factors. The implication is that certain pre-purchase factors are part of post-purchase factors that influences repurchase behaviour of online retailing consumers.

Second, this research sheds some light into the online retailing repurchase and switching behaviours of Millennials. Thus, the study aims to add to the existing body of research by applying the CTMC model to assess Millennials repurchase and switching behavioural intentions. It is observed, based on the post-purchase evaluation, Millennials repurchase and switching behaviour is recurrent that is the probability of exhibiting these behaviours is one. This shows that they will certainly exhibit the repurchase behaviour among

preferred, other online and offline retailing outlets on a continuous shopping endeavour. Affirming that customer experience and behavioural intentions are closely related (Olorunniwo et al., 2006). The implication of this is that e-loyalty among online consumers is not guarantee.

Third, the strength of the Markov Chain is the ability to predict the equilibrium or steady state (that is in the long run). The study attempts to predict the repurchase and switching behaviour using the current observation to ascertain the behaviour in the long run. The model steady state revealed that approximately 39 percent of Millennials would repurchase or switch to preferred online outlet in their next shopping endeavour. While approximately 30 percent of Millennials would repurchase or switch to other online retailing outlet in their next shopping endeavour and approximately 31 percent of Millennials would repurchase or switch to offline outlets in their next shopping endeavour. This study supports the findings of Reichheld and Schefter (2000) that loyalty is not won with technology but through the delivery of a consistently superior customer experience. The implication is that for an online retailing outlet to generate superior long-term profits, there is a need to achieve superior customer e-loyalty as more than 50% of previous online retailing consumers are likely not to repurchase with them in their next shopping endeavour.

Conclusions

This study was conducted to explore and model Millennials repurchasing and switching behavioural intentions in the Nigeria online retailing industry. This study presented and analysed continuous time Markov chain model to understand and predict Millennials repurchase and switching behaviour. It concluded that:

i. 39 percent of Millennials online retailing consumers would repurchase or switch to preferred online outlet in their next shopping endeavour. While approximately 30 percent of Millennial consumers would repurchase or switch to other online retailing outlets in their next shopping endeavour and approximately 31 percent of Millennial consumers would repurchase or switch to offline retailing outlets in their next shopping endeavour.
ii. In every subsequent shopping behaviour, preferred online outlets would lose approximately 61 percent of their previous consumers to other online and offline retail outlets. Whereas other online and offline retail outlets would lose approximately 70 percent and 69 percent, respectively.
iii. The CTMC model was found suitable in modelling, understanding, and predicting the repurchase and switching behavioural intentions of Millennial online retailing consumers.

iv. Adapting the CTMC methodology as proposed in this study assists management to devise policies and maintain sustainable relevant competitive plans for retaining consumers. It offers a bigger picture in online retailing management especially in the Nigerian online retailing industry.

5.1 Further Studies

This study focused on millennial online retailing consumers, however, further studies about online consumer behaviour can be extended to generation Z who were born between 1995 and 2015 and are mostly undergraduate students in tertiary institutions.

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