

TELECOMMUNICATION SECTOR IN BANGLADESH: EXAMINING THE MARKOV ANALYSIS FOR ASSESSING CONSUMERS' BRAND SWITCHING BEHAVIOR

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ABSTRACT

The aim of this paper is to clarify the markov analysis for assessing consumers' brand switching behavior towards telecommunication sector in the context of Bangladesh. The logistic regression model has been applied here to find out the significance influential aspects which are considered by the consumers to switch from one to another brand of telecommunication sector. The results of binary logistic regression model exhibited that brand switching is significantly influenced by strong advertisement. Again, the consumers' those who have positive belief about the perception of offering package is 1.542 times more likely to brand switching rather than those who does not. Age, multiple SIM use, profession, perception about total attributes rating of the current SIM are aspects which have significantly influence or brand switching behavior towards telecommunication sector in Bangladesh. The implications of these results can be applied to the development of competitive position of several telecommunication service providing companies in the economical marketplace.

Keywords: Markov chain, Transition probability matrix, Binary logistic regression model, Brand switching behavior, Telecommunication sector, Bangladesh.

INTRODUCTION

Telecommunication is a vital portion of human life. From the starting of human evolution people were attempted to connect each other to accomplish their

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social needs. Over the passes of time though the tools of communication were altered but still it is current in the society. At present cellular phone has brought a rebellion in the field of communication. Telecommunication creates the entire worldwide in a small village by using the service life become more comfortable and easier. In its broadest sense, telecommunication is used to conduct commerce, encompassing within business, business to business and business to consumers' interaction. It is a stochastic system which is used to control the future state of a specific phenomenon based on numerical calculations. It depends on probability of mutual influence over time (Mehmood & Lu, 2011).

The word consumers' brand switching behavior mentions situations in which consumers change from buying a product brand different from that formerly bought. Brand switching can be encouraged by price, promotion, in-store displays, superior availability, perceived development or modernizations in competitive brands, aspiration for novelty, number of available brands, perceived risk, frequency of buying, alterations in quality, level of satisfaction with the most recent purchases and others. Therefore, brand switching is the procedure of selecting to shift from routine use of product or brand to steady usage of a different but similar product or dual user. Additional word markov analysis is a stochastic procedure whose possibility of being in any state depends only on its prior state. A markov analysis is a process that can be used to designate the behavior of a state in a dynamic situation. Exactly, it terms the behavior of a state in a dynamic situation. Conversely, future buying decision depends on recent past choice. It is well known that brand choice can be designated by a Markov Chain. It is used to take a two-stage decision making process: (a) whether to continue or whether to reconsider the last choice, (b) in the latter case which brand to choose. Brand switching is known as brand flying mentions to the procedure in which a customer changes from purchasing one brand of a product to buying another brand (Keller, 2008). In telecommunication area, the brand switching cost is relatively low, so consumers simply shift to another network, which deals competitive prices and quality. The effect behind consumer brand switching comprises undesirable experience of consumer because of poor product quality or service (Sultana, 2012). Building markov predicting model to forecast the state of a purpose in a certain period of time in the upcoming is the key principle of using Markov chain. Likewise, markov chain prediction method is only a probability forecasting approaches and the predicted outcomes are articulated as a probability of a specific state in the future (Zhang & Zhang, 2009).

The consumers create judgments about brand switching based on a methodical procedure of gaining, assessment and combination of the quality of product or service. Even if a consumer is loyal to a specific brand; and if the brand does not gratify his/her needs, the consumers change to a competitor brand. There are different aspects and causes which influence the switching behavior from one brand to another brand. As people of the third world country, consumers are very much price aware, but they have every chance of switching the mobile service provider because of industry development. Mobile industry is rising exactly and becoming reasonably priced because of competitor's innovative and attractive services. Number of companies in this area is rising, so each of them wants to over play with others to fascinate the consumers.

The research is conducted to explore the markov analysis for assessing consumers' brand switching behavior towards telecommunication sector in the

context of Bangladesh and also tried to identify the influential aspects related with brand switching about brand performance, From marketing perspective the study is indispensable with the help of recognizing the influential aspects and determinants which affect the switching behavior from one brand to another brand; marketers can implement suitable marketing approaches to accomplish market share.

The paper is allocated into the following sections. Firstly, represents the statement of the problem. Secondly, objectives of the study. Thirdly, literature review & research gap to brand switching. Fourthly, model specification. Next, deliberates the research method. Next, represents the results and discussions. Also, next, describe the recommendations and conclusion, lastly, limitations of the study and future research directions are presented.

STATEMENT OF THE PROBLEM

Although researches on consumers switching behavior towards telecommunication service has been conducted from numerous perspectives, the dynamic difficult natures of the aspects of switching behavior, mostly, firm selection of consumers and their opinions regarding brand preferences and competitive strategies have not been clearly addressed in Bangladesh.

Generally, consumers' brand switching behavior is influenced with the several categories of aspects, including the perceived brand development effects, environmental aspects, affects and cognition (feeling, thinking) and culturally adoption with the products and services have become a problem for the Bangladesh. Otherwise, consumers have every chance of switching the mobile service provider because of industry growth. Number of companies in this sector is increasing, thus, each of them wants to over play with others to fascinate the consumers. It has become economic, with the end of the result that consumers have less switching cost.

Hence, this research has empirically tested its pertinent elements from the contexts of Bangladeshi consumers. Thus, the information from this research can aid policymakers and planners to build more competitive brand in the market choice.

OBJECTIVES OF THE STUDY

The broad objective of the study is to investigate the markov analysis for evaluating consumers' brand switching behavior towards telecommunication sector in the context of Bangladesh. The specific objectives of this study, which are given the below:

- a) To measure different factors and determinants which impact on brand switching behavior?
- b) To find out the consumers' brand switching behavior based on markov analysis.
- c) To highlight some suggestions to reduce the consumers' brand switching tendencies.
- d) To improve the market position of mobile phone operators in Bangladesh.

LITERATURE REVIEW & RESEARCH GAP

The section has been provided a review of the relevant literature from where we can find out the research gap. Some selected reviews have been presented below to find out the specific research gap.

Reza et al. (2015) revealed that the purpose of the paper was to understand the aspects affecting brand switching in telecommunication sector. Variables of the research were service quality, brand image, value offered, trust, price, satisfaction, and loyalty whereas the dependent variable is switching cost. Several techniques were to collect data. The data analysis for the research was done by using the statistical package. The research designates several factors that play a significant role in switching behavior of consumers in telecommunication sector. The main limitation of the research was to consider some nominated aspects, but there are some intrinsic and extrinsic attributes which effect on brand switching behavior were excluded from the research.

Makwana et al. (2014) demonstrated that the research aimed to investigate the aspects influencing consumers brand switching behavior in the context of telecommunication industry. The investigation focused on identifying aspects persuading consumers switching behavior towards telecommunication industry, the research reveals that by providing value added services and real pricing approaches, telecommunication service providers can control consumers brand switching behavior and can relation with consumers. The main limitation of the research was that though many other features both internal and external can influence the brand switching behavior but are excluded from the study due to the scope of the model used.

Hasan et al. (2013) exposed that the area of the research was to identify the aspects affecting to Bangladeshi consumers' mobile phone operators' choice and change behavior. Both primary and secondary data were used, and data were collected from 174 consumers based on survey method, using self-administered questionnaires disseminated to the consumers at the research field heedless of consumers' socio-demographic features. The research revealed that network coverage, faster internet service, call charge and promotional package such as bonus on recharge, cash back on use are the chief features that effect consumers' mobile phone operators' choice and switching behavior.

Prasad and Prasanna (2016) exhibited that the objective of the research was to know factors persuading the behavior of the mobile phone users to shift their behavior of the mobile phone users to switch their service providers. The paper decided that there are different aspects which affect the consumers to switch from loyalty to switching intensions such as service quality, technology change, social effect, price, switching cost, and advertising. The results showed that cellular service providers pay attentions to all aspects and generally towards the price of the service, because the consumers' switching intensions were found to be most significantly influenced by the price. The major limitation of the research was studied six aspects that may affect consumers' switching behavior in cellular service. However, there may be other aspects that can have an effect on consumers' switching behavior but those were not examined in the research.

Gulamali and Julia (2017) presented that the paper aimed to discover which type of informants the social media influencers signify when consumers voluntarily switch brands after the endorsement of a brand by a social media influencer. The data results of the 190 successful questionnaires selected that when the consumers shift out of displeasure and an indispensable for variability, the social media influencers noteworthy symbolizes the role of an opinion leader. The results exhibited that the social media influencers function as an opinion leader, social

leader and micro-celebrity. The main limitation was that the technique which could be relevant to the world to be scrutinized how diverse consumptions incentives might be related to certain brand switching motivation.

Shujaat et al. (2015) displayed that the goal of the research was to examine the aspects which encourage brand switching among consumers in the context of telecommunication sector. Due to the low switching cost, the consumers easily change from one network to another making it essential to study those factors and evaluate the consumers switching behavior towards telecommunication sector. The data was collected through use of a structured questionnaire which was duly occupied by 500 consumers. The regression analysis, ANOVA and Correlation tests were applied to test research hypothesis. The results revealed that brand image, network quality, value added services, promotional activities and price directly affect consumers switching behavior among youngsters. The outcomes of the research can aid telecommunication companies in influential what factors are more significant to keep consumers loyal and to discourage brand switching.

Brezavscek et al. (2017) exhibited that the aim of the exploration was to progress a stochastic model for assessment and nonstop perceiving of various quality and helpfulness pointers of a given higher education study programme. The study programme was modelled by a limited markov chain with five brief and two fascinating situations. The probability transition matrix was created. The quantitative features of the fascinating markov chain, like the anticipated time until fascination and the prospects of absorption, are used to standardize chosen pointers of the programme. The model was applied to study the pattern of consumers' enrolment and their academic performance in a Slovenian higher education institution. Users' development towards the next period of the research programme was estimated. The expected time that a student spends at a specific period as well as the expected duration of the study was determined. The graduation and withdrawal prospects were achieved. In addition, a prediction on the consumers' enrolment for the next three academic years was made. The results were interpreted and discussed. The analysis presented was applicable for all higher education stakeholders. It was particularly useful for a higher education institution's manager seeing that it offers useful information to plan developments regarding the quality and usefulness of their study programmes to attain better position in the educational market.

Migdadi (2017) exposed that the paper area to adopt the markov analysis to predict the operations competitive advantages of mobile phone service providers. The secondary data of each service provider over the period was used for the purpose of research. The markov analysis was used to progress the series of predicted competitive position index for each service provider, and then regression analysis was used to estimate the changes in operations competitive places. The results presented that the competitive position leader service provider which is Zain will be enhanced in term of network coverage, cost of calls services and network accessibility. But the supporter competitive position will be developed in word of cost of calls services, number of basic and entertainment services. The laggard competitive position will be worsened over time. This is the first research which accepts markov analysis to measure the operations competitive position. The managers of the corporations have a clear insight about their upcoming competitive position. The leader and follower can endure their position, but the laggard should make further development with the intention of avoid the deterioration of its

position. The researcher can benefit from the technique of this paper to accept markov analysis to forecast the operations competitive position.

Paulsen (1990) demonstrated that two models like mixed markov and the latent markov model. Both can be seen as simplifications of Lazarsfeld's latent class model. The mixed markov model was defined as a finite mixture of markov chains, approving for individual differences in transition probabilities. It simplifies the latent class model by soothing the assumption of local independence. The latent markov model describes a markov chain operating at the unobservable or latent level, because of, for example, errors in the determination of the pertinent states. From a marketing perspective, a partial division method was taken. This is applied in well-defined statistical models that can be estimated and tested competently. The structural insights and forecasts provided by the models are demonstrated using a data set from Aaker (1970) on brand switching.

Fudenberg and Tirole (2000) showed that consumers poaching and brand switching. The aim of the research was to examine the switching and repeat purchasing effects of advertising in mature, frequently purchased product categorizations. The study was appealed on consumers' behavior philosophies of framing and usage dominance to formulate a logit choice model for assessing these effects. The research also was assessed the model using single-source scanner data. Results recommend that advertising persuades brand switching but does not affect the repeat buying rates of consumers who have just attained the brand, an outcome constant with usage supremacy rather than inclosing. It was found that the switching effect to be largely restricted between the present and earlier purchase occasions. The research decided that the magnitude of the effect and discover potential profitability. In the first study, scanner-panel data were used. Likewise, in the second study, logit choice model was used. These two studies used different mechanical features for their exploration.

Neger (2018) demonstrated that the area of the paper was to evaluate consumers' attitude towards brand switching on telecommunication sector. As the stimuli telecommunication service was selected. Tricomponent Attitude Model (TAM), Fashion's Multi-attributes Attitude Model (FMAM), Logistic Regression Model (LRM) and Markov chain were used to assess the variables. Telecommunication service related intrinsic and extrinsic cues where comprised five individual attributes like network availability, service quality, service charge strategies, brand image, offered value that served to influence consumers' attitude and some persuasive aspects like strong advertisement policy, huge offering packages, perception about network coverage, FnF tariff and so on which effect on consumers to shift from one to another brand of telecommunication sector. The main limitation of the research was that the study tried to consider only three leading telecommunication companies. It would have been more representative if the total number of telecommunication service providing firms of Bangladesh could have been taken under the research.

After reviewed some related literatures, it is clear that maximum scholars attempted to evaluate the consumers' brand switching behavior from the perspectives of foreign consumers, but this research has been tried to focus on this area from the perspectives of Bangladeshi consumers which remained as an unexplored field. Also, these literatures considered some factors which serve to influence consumers' switching behavior towards telecommunication sector. But

still there are some additional aspects which serve to influence consumers' brand switching behavior of the products or services yet to be explored.

Moreover, in Bangladesh, there is no depth research conducted yet so far in this regard. So, the study has been tried to fill up this gap by using additional determinants (strong advertisement policy, FnF tariff, perception about age of the consumers, marital status, satisfaction level about the current SIM) and appropriate statistical analysis techniques (logistics regression, markov chain) for assessing consumers' brand switching behavior towards telecommunication sector in the context of Bangladesh.

MODEL SPECIFICATION

The section is observed details model used in the study to fill up the research gap on the basis of literature review.

Logistic Regression Model

The logistic regression model is that model where to outcome (dependent or response) variable is binary. The qualitative response of the model is that yes/no or presence/absence and this response are coded by numerical value "1" and "0". The distribution of this model is binomial distribution. Maximum likelihood method is used to analyze the logistic regression model.

The maximum probability estimates and is denoted as $\hat{\beta}$. In practice many scholars select the logistic regression model due to its comparative mathematical simplicity that means, easily usable and explicable. In summary, we have shown that in a regression analysis when the outcome variable is dichotomous:

- a) The model for the provisional mean of the regression equation must be confined between zero and one.
- b) The binomial, not the normal, distribution of the errors and is the statistical distribution on which the analysis is based.
- c) The principles that guide an analysis using linear regression likewise guide us in logistic regression. The proposed logistic regression model is that

$$Y_i = \beta_0 + \beta_1 PP_i + \beta_2 AGE_i + \beta_3 NSPC_i + \beta_4 NSPC_i + \beta_5 ANC_i + \beta_6 CC_i + \varepsilon_i; i = 1, \dots, n$$

Where Y = {0, No Switching

{1, Switching

PP = Promotional Packages

AGE = Age of the consumer

FnF = No of FnF

NSPC = Number of SIM of the consumer

ANC = Area of the network coverage

C = Call charge

ε_i = Random of error.

Markov - Chain Model

Brand switching has been designated usually in a straightforward way by markov chains (Bass, 1961; Schmalensee, 1972). A markov analysis is a process that can be used to express the behavior of a state in a forceful situation. The significant portion of the markov chain is transition probability matrix.

Transition probability matrix is a matrix used to clarify the transitions of a markov chain. Each of its accesses is a nonnegative real number demonstrating a probability. To put some structure into the transition likelihoods it has been recommended (Schmalensee, 1972) that brand loyalty or switching behavior includes two-stage decision procedure: a) whether to switch to the same brand, and if not, b) which new brand to select? There are two basic likelihoods here, whether the old brand will be controlled out or not. While Schmalensee presumed the likelihoods of brand loyalty to be the same for all brands, we permit it to depend on the brand, since it is taken together an indication of consumers' satisfaction with the products or services.

Transition probability matrix is the matrix; by which to regulate the possibility of the consumers to switch from one state to another (**Table 1**). The probability transition matrix for three state GP, Banglalink, and Robi are given below in **Table 1**.

Table 1. The probability transition matrix.

State	GP	BL	Robi	Airtel	Teletalk
GP	P_{11}	P_{12}	P_{13}	P_{14}	P_{15}
BL	P_{21}	P_{22}	P_{23}	P_{24}	P_{25}
Robi	P_{31}	P_{32}	P_{33}	P_{34}	P_{35}
Airtel	P_{41}	P_{42}	P_{43}	P_{44}	P_{45}
Teletalk	P_{51}	P_{52}	P_{53}	P_{54}	P_{55}

Since the total of transition probability from a state i to all other states must be 1, so that

$$\sum_{j=1}^n P_{ij} = 1.$$

RESEARCH METHODS

The research aims are to assess consumers' brand switching behavior towards telecommunication sector in Bangladesh. The area of the present section is to deliberate a detail research method which has been used to collect and analyze the data. On the way to conduct a research, what is required is to plan the research outline and choice the suitable research method. The survey method is used for this research. Details of the pretests, sample respondents, types and sources of data, questionnaire design and data analysis processes are deliberated below.

Pretest 1

The aim of the first pretest was to obtain information, which aided in developing questionnaire. 10 corporate officers, 50 students of both public and private universities, 10 housewives, 10 bankers and 20 university teachers from both public and private universities who stay at Dhaka Metropolitan city and they are the voice caller have been selected for presetting. The pretest sample established the similarly accumulating constant with the prior expectation for the last research.

Pretest 2

In this stage the first pretest survey questionnaire was disseminated to universities teacher, students of both (public and private) universities, corporate officers, housewives, bankers and businessman who stay at Dhaka Metropolitan city and they are the voice caller. The goal of this method was to regulate if there was an essential for modification of the survey approach, arrangement, wording, and if it was essential to state any confusing measurement items. Respondents were stimulated to contribute their response and comments regarding the predominantly developed survey questionnaire, and then such recommendations were considered in the modification of the questionnaire. A total of 100 participants from the sampling frame were designated and asked if they understood the questions and if anything was left out that they felt should have been encompassed. Their notes and recommendations were amalgamated into the design of the final questionnaire.

Target population

The population of the exploration are mostly students of the universities (public and private) and professional of different groups (Universities Teachers, Different Businessmen, Bankers, Corporate Officers, Housewives and other Government, Non-government employees) who stay at Dhaka Metropolitan city; age 18 to 65 years, and they are the voice caller.

Sampling technique and sample size

The probability sampling technique (*stratified sampling*) has been used on the basis of gender and profession of consumers. The sample size can be designed on the basis of the following formula:

$$n_{\text{strat}} = D \times n_{\text{srs}}$$

Where, n_{srs} refers sample size of simple random sampling

$$n_{\text{srs}} = \frac{z^2 pq}{d^2} = \frac{(1.96)^2 \times 0.47 \times 0.53}{(0.05)^2}$$
$$= 383$$

Here, n = required sample size

z = standard value of 1.96 at 95% confidence level

p = estimated proportion of Grameen Phone Users

d = margin of error at 5% (standard value of 0.05)

D = refers design effect for stratified random sampling (say, $D = 2$)

So, required sample size $2 \times 383 = 766$.

Types and sources of data

Both primary and secondary data have been used to get the real results of the research. Primary data has been collected from the field directly and secondary data has been collected from the published materials of different organization (BTRC, Grameen Phone Limited and others).

Questionnaire design

Data has been collected from students of the universities (public and private) and professionals of different classes through a set of organized questionnaires. In the first page of the questionnaire it has been designated the aim of the research. After that some introductory questions are incorporated in the questionnaire. In the next page of the questionnaire the respondents have been asked to turn the page comprising some dichotomous questions to study the effect of some influential aspects which impact on consumers switching behavior towards telecommunication sector in the context of Bangladesh. Next, some informative questions are used for analyzing the switching tendencies of consumers.

Some open-ended questions are used here to identify the opinion of respondents. For finding out the psychological and demographic aspects, there are also six prescribed questions are mentioned in the questionnaires. A total of 1100 questionnaires were disseminated to the people who were the target respondents of the research. Number of 912 respondents were received, of which 840 were completed and useable. Therefore, lastly 840 questionnaires have been used for the analysis purpose.

Data analysis procedures

Tubular presentations, descriptive statistics have been used to assess the demographic variables- gender, age and profession of the respondents. The opinion of the respondents has been examined in the light of the analysis processes used by logistic regression model to recognize the significance influential aspects which are measured by the consumers to switch from ore to another brand of telecommunication sector. Then, markov chain (Transition probability matrix) has been also used to find out the consumers brand switching behavior from one to another brand.

RESULTS AND DISCUSSIONS

Both Univariate and Multivariate Analysis used to analyze the data. Univariate analysis is used as a statistical approach for assessing the socio-demographic characteristics of the respondents.

Multivariate analysis techniques used to recognize the significance influential aspects which affected on consumers brand switching behavior towards telecommunication sector based on binary logistic regression model. After that markov chain (Transition probability matrix) has been also used to find out the brand switching tendencies of consumers from one to another brand.

The demographic profile of respondents

As illustrated in **Table 2**, the results of the respondents' socio-demographic characteristics. The study discloses that 86.4% respondents are in age 18 to 35 from where 75.48% respondents are male. Also, about 66% of the respondents are

students of the tertiary levels who have adaptable capability about sophisticated technology and also aware about market change.

Markov analysis for assessing brand switching behavior

A markov analysis is a process that can be used to elucidate the behavior of a method in a dynamic situation. Specifically, it designates and forecasts the movement of a method, among different method states, as time passes. The markov procedure designates the movement of a method from a certain condition in the current stage to one of n possible states in the next stage. The transition probability is the likelihood that the method, presently in one state, will move to another state in the next period.

Table 2. The demographic profile of respondents.

Age	Number of the consumers			Percentage (%)
	Male	Female	Total	
18 – 25	412	128	540	64.3
26 – 35	136	50	186	22.1
36 – 45	81	15	96	11.4
46 – 55	6	9	15	1.8
56 – 65	2	1	3	0.4
Total	637	203	840	100
Profession	Number of the consumers			Percentage (%)
Student	557			66.3
University Teacher	35			4.2
Banker	29			3.5
Businessman	66			7.9
Corporate officer	28			3.3
Government Employees	29			3.5
Non-Government Employees	50			6.0
Housewife	46			5.5
Total	840			100

Source: Researchers' field data

As illustrated in **Table 3**, The probability that a consumer will move from GP to Banglalink is 0.345 whereas a consumer will move from Banglalink to GP is 0.190. Again, the likelihood that a consumer will move from GP to Robi is 0.190 whereas a consumer will move from Robi to GP is 0.360. Other hand, the probability that a consumer will move from GP to Teletalk is 0.063 whereas a consumer will move from Teletalk to GP is 0.283. A consumer will switch from Banglalink to Robi with probability 0.224 whereas switching probability will be 0.093 from Robi to Banglalink. The likelihood that a consumer will move from Banglalink to Airtel is 0.176 whereas a consumer will move from Airtel to

Banglalink is 0.129. The probability that a consumer will move from Banglalink to Teletalk is 0.053 whereas a consumer will move from Teletalk to Banglalink is 0.132.

The likelihood that a consumer will move from Robi to Airtel is 0.115 whereas a consumer will move from Airtel to Robi is 0.269. Lastly, the probability that a consumer will move from Robi to Teletalk is 0.094 whereas a consumer will move from Teletalk to Robi is 0.264.

Binary logistic regression for identifying influential aspects related to brand switching

As illustrated in **Table 4**, Brand switching is a very vigorous issue in telecommunication industries. To increase profit margin and reduce business risk, operation manager needs to know the influential aspect related to consumers' brand switching behavior. Network availability, strong advertisement policy, huge offering packages, perception about network coverage, FnF tariff, perception about age of the consumer, profession of the consumer, marital status and user satisfaction level about the current SIM are the significant associated factors related to brand switching ($P < 0.1$) on the basis of χ^2 and Cramers' V.

On the other hand, the study has been considered call rate, SMS charge, income, and age of the consumer as quantitative variables which may be correlated with brand switching.

Brand switching is a binary response variable (switch= 1 or non – switch=0) in this study which may be depend on several predictors. To find out the degree of the dependency among binary response variable and predictors, logistic regression is appropriate.

The value of the Hosmer-Lemeshow test statistic is 5.51 with P-value=0.702 which is greater than 0.05, so the null hypothesis (H_0 : There is no difference between the observed and predicted values) cannot be rejected. Hence, there is enough evidence to conclude that the current model appears to fit the data reasonably well. Again, higher overall percentage of correct predictions gives better model. The overall percentage of correct predictions is 65.60% by this model.

Table 3. Transition Probability for Assessing Brand Switching.

	Grameen Phone Ltd. (GP)	Banglalink Digital Communications Limited	Robi Axiata Limited (Robi)	Airtel Bangladesh Limited	Teletalk Bangladesh Limited
Grameen Phone Ltd. (GP)	0.289	0.345	0.19	0.113	0.063
Banglalink Digital Communications Limited	0.19	0.357	0.224	0.176	0.053
Robi Axiata Limited (Robi)	0.36	0.093	0.338	0.115	0.094
Airtel Bangladesh Limited	0.194	0.129	0.269	0.29	0.118
Teletalk Bangladesh Limited	0.283	0.132	0.264	0.057	0.264

Source: Researchers' field data

Table 4. Association among Brand Switching and Other Aspects.

Aspects	Brand Switching			
	χ^2		Crammer's v	
	Statistic	P value	Statistic	P value
Network availability	8.630	.071	.101	.071
Service quality	3.318	.506	.063	.506
Strong advertisement	52.149	.000	.249	.000
Offering packages	52.611	.000	.250	.000
Perception about network coverage	2.957	.086	.059	.086
FnF tariffs influence	30.892	.000	.192	.000
Perception about age of the user	37.996	.000	.213	.000
Multiple SIM use	.413	.520	.022	.520
Profession of the user	33.476	.000	.200	.000
Gender of the user	1.531	.216	.043	.216
Marital status of the user	29.729	.000	.188	.000
User satisfaction about current SIM	5.983	.014	.084	.014

Source: Researchers' field data

Logistic Regression Estimates of Effects of Different Aspects on Brand Switching

As illustrated in **Table 5**, The binary logistic regression model recommended that brand switching is significantly influenced by strong advertisement ($P < 0.01$) effort of the telecommunication firm whereas the consumers' those who have positive belief about the perception of strong advertisement is 2.041 times more likely to brand switching rather than those who does not.

Again, the consumers' those who have positive belief about the perception of offering package is 1.542 times more likely to brand switching rather than those who does not. It also revealed that perception of offering package is a significant determinant ($p < 0.05$) for brand switching in the telecommunication sector.

The likelihood of the users who believe that age is a considerable factor for brand switching is about 74% more than the users who does not believes so. It also explained that average switching status will be decrease for every unit increase of age. These indicate that age of the users is a significant determinant of brand switching behavior ($p < 0.05$).

The binary logistic regression model suggested that brand switching is significantly influenced by multiple SIM use of the consumer ($p < 0.10$) whereas the consumers' those who have multiple SIM is 1.354 times more likely for brand switching rather than those who have single SIM.

Likewise, it disclosed that profession of the users is one of the significant factors for brand switching behavior whereas switching rate of university teachers, businessman and other government employee are higher than housewife.

The consumers' who has positive perception about their own service providing brand is 43% less likely to switch their brand than who has comparative

less positive perception. This means that, perceptions about total attribute rating about brand is a significant indicator for brand switching.

Table 5. Logistic regression estimates of effects of different aspects on brand switching.

Independent Variables	β	S.E.	Odds Ratio (OR)
Strong Advertisement (r: No)			
Yes	.713***	.181	2.041
Offering packages (r: No)			
Yes	.433**	.186	1.542
Perception about Network Coverage (r: No)			
Yes	.004	.169	1.004
Call Rate Per Minute	-.235	.293	0.791
SMS Charge (Per SMS)	-.524	.332	0.592
FnF Tariff Influence	.060	.187	1.062
Perception about Age of the Consumer (r: No)			
Yes	.553***	.175	1.738
Multiple SIM Use (r: Single)			
Multiple	.303*	.180	1.354
Age of the Respondent	-.053**	.021	0.948
Profession of the Respondent (r: Housewife)			
Student	.647	.543	1.910
Universities Teacher	1.592***	.606	4.913
Banker	.871	.642	2.389
Businessman	1.230**	.554	3.422
Corporate Officer	.740	.642	2.095
Government Employees	1.573**	.634	4.822
Nongovernment Employee (NGO, Company etc.)	.434	.565	1.544
Monthly Income	-.111	.084	0.895
Gender of the Consumer (r: Male)			
Female	-.230	.214	0.794
Marital Status (r: Single)			
Married	.077	.284	1.080
Number of Out Call	.006	.006	1.006
Perception about Total Attributes Rating (r: Negative)			
Positive	-.566***	.163	0.568
Constant	.448	.841	1.566

Note: Level of significance *** $P < 0.01$; ** $P < 0.05$; * $P < 0.10$

Source: Researchers' field data

RECOMMENDATIONS & CONCLUSIONS

Based on the findings we put forward the following recommendations:

- a) Telecommunication service providers need to reduce the higher customer cost and provide increased quality of service. They may offer attractive bundle packages with low price for increasing future consumers' attraction;
- b) Operators should create trust worth and rational appeal in their advertisements. They should conduct innovative promotional campaign and generating subject oriented advertisement for creating attraction of different professional;
- c) The suggestion for the telecommunication service providing firms is that they should try to improve the technical quality of the service based on their subscribers' expectation;
- d) Telecommunication service providers should monitor their activities and take initiative to improve its both intrinsic and extrinsic attributes of service in comparison to competitors' firms.

Conclusively, Bangladesh has adopted information communications Technologies (ICTs) as tools for development. The paper has employed to recognize consumers' brand switching behavior based on Markov chain (Transition probability). The results highlight that the consumer will move from GP to Banglalink, GP to GP and GP to others. The logistic regression model has been applied to realize the importance influential factors which are considered by the consumers to switch from one to another brand of telecommunicate service. The results highlight the need to gain an understanding of the influences of aspects and their contribution to the brand preference individually.

Lastly, it can be said that though there are some restrictions of the paper it might be an effective avenue for the service providers of telecommunication service to evaluate the brand switching behaviors on telecommunication sector in Bangladesh. Positively, the method employed for this study can be used in other experiments to understand more fully the influence of service quality variation on consumer select and choice procedure. Students and academicians may follow the systematic procedure of quantitative and qualitative analysis from this exploration.

If any company wants to dominate the market and retain their consumers, they must have to consider the switching behavior of consumers. They should introduce such an offer or package as the consumers' demand, improve network quality, arrange innovative advertisement and promotional campaign to ensure satisfactory level of customer services; otherwise it is not possible to survive in the competitive market of telecommunication firms in Bangladesh.

LIMITATIONS AND DIRECTIONS FOR FURTHER RESEARCH

The study spawns a number of limitations and potential fertile directions for future research. The study focuses on scrutinizing the aspects (network availability, strong advertisement policy, huge offering packages, perception about network coverage, FnF tariff, perception about age of the consumer, profession of the consumer, marital status and user satisfaction level about the current SIM) related to the object. Through many other factors both internal and external can affect the brand switching behavior. Further investigator can notice and evaluate importance of unexplored internal and external factors relate to brand switching.

After that respondents who stay at Dhaka Metropolitan city and are the voice caller have been considered for the study. But future researchers can be measured the whole geographical areas of Bangladesh to select the sample unit;

and not only they will be the voice caller but also be the internet user from the said telecommunication firms.

Moreover, the main limitation of this study is that the paper tries to consider 5.5% housewife as sample, almost among did not fully conscious about telecommunication service. They provided their opinion based on their likely most one and willingly they are not interested to answer of the questionnaire. This is especially significant for manufacturers who need to decide whether the telecommunication service providing firms and attributes of telecommunication service shown in this study were limited to these populations due to not taking the opinion from unconscious and illiterate housewives etc.

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