MODELING OF CHURN BEHAVIOR OF BANK CUSTOMERS USING LOGISTIC REGRESSION

Ndung'u Anne Wanjira

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Declaration

I hereby declare that this submission is my own work towards the Msc in Applied Statistics and that,to the best of my knowledge ,it contain no material previously published by another person nor material which has been accepted for the award of any other degree of the university,except where due acknowledgment has been made.

Anne Wanjira Ndung'u   ....

Sc382-1468/2011   Signature   Date

Dr Gichuhi A. Waititu   ....

Supervisor: Signature   Date

Dr John Kihoro   ....

Supervisor: Signature   Date

Abstract

With the intense competition and increasing globalization in the financial markets, bank management must develop customer-oriented strategies in order to compete successfully in the competitive retail banking environment. The longer a bank can retain a customer,the greater revenue and cost savings from that customer. However customers are prone to changing their banking behavior when they can purchase nearly identical financial products provided by the retail banks. In order to stay competitive, bank managers need to understand the customer that are likely to switch, factors that influence and determine customers switching behavior and also to what extent each of the factor influence customer switching.

This research aimed at modeling the churn behavior of bank customer using logistic regression.It also identified the factors that contribute to the switching behavior and also to what extent each of the factors influenced the switching behavior.

The findings reveal that Bank reputation,Service quality,Service Products and Price are the main factors that have an impact on customers switching behavior.In general, the results of this research allow service marketers and practitioners to develop and implement services marketing strategies to decrease customer defection rates , and in turn, increase bank profits. Furthermore,this research provides useful information for future researchers who study switching-behavior in the banking industry.

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List of Abbreviations

LTV   LifeTime Value

CL   Customer Loyalty

CR   Customer Retention

CRM   Customer Relationship Management

CS   Customer Satisfaction

ML   Maximum Likelihood

SPSS   Statistical Package for the Social Sciences

Dedication

To my parents,Mr and Mrs Ndung'u and my entire family.

1 Introduction

1.1 Background of the study

The subject of customer retention, loyalty, and churn is receiving attention in many industries. This is important in the customer lifetime value context. A company will have a sense of how much is really being lost because of the customer churn and the scale of the efforts that would be appropriate for retention campaign. The mass marketing approach cannot succeed in the diversity of consumer business today. Customer value analysis along with customer churn predictions will help marketing programs target more specific groups of customers. Personal retail banking sector is characterized by customers who stays with a company very long time. Customers usually give their financial business to one company and they won't switch the provider of their financial help very often. In the company's perspective this produces a stable environment for the customer relationship management. Although poor relationships with the customers will lead to potential loss of revenue because of customer churn which in this case can be huge and we know that Enterprises in the competitive market mainly rely on the incessant profits which come from existing loyal customers. Therefore, customer relationship management (CRM) always concentrates on loyal customers that are the most fertile and reliable source of data for managerial decision making. This data reflects customers' actual individual product or service consuming behavior. This kind of behavioral data can be used to evaluate customers' potential life time value to assess the risk that they posse once they stop paying their bills or will

stop using any products or services, and to anticipate their future needs.

Today, customer relationship management (CRM) systems are replacing traditional mass marketing strategies by selective or personalized marketing practices. These selective marketing practices involve identifying a sub-set of existing customers that are likely to stop using products or services of the company (churn). As existing customer's churning will likely to result in the loss of businesses and thus decline in profit thus churn prediction has received increasing consideration in the consumer marketing and management research literature over the past few years. In addition, literature suggests that a small change in the retention rate can result in significant impact on business. In order to effectively control customer churn, it is important to build a more effective and accurate customer churn prediction model. As we consider from business intelligence perspective, churn management processes under the customer relationship management (CRM) framework consists of two major analytical modeling tasks. First task is predicting those customers who are about to churn and second task is assessing the most effective way that an service operator can react that includes providing special promotion programs to customer or simply do nothing for customer retention.

In personal retail banking a company must operate on a long term customer strategy, young customers are recognized as being unprofitable in the early stage in life cycle but will become profitable later on. So as the customer relationships last, maybe decades, the company must address the value of a potential loss of a customer. The customer lifetime value analysis will help to face this challenge. The customer lifetime value is usually defined as the total net income from the

customer over his lifetime. This type of customer analysis is done under several terms: customer value, customer lifetime value, customer equity, and customer profitability. The underlying idea in LTV concept is simple and measuring the lifetime value is easy after the customer relationship is over. The challenge in this concept is to define and measure the customer lifetime value during, or even before, the active stage of customer relationship. Hoekstra et al defines a conceptual LTV model as follows: LTV is the total value of direct contributions and indirect contributions to overhead and profit of an individual customer during the entire customer life cycle that is from start of the relationship until its projected ending. Most LTV models stem from the basic equation, although there are also many other LTV models having various application areas. The components of the basic LTV model are: The customer net present value over time (revenue and cost), Retention rate or length of service (LoS) and Discount factor. Each component can be measured or estimated separately and then combined for the LTV model. The benefits of better understanding the customer lifetime value are Numerous. The Company can measure the present and the future income from the customers. The company can also foster customer retention and loyalty which will lead to higher customer profitability. The LTV analysis can also help the company on their customization of products and services. This understanding of the customer value helps the company to focus on revenue productive customers and yield the customer segment with potential negative impacts to the revenue. And last, the customer lifetime value is not a fixed value it can be influenced by marketing efforts. The focus on customer churn is to determinate the customers who are

at risk of leaving and if possible on the analysis whether those customers are worth retaining. The churn analysis is highly dependent on the definition of the customer churn. The customer churn is closely related to the customer retention rate and loyalty. Hwang et al. defines the customer defection the hottest issue in highly competitive wireless telecom industry. Their LTV suggest that churn rate of a customer has strong impact to the LTV value because it affects the length of service and the future revenue. Hwang et al. also defines the customer loyalty as the index that customers would like to stay with the company. Churn describes the number or percentage of regular customers who abandon relationship with service provider. Modeling customer churn in pure parametric perspective is not appropriate for LTV context because the retention function tends to be "spiky" and non smooth, with spikes at the contract ending dates . And usually on the marketing perspective the sufficient information about the churn is the probability of possible churn. This enables the marketing department so that, given the limited resources, the high probability churners can be contacted first. The loyal customers are those who shop frequently and at the same time exhibit a regular buying pattern. In this retail setting the customer churn is defined as customers who switch their purchases to another store. This is hard to detect because customers may still have transactions in the previous store. So Butnix et al. classify the customer a partial defective if he deviates from his established buying behavior. This is possible because in their setting they focus only on loyal clients. Personal retail banking sector is a typical market sector where a customer is not regularly switching from one company to another. Customers

usually give their banking business to one or two companies for long periods of time. This makes customer churn a priority for most companies in the banking sector. [Garland(2002)] has done research on customer profitability in personal retail banking. Although their main focus is on the customers' value to the study bank, they also investigated the duration and age of customer relationship based on profitability. His study was based on customer survey by mail which helped him to determine the customer's share of wallet, satisfaction and loyalty from the qualitative factors. The banking business is characterized by many customers with different characteristics and financial demands. This is indicates that the mass marketing approach is not likely to succeed with the diversity of consumer business. The banking business is likely to loose customers, and consequently performance, if they embarked on a mass marketing approach instead of a customer centric approach. A customer centric approach may be advantageous in a developing country such as Kenya because of its diverse population with different cultural backgrounds. The business is faced with the challenge of maintaining and satisfying these customers with different backgrounds, interests and approaches towards their own personal finances.

Traditionally, Banks have dominated the financial service sector for many years due government regulation,the high cost of entry, and the physical distribution networks, [Reber(1999)] More recently, banks have been confronted with increased competition from both financial institutions and non-bank institutions, [Hull(2002)]. New technologies such as the internet, have boosted the entrance of new competitors during the last few years and banks now must compete with new

types of products created through the internet, [Gonzalez and Guerrero(2004)]. The deregulation and the emergence of new forms of technology have acted to create highly competitive market conditions and consumers are more price and service conscious in their financial services buying behavior, [Beckett and B(2000)]. In New Zealand the number of banks have been reduced and the use of automatic teller machines and other electronic transaction mechanism have increased due to increased competition, funding constraints and adoption of new technologies, [Denys(2002)]. Many New Zealand banks have employed customer retention strategies to compete aggressively in a more competitive banking environment. Customer retention is logical as the longer a customer stays with an organization, the more profits the customer generates, [Reichheld(1990)]. Long term customers tend to increase the value of their purchases, the number of their purchases and produce good word of mouth. In addition, from a cost perspective, retaining an existing bank customer costs less than recruiting a new one. Therefore, it is important that banks not only know the number of customer they are retaining and losing, but also understand the underlying factors influencing their customers to switch banks. The purpose of this research was to model the churn behavior of bank customers using logistic regression, To identify the factors that contribute to customer switching and to know to what extent each of this factor contribute to customers switching from the customers point of view. The factors that were measured were based on a thorough review of literature and were identified as Price, Service quality, Involuntary switching, Bank reputation, Services products and effective advertising competition.

1.1.1 Statement of the problem

Customer churn may be a critical issue for banks. Previous researches have been able to identify the customers who are about to churn from banks and identified factors that contribute to customers churning in the banking sector, however these studies have not been done in Kenya and these factors may not apply in Kenya's context because of its diverse cultural environment thus there is need to establish the factors that apply to Kenya's case. In Kenya the decision of what actions to deliver to what customers is normally left to managers who can only rely upon their limited knowledge. In this study we used Logistic Regression to identify the customers who are about to churn, the factors that contribute to their churn and their extent in influencing customer churn.

1.1.2 Justification

With the intense competition and increasing globalization in the financial markets, bank management must develop customer-oriented strategies in order to compete successfully in the competitive retail banking environment. The longer a bank can retain a customer, the greater revenue and cost savings from that customer. However, customers are also more prone to changing their banking behavior when they can purchase nearly identical financial products provided by the retail banks. In order to stay competitive, bank managers need to know the customers who are about to churn and understand the factors that influence customer's bank switching behavior.

1.1.3 Hypothesis

H_1: There is no significant relationship between pricing and Customers' switching banks.

H_2: There is no significant relationship between service quality and Customers' switching banks.

H_3: There is no significant relationship between Involuntary switching and Customers' switching banks.

H_4: There is no significant relationship between service products and Customers' switching bank.

H_5: There is no significant relationship between bank reputation and Customers' switching bank.

H_6: There is no significant relationship between customer satisfaction and Customers' switching bank.

H_7: There is no significant relationship between Effective advertising competition factor and Customers' switching bank.

1.2 Objectives

1.2.1 Main objective

1. To model the churn behavior of retail bank customers

1.2.2 Specific objectives

1. To identify the contributing factors to customers churn behavior in retail banking.

2. To identify the extent of each factor in influencing customers churn behavior.

1.3 Research Contribution

This study will make several contributions to the marketing literature from both a theoretical and a managerial perspective by satisfying the 3 research objectives. First, this study will contribute to the marketing literature by providing an empirical examination of several service marketing constructs. The results of the study will also provide an improved understanding of how price ,bank reputation, Service products, Service quality, Effective advertisement and the involuntary switching influence customer's switching behavior in the Kenyan retail banking industry.

Secondly, This study will benefit marketers and practitioners in the Kenyan retail banking industry. This research will model the customer switch behavior using Logistic regression which can be used to predict customer who are about to churn, it also identify the most important factors that cause customers to switch or stay with a bank. This knowledge can make a contribution to enhancing long-term customer relationships with bank customers. In addition, bank managers can utilize this knowledge to prevent perspective customers from switching service

providers. From the perspective of the banks that are attempting to attract new customers, this information will enable them to develop strategies to overcome switching barriers and gain market share.

2 Literature Review

As the market becoming more competitive, many companies have started realization of the importance of customer-oriented business strategy for sustaining their competitive edge and maintaining a stable profit level at top line and bottom line. That is, companies mainly rely on the stable income which comes from loyal customers. However, creating new customers and retaining loyal customers is difficult and costly. As new customer account is setup different expenses like credit searching, advertising and promotional expenses are occurred. These expenses are several times greater than cost of efforts that might enable the firms to retain a customer. So, it has developed into an industry-wide belief that the best core marketing strategy for the future is to retain existing customers and avoid customer churn. Marketing research literature has noted that 'customer churn' is a term used in the banking service industry to indicate the customer movement from one provider to another, and 'churn management' is a term that describes an operator's process to retain profitable customers. Churn is also called attrition and often used to indicate a customer leaving the service of one company in favor of another company. Similarly, the term churn management in the banking services industry is used to describe the practices of securing the most important customers for a company. In essence, effective customer management presumes an ability to forecast the customer decision to shift from one service provider to another.Customer management also presumes a good measurement of customer profitability and different strategic and tactic retention measures to overcome the customer's movement. In practice, a bank can segment its customers by their

profitability and focus retention management only on those profitable customer segments. The other way is, to score the entire customer data base with respect to propensity to churn and prioritize the retention effort based on profitability (life time value of customer) and churn propensity. [Burez and Van den Poel(2008)] indicate that there are two types of targeted approaches to managing customer churn: reactive and proactive. When a company (bank) adopts a reactive approach, it waits until customers ask the company to cancel their service relationship. In this situation,the company may have to offer the customer an incentive to stay. On the other hand, when a company proceeds with a proactive approach, it tries to identify customers who are likely to churn to other service providers before they actually do so. The company then provides special promotion programs or incentives for these customers to avoid the customers from churning. Targeted proactive promotion programs have potential advantages of having lower incentive costs. However, these strategies may be very wasteful if churn predictions are inaccurate, because companies will be wasting money to incentive customers who will not churn. Therefore, an accurate customer-churn prediction model is also critical for success of customer incentive programs.

The customer lifetime value is usually defined as the total net income from the customer over his lifetime. This type of customer analysis is done under several terms: customer value, customer lifetime value, customer equity, and customer profitability. The underlying idea in LTV concept is simple and measuring the lifetime value is easy after the customer relationship is over. The challenge in this concept is to define and measure the customer lifetime value during, or even

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The focus on customer churn is to determinate the customers who are at risk of leaving and if possible on the analysis whether those customers are worth retaining. The churn analysis is highly dependent on the definition of the customer churn. The business sector and customer relationship affects the outcome how churning customers are detected. Example in credit card business customers can

easily start using another credit card, so the only indicator for the previous card company is declining transactions. On the other hand for example in Finnish wireless telecoms industry a customer can switch one carrier to another and keep the same phone number. In this case the previous carrier will get the signal right at the churning moment. The customer churn is closely related to the customer retention rate and loyalty. Modeling customer churn in pure parametric perspective is not appropriate for LTV context because the retention function tends to be "spiky" and non smooth, with spikes at the contract ending dates. And usually on the marketing perspective the sufficient information about the churn is the probability of possible churn. This enables the marketing department so that, given the limited resources, the high probability churners can be contacted first. The loyal customers are those who shop frequently and at the same time exhibit a regular buying pattern. In this retail setting the customer churn is defined as customers who switch their purchases to another store. This is hard to detect because customers may still have transactions in the previous store. So Butnix et al, classify the customer a partial defective if he deviates from his established buying behavior. This is possible because in their setting they focus only on loyal clients. Personal retail banking sector is a typical market sector where a customer is not regularly switching from one company to another. Customers usually give their banking business to one or two companies for long periods of time. This makes customer churn a priority for most companies in the banking sector. [Garland(2002)] Garland has done research on customer profitability in personal retail banking . Although their main focus is on the customers' value to

the study bank, they also investigate the duration and age of customer relationship based on profitability. His study was based on customer survey by mail which helped him to determine the customer's share of wallet, satisfaction and loyalty from the qualitative factors.

The introduction of massive technology into the banking business, has helped the business to keep track of the customer's crucial information and behavior patterns. Businesses have massive amounts of data which may be useful to support crucial business decisions [Nguyen and LeBalnc(2001)]. For example, analyzing customer transactions data, may lead to an improvement in production and promotions to the right segment of customers in terms of age, race group in a multicultural environment, gender or income group. Authors such as, [Garland(2002)], [Mutanen(2006)] and [Mavri and Loannou(2008)] have paved a way in the area of customer relationship management, customer churn and customer retention models. Retaining customers becomes one of the most serious challenges facing customer service providers, [Au and Ma(2003)]. [Mutanen(2006)] identified factors that contribute to customer churning behavior. The author describes customer age, account age, and income amount as other factors which may help to identify customer churning behavior. The focus on customer churn has been placed on the influential behavioral factors rather than the churning percentage of the customer. Businesses who understand customers and their behavioral patterns stand a chance of sustaining a good relationship with their customers. By integrating various data, such as operations or service logs, researchers can obtain a more complete view of customer behavior. Current customers are a businesses

greatest potential source of sales and profits. For many businesses, 80% of sales come from 20% of their existing clientele. Some studies, [Geppert(2002)], highlight some causes of churn behavior. These behaviors are, namely, price, service quality, fraud, lack of business responsiveness, brand loyalty, privacy concern, and new technology or a product introduced by a competitor. The business should maintain its brand standard, evaluate its price and assure customer privacy regarding their information.

CRM is the process of collecting and analysing a firm's information regarding the customer's value to the business. CRM is the outcome of the continuing evolution and integration of marketing ideas as well as of data which has only recently been made available data, technologies, and 11 organizations, [Boulding and Johnston(2005)] he emphasis is not on how one sells the product, but rather on how one creates value for the customer, and in the process, creates value for the business. [Benaroch(2005)] defines Customer Relationship Management as a collective term for business strategies, financial processes and software technologies relating to an individualized relationship between an enterprise, customer prospects, and business partners. These strategies are deployed with the goal of winning new customers, extending existing customer relationships across the entire customer life cycle, as well as improving competitiveness and business success by optimizing the long term profitability of the individual customer relationship. [Boulding and Johnston(2005)] define CRM as the process of achieving and maintaining an ongoing long term relationship with the customer, and identifying the overall financial contribution of a customer to the business. In the

marketing literature, [Benaroch(2005)] refer to CRM as a company–wide business strategy designed to optimize profitability, revenue, and customer satisfaction by focusing on a highly defined and precise customer group.

In the retail banking environment, where more sophisticated consumers with less banking loyalty is becoming the norm, customer service quality is an essential competitive strategy, [Mavri and Loannou(2008)]. The quality of services and products offered by the bank, in combination with the brand name has a positive effect in decreasing churn, [Mavri and Loannou(2008)]. Banks need to develop a CRM strategy in which the intention of clustering clients across their personal characteristics and exclusive attributes, will contribute to a decrease in the rate of retention, [Mavri and Loannou(2008)]. Banks should also implement strategies to specifically increase the knowledge of businesses and the attitudes of bank employees, so that their attitudes can positively influence their CRM and ultimately their service quality, [C(2006)]. These strategies are an important part of reducing customer churn behavior and encouraging loyalty to the bank. A loyal customer to a bank is referred to as a customer who will stay with the same service provider, is likely to take out new products within the bank and is likely to recommend the bank's service. Thus, commercial banks have embarked on different management strategies as a way of promoting customer loyalty, [Jamal and Nasser(2002)]. Other issues of gaining customer loyalty in the banking system include confidentiality in transactions, the banks trustworthiness, the introduction of weekend banking, the extension of banking hours and the provision of insurance, [O(2006)].

The issue of the customer relationship and switching behavior in the banking industry is one of the problems which many banking businesses face on a daily basis. The challenge is: 'how does one keep the customer happy and ensure that customers continue to do business with the bank?' A study was conducted on the effect of gender on customer loyalty, in Malaysian banks, [Ndubisi(2005)]. The key finding of this study is that female customers are significantly more loyal than males when the bank is very trustworthy. [Bick G. and Abratt(2004)] on the other hand indicate that customers are not satisfied with the services, products and levels of customer intimacy delivered to them by their banks. Thus, they did not believe that they were getting the value they expected. Therefore, it is essential for retail banks to achieve operational excellence as a matter of urgency and to become more market or customer focused and engage with the customers to seek their input.

[Keaveney(1995)] developed a model of customer switching behavior in service industries. By collecting "grounded events" or actual incidents that caused customer to switch services, they used critical incident technique(CIT) to study on customer's behavior and found that customer switch service providers for many reasons,including pricing, inconvenience,core service failures,failed service encounters, response to fail service encounters, competition and ethical problems. [Boulding and Johnston(2005)] studied the implication of loyalty program membership and service experiences for customer retention and value. They employed logistic regression analysis to determine variables explaining customer retention and t-test to test differences in re patronage decisions between members and non

members of loyalty programs.

2.1 Independent variables:

2.1.1 Price factor:

From customer's cognitive conception, price is something that must be given up/sacrificed to obtain certain kinds of products or services, [A and J(1998)]. Pricing in the context of banking has additional components. Banks charge not only fees for the services, but also impose interest charges on loans and pay interest on certain types of accounts, thus pricing has a broader meaning in the banking industry, [Gerrald and Cunningham(2004)]. In a qualitative study of customer switching among services, [Keaveney(1995)] reported that more than a half the customers had switched services due to poor service/price perceptions. This findings suggests that unfavorable price perceptions may have a direct effect on a customer's intention to switch. [M and B(2001)] empirically confirmed that pricing had the most impact on customer switching in the New Zealand and Australian banking industries.

2.1.2 Reputation factor:

In the banking industry, [H(1994)] suggested that bank reputation was a function of financial performance ,production quality, service quality and management effectiveness. [Gerrald and Cunningham(2004)] also referred to bank reputation as the integrity of a bank and its senior executives and the bank's perceived financial stability. Bank reputation plays an important role in the determining the purchasing and repurchasing behaviors of customers.Researches suggest

that bank reputation is regarded as an important factor in customers' bank selection decisions, [E and dour Radi(1990)]; [Yue and Tom(1995)]. In addition, [Gerrald and Cunningham(2004)] investigated switching incidents for Asian banks and empirically demonstrated that bank reputation was one of the primary factors that contributed to customers switching banks. The authors argued that a good reputation may enhance customers' trust and confidence in banks, whereas an unfavorable reputation tended to strengthen a customer's decision to switch banks. Responses to service failure factors, [Hirchman(1970)] demonstrated that service failures could provoke two active negative responses: voice and exit. [L and Jr(1977)] described the notion of voice by explaining that voice can be complaining to the service provider, complaining to acquaintances (negative word of mouth), or complaining formally to third parties in order to help seek redress. Financial services are often provided at a service counter with direct contact between a bank's employees and customer, or by telephone, or having the customers interact with the bank, automatic teller machines(ATM). Simultaneity in delivering and receiving a service is a common characteristic in the banking sector. Although banks try to provide error free services, service failures are inevitable because the bank-customer interaction is influenced by many uncontrollable factors, [Stefan(2004)]. Service failures may lead to customer dissatisfaction.[K(1998)] argued that dissatisfaction in relation to a particular problem or incident may not be sufficient to cause a customer to exit. The exit is likely to be promoted when the customers remembers prior instances or when the same problems have emerged. However the author also stated that tolerating a problem on one occa-

sion does not mean that the problem "dies"as lack of response to service failures may also exaggerate the circumstance and increase the likelihood of a customer switching banks. [Keaveney(1995)] empirically confirmed that responses to service failure were factor contributing to customer switching behavior. Customer switching,in the banking industry, is often the result of customer complaining and then experiencing the bank service provider, recovery effort, [M and B(2001)]. Customers may become more dissatisfied and even leave, if recovery efforts are poor.Customers may also be satisfied with the cover they have received but still exit. These situation may result from perceived lack of exit barriers by the customer, or the recovery may not fully compensate unfavorable incidents that bank customers have experienced, or the service failures may be so bad that even a good service recovery will not change the customer's decision to switch banks, [M and B(2001)].

2.1.3 Customer satisfaction factor:

Many research have provided different definitions of customer satisfaction. [Keith(1977)] stated that "Satisfaction is not the pleasure of the experience, it is an evaluation rendered that experience was at least as good as it was supposed to be". Based on previous definitions, [Hansen et al.(1997)Hansen, Jacobsen, and Jensen] offered a formal definition that satisfaction was the customer's fulfillment response and it was a judgment that a product or service feature, or the product or service itself, provided a pleasurable level of consumption-related fulfillment. Customer satisfaction is often recognized as a main influence in the formation of customers' future purchase intention, [Taylor and Baker(1994)]. Customers who gain satis-

faction from services are inclined to repeat purchase. Thus,customer satisfaction serves as an exit barrier to help an organization retain its customers and lower its switching rate. In contrast, [Ahmad and Kama(2002)] found that dissatisfied customers contributed to an increase in the switching rate. [Athanassopoulos and Stathakopoul investigated that the relationship between customer satisfaction and switching behavior in the Greece banking industry. The authors empirically confirmed that the perceptions of high customer satisfaction are negatively related to switching behavior,alternatively, when bank customers have inferior perceptions of customer satisfaction,they engage in unfavorable behavior responses(switching banks).

2.1.4 Service quality factor:

Service quality has become an increasing important factor for success and survival in the banking industry. Many banks have employed the quality of service as a sustainable competitive advantage because products offered by most banks are almost identical and are duplicated easily. [Gerrald and Cunningham(2004)] suggested that the perceived quality of a given service was the outcome of an evaluation process where consumers compared their expectations of the service with the service that they experienced in the service encounter. Good perceived quality was achieved when expected service quality was at least equal to experienced service quality. In the context of banking, [Kamilia and Jacquer(2000)] suggested that perceived service quality resulted from the difference between customers' perceptions for the service offered by the bank (received service) and their expectations from the bank that provided such services(expected service). [Avkiran(1994)], in a study of an Australian trading bank, identified four valu-

able service quality dimensions; staff conduct, credibility, communication and access to teller services. [East and Narain(2001)] used factor analysis to identify three banking service quality dimensions in the United Kingdom:knowledge and advice offered, personalization in the service delivery and general product characteristics. [Bahia and Nantel(2000)] identified six perceived service quality dimensions in the banking industry: effectiveness and assurance, access, price, tangibles, service portfolio and reliability. They represent a customer's overall impression of his/her banking service experience. The three dimensions will include: Inconvenience, reliability and staff that deliver services. The inconvenience dimension includes two aspects:geographical inconvenience and time inconvenience, [Gerrald and Cunningham(2004)]. The former refers to either the nearest bank branch or ATM, while the latter refers to a shorter opening hours. [Keaveney(1995)], [M and B(2001)] and [Gerrald and Cunningham(2004)] have empirically confirmed that inconvenience was an important factor that influenced customer to switch banks. The authors argued that the inconvenience dimension was negatively associated with customers switching banks. Reliability, as a service quality dimension, may be represented in a number of ways, [Bahia and Nantel(2000)]. Reliability has a time component. If a bank promises to do something by a certain time, the bank should do so. For example, a bank customer may have applied for a loan and the banks's guidelines mandate that the customer will be advised of the outcome within 48 hours of loan application. In this scenario, the bank should provide the customer with its decision within the specific time frame. [M and B(2001)] found that, in the context

of banks,performing poorly on the reliability dimension prompted customers to switch banks. [Phillip and Bart(2001)] found that bank customers had high expectations about staff that deliver the service; in particular, that customer are concerned about staff appearance,courtesy,efficiency and knowledge.

2.1.5 Service products factors:

Several studies revealed that the wide range of bank service products offered to customers was one of the most important criteria for customers when they select a bank, [Gerrald and Cunningham(2004)]. In addition, [M and B(2001)] empirically determined that a lack of service products for bank customers was a major factor that caused bank switching.

2.1.6 Customer commitment factor:

[Denys(2002)] suggested that there is also a need to understand switching behavior from a relationship marketing perspective. In a relationship marketing context,customer commitment was seen as an altitude that reflects the desire to maintain a valued relationship. [Gordon(2003)] empirically confirmed that committed customer are less likely to switch than consumers who lacked commitment to an organization, such as banks.

2.1.7 Demographic characteristics factors:

Customers' demographic characteristics have been widely used to distinguish how one segment of customers differs from another one. In terms of assessing customer switching in the context of banking,demographic characteristics, such as age, income and education may have an effect on customers switching banks.

[M and B(2001)] empirically examined Australian and New Zealand, banking behavior and found that switching banks was more common with younger customers, high income customers and customers with higher education. There is also evidence in previous research that supports the contention that additional demographic characteristic such as gender, race and occupation have an impact on customer switching behavior in the banking industry.

2.1.8 Effective advertising competition factor:

In a service context, advertising is most commonly used to create awareness and stimulate interest in the service offering, to educate customers about service features and applications, to establish or redefine a competitive position, to reduce risk, and to help make services more tangible, [Lovelock and Walker(1998)]. The attitudes of customers toward advertising professional services had become more positive with greater expected customer benefits. [Balmer and Stotving(1997)] suggested that advertising, as a means of marketing communication, was blames for reinforcing the similarity of financial service providers, rather than differences. [L and Jr(1977)] has suggested that effective advertising should add value in the eye of the customer. Therefore, the author proposed the effective advertising could provide bank customers with opportunities for their purchasing choices, which in turn, could contribute to customer not switching.

2.1.9 Involuntary switching factors:

[East and Narain(2001)] defined involuntary switching as unwilling behavior by customers. The author suggested that involuntary switching could be attributed

to a customer changing his/her residential area and a service provider opening and closing facilities. The authors also suggested that involuntary switching could force customers to switch service providers in the service sector, [Keaveney(1995)]; [East and Narain(2001)]. Involuntary switching is, for most part, beyond the control of marketers but is included in many switching behavior models, [Keaveney(1995)].

Managers typically believe that it is desirable and expected for properly execute loyalty rewards program to increase usage of the company's product or service offering. Generally, the goal of these rewards programs is to establish a higher level of customer retention in profitable segments by providing increased satisfaction and value to certain customers. The managerial justification for these programs is that increased customers satisfaction and loyalty have a positive influence on long term financial performance, [Reichheld(1990)]. According to, [M and B(2001)], the objective of these programs is to increase the satisfaction and retention of key customers. The loyalty program is a rewards for usage program. Loyalty rewards program members accumulate points with each dollar transacted that are redeemable for wide variety of goods and services such as air certificates, car rental, vacation options and retail gifts, [Bick G. and Abratt(2004)].

3 Methodology

3.1 Data collection and methods analysis

The research aimed at using primary data to test the 7 hypotheses and satisfy the 3 research objectives. The primary data was collected through survey questionnaire. The questionnaire design involved operationalizing the factors contributing to switching banks, designing the layout of the survey instrument, pretest and the development of the final survey instrument. A five likert scale was selected for the questionnaire. The questions used a standard five-point likert-type scale ranging from strongly Agree(1)to strongly disagree(5). A pretest of the questionnaire was conducted from a random sample comprising 20 customers. The respondent were expected to answer the statements in the questionnaire and to comment on any questions that they thought was ambiguous or unclear and rewording of the statements in the questionnaire was required. After the necessary corrections were done, the questionnaire were distributed to 200 respondents. A logistic regression model was then fitted into the data. The data was collected from convenience sample drawn from bank customers in Juja irrespective of their banking purpose, gender, occupation or income. The sample consisted of 200 respondents. Researcher-administered survey method was used in collecting data. Research assistants were used in data collection, they underwent some training on data collection so that there was uniformity in the data collected. The respondent were scanned by asking them whether they had ever switched from their principal bank. The dependent variable was based on the question asked in the survey:

"During the last three years have switched your principal bank?" it is 1 if the respondent has switched and 0 if the respondent had not switched.After the data was collected, the statistical package for social sciences (),which is a widely used data analysis program to analyze the data, was used in order to establish relationships between variables.Statistics that were used for data analysis included descriptive statistics and inferential statistics. Inferential statistics was used in hypothesis testing;the method to be applied was Logistic Regression Analysis. In Logistic regression,estimated calculated. Classification table,R-squared and Omnibus test of model coefficient which were used to assess the goodness of fit of the model. Thus a logistic regression model was derived in order to predict whether a customer is about to churn or not.

3.2 Binary Logistic Regression Analysis

3.2.1 Logistic Regression

Despite the similarity between linear regression and logistic regression, linear regression can not be applied to a situation in which the dependent variable is categorical or dichotomous. The linearity assumption of linear regression will be violated when the dependent variable is dichotomous, [Benaroch(2005)]. Since the probability of an event must lie between 0 and 1, it is impractical to model probability with linear regression technique because linear regression allows the dependent variable to take values greater than 1 or less than 0.

The logistic function

$$f(z) = \frac{1}{1 + e^{-z}}$$

, describes the mathematical form on which the logistic model is based. To obtain

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the logistic model from the logistic function, we write z as a linear sum of risk factors of the form;

$$z = \alpha + \beta_1 x_1 + \beta_2 x_2 + ... + \beta_n x_n$$

where the x_i's are independent variables of interest and the β_1's are constant terms representing unknown parameters. Thus

$$f(z) = \frac{1}{1 + e^{-z}} = \frac{1}{1 + e^{-(\alpha + \sum \beta_i x_i)}}$$

for i ranging from 1 to n. $f(z)$ is the probability of customer switching intention; α is a constant, β is the estimated coefficients, $x_i's$ are the independent variables. From the expression the probability of switching behavior increases with a unit increase in the independent variable when the coefficient of independent variable is positive.

For Binomial Logistic Regression, Consider a random variable Z that can take on one of two

possible values. Given a data set with a total sample size of M, where each observation is independent, Z can be considered as a column vector of M binomial random variables zi. By convention ,a value of 1 is used to indicate "success" and a value 0 is used to signify "failure". To simplify computational details of estimation, it is convenient to aggregate the data such that each row represents one distinct combination of values of the independent variables. These rows are often referred to as "populations". Let N represent the total number of populations and let n be a column vector with elements n_i representing the number of observations in

population i for $i = 1$ to N where $\sum_{i=1}^{N} n_i = M$, the total sample size.

Now, let Y be a column vector of vector of length N where each element Y_i is a random variable representing the number of successes of for population i. Let the column vector y contain elements y_i representing the observed counts of the number of successes for each population. Let π be a column vector also of length N with elements $\pi i = p(Z_i = 1/i)$, i.e the probability of success for any given observation in the ith population.

The linear component of the model contains the design matrix and the vector of parameters to be estimated. The design matrix of independent variables, X, is composed of N rows and $K + 1$ columns, where K is the number of independent variables specified in the model. For each row of the design matrix, the first element $x_{i0} = 1$. This is the intercept or the "alpha". The parameter vector, β, is a column vector of length $K + 1$. There is one parameter corresponding to each of the K columns of independent variable settings in X, plus one, β_0, for intercept.

The logistic regression model equates the logit transform, the log-odds of the probability of a success, to the linear component:

$$log(\frac{\pi i}{1 - \pi i}) = \sum_{k=0}^{K} x_{ik}\beta_k i = 1, 2, ..., N \tag{1}$$

3.2.2 Parameter Estimation

The goal of logistic regression is to estimate the $K + 1$ unknown parameters β in Eq.1. This is done with maximum likelihood estimation which entails finding

the set of parameters for which the probability of the observed data is greatest. The maximum likelihood equation is derived from the probability distribution of the dependent variable. Since each y_i represents a binomial count in the ith population, the joint probability density function of Y is:

$$f(y/\beta) = \prod_{i=1}^{N} \frac{n_i!}{y_i!(n_i - y_i)!} \pi_i^{y_i} (1 - \pi_i)^{n_i - y_i} \qquad (2)$$

for each population, there are $n_{iC_{y_i}}$ different ways to arrange y_i successes from among n_i trials. Since the probability of a success for any one of the n_i trials is π_i, the probability of y_i successes is π_i.likewise, the probability of $n_i - y_i$ failures is $(1 - \pi_i)^{n_i - y_i}$. The joint probability density function in eqn 2 expresses the values of y as a function of known, fixed values for β.The likelihood function has the same form as the probability density function, except that the parameters of the function are reversed: the likelihood function expresses the values of β in terms of known, fixed values for y. Thus,

$$L(\beta/y) = \prod_{i=1}^{N} \frac{n_i!}{y_i!(n_i - y_i)!} \pi_i^{y_i} (1 - \pi_i)^{n_i - y_i} \qquad (3)$$

The maximum likelihood estimates are the values for β that maximize the likelihood function in eqn 3. The critical points of a function (maxima and minima) occur when the first derivative equals 0. If the second derivative evaluated at that point is less than zero, then the critical point is a maximum. Thus, finding the maximum likelihood estimates requires computing the first and second derivative of likelihood function. Attempting to take the derivative of eqn3 with respect to β is a difficult task due to the complexity of multiplicative terms. Fortunately,

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the likelihood equation can be considerably simplified.

First, note that the factorial terms do not contain any of the π_i. As a result they are essentially constants that can be ignored: maximizing the equation without the factorial terms will come to the same result as if they were included. Second, note that since $a^{x-y} = a^x/a^y$ and after rearranging terms, the equation to be maximized can be written as:

$$\prod_{i=1}^{N} (\frac{\pi_i}{1 - \pi_i})^{y_i} (1 - n_i)^{n_i} \tag{4}$$

Note that after taking e to both sides of Eq. 1,

$$(\frac{\pi_i}{1 - \pi_i}) = e^{\sum_{k=0}^{K} x_{ik}\beta_k} \tag{5}$$

which, after solving for π_i becomes,

$$\pi_i = \frac{e^{\sum_{k=0}^{K} x_{ik}\beta_k}}{1 + e^{\sum_{k=0}^{K} x_{ik}\beta_k}} \tag{6}$$

Substituting Eq.5 for the first term and Eq.6 for the second term,Eq.4 becomes:

$$\prod_{i=1}^{N} (e^{\sum_{k=0}^{K} x_{ik}\beta_k})^{y_i} (1 - \frac{e^{\sum_{k=0}^{K} x_{ik}\beta_k}}{1 + e^{\sum_{k=0}^{K} x_{ik}\beta_k}})^{n_i} \tag{7}$$

Use $(a^x)^y = a^{xy}$ to simplify the first product and simplify the second product. Eq. 7 can now be written as:

$$\prod_{i=1}^{N}(e^{y_i\sum\limits_{k=0}^{K}x_{ik}\beta_k})(1 + e^{\sum\limits_{k=0}^{K}x_{ik}\beta_k})^{-n_i} \tag{8}$$

This is the kernel of the likelihood function to maximize. However, it is still cumbersome to differentiate and can be simplified a great deal further by taking its log. Since the logarithm is a monotonic function, any maximum of the likelihood function will also be a maximum of the log likelihood function and vice versa. Thus, taking the natural log of Eq.8 yields the log likelihood function:

$$l(\beta) = \sum_{i=1}^{N} y_i(\sum_{k=0}^{K}x_{ik}\beta_k)^{-n_i}log(1 + e^{\sum\limits_{k=0}^{K}x_{ik}\beta_k}) \tag{9}$$

To find the critical points of the log likelihood function, set the first derivative with respect to each β equal to zero. In differentiating Eq.9,

$$\frac{\partial}{\partial\beta_k}\sum_{k=0}^{K}x_{ik}\beta_k = x_{ik} \tag{10}$$

since the other terms in the summation do not depend on β_k and can thus be treated as constants. In differentiating the second half of eq. 9, take note of the general rule that $\frac{\partial}{\partial x}logy = \frac{1}{y}\frac{dy}{dx}$. Thus, differentiating Eq.9 with respect to each β_k,

$$\frac{\partial l(\beta)}{\partial \beta_k} = \sum_{i=1}^{N} y_i x_{ik} - n_i . \frac{1}{1 + e^{\sum_{k=0}^{K} x_{ik}\beta_k}} . \frac{\partial}{\partial \beta_k}(1 + e^{\sum_{k=0}^{K} x_{ik}\beta_k})$$

$$= \sum_{i=1}^{N} y_i x_{ik} - n_i . \frac{1}{1 + e^{\sum_{k=0}^{K} x_{ik}\beta_k}} . e^{\sum_{k=0}^{K} x_{ik}\beta_k} . \frac{\partial}{\partial \beta_k} \sum_{k=0}^{K} x_{ik}\beta_k$$

$$= \sum_{i=1}^{N} y_i x_{ik} - n_i . \frac{1}{1 + e^{\sum_{k=0}^{K} x_{ik}\beta_k}} . e^{\sum_{k=0}^{K} x_{ik}\beta_k} . x_{ik}$$

$$= \sum_{i=1}^{N} y_i x_{ik} - n_i \pi_i x_{ik} \qquad (11)$$

The maximum likelihood estimates for β can be found by setting each of the $K + 1$ equations in Eq. (11) equal to zero and solving for each β_k.

Each such solution, if any exists, specifies a critical point-either a maximum or a minimum. The critical point will be a maximum if the matrix of second partial derivatives is negative definite; that is, if every element on the diagonal of the matrix is less than zero. Another property of this matrix is that it forms the variance-covariance matrix of the parameter estimates. It is formed by differentiating each of the K+1 equations in Eq.(11) a second time with respect to each element of β,denoted by $\beta_{k'}$. The general form of matrix of second partial derivatives is

$$\frac{\partial^2 l(\beta)}{\partial \beta_k \partial \beta_{k'}} = \frac{\partial}{\partial \beta_{k'}} \sum_{i=1}^{N} - n_i x_{ik} \pi_i$$

$$= -\sum_{i=1}^{N} n_i x_{ik} \frac{\partial}{\partial \beta_{k'}} \left(\frac{e^{\sum_{k=0}^{K} x_{ik} \beta_k}}{1 + e^{\sum_{k=0}^{K} x_{ik} \beta_k}} \right) \qquad (12)$$

To solve Eq(2) we will make use of two general rules for differentiation. First, a rule for differentiating exponential functions

$$\frac{d}{dx} e^{u(x)} = e^{u(x)} . \frac{d}{dx} u(x) \qquad (13)$$

In our case, let $u(x) = \sum_{k=0}^{K} x_{ik} \beta_k$ second, the quotient rule for differentiating the quotient of two functions:

$$\left(\frac{f}{g} \right)'(a) = \frac{g(a).f'(a) - f(a).g'(a)}{[g(a)]^2} \qquad (14)$$

Applying these two rules together allows us to solve Eq. 12.

$$\frac{d}{dx} \left(\frac{e^{u(x)}}{1 + e^{u(x)}} \right) = \frac{1 + e^{u(x)} . e^{u(x)} \frac{d}{dx} u(x) - e^{u(x)} . e^{u(x)} \frac{d}{dx} u(x)}{(1 + e^{u(x)})^2}$$

$$= \frac{e^{u(x)} \frac{d}{dx} u(x)}{(1 + e^{u(x)})^2}$$

$$= \frac{e^{u(x)}}{1 + e^{u(x)}} . \frac{1}{1 + e^{u(x)}} . \frac{d}{dx} u(x) \qquad (15)$$

.

Thus Eq.(12) can now be written as:

$$-\sum_{i=1}^{N} n_i x_{ik} \pi_i (1 - \pi_i) x_{ik} \tag{16}$$

3.2.3 The Newton-Raphson Method

Setting the Eq. 11 equal to zero results in a system of $K+1$ nonlinear equations each with $K+1$ unknown variables. The solution to the system is a vector with elements, β_k. After verifying that the matrix of second partial derivatives is negative definite, and that the solution is the global maximum rather than a local maximum, then we can conclude that this vector contains the parameter estimates for which the observed data would have highest probability of occurrence. However, solving a system of nonlinear equations is not easy-the solution cannot be derived algebraically as it can in the case of linear equations. The solution must be numerically estimated using an iterative process. Perhaps the most popular method for solving systems of nonlinear equations is Newton's method, also called the Newton-Raphson method.

Newton's method begins with an initial guess for the solution then uses the first two terms of the Taylor polynomial evaluated at the initial guess to come up with another estimate that is closer to the solution. This process continues until it converges to the actual solution. Recall that the Taylor polynomial of degree n for f at the point $x = x0$ is defined as the first n terms of the Taylor series for f:

$$\sum_{i=0}^{n} \frac{f(i)}{i!} (x - x0)^i \tag{17}$$

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provided that the first n derivatives of f at $x0$ all exist. The first degree Taylor polynomial is also the equation for the line tangent to f at the point $(x0, f(x0))$. The point at which the tangent line crosses the x-axis, $(x1, 0)$, is used in next approximation of the root to be found where $f(x) = 0$. The first step in Newton's method is to take the first degree Taylor polynomial as an approximation for f, which we want to set equal zero:

$$f(x0) + f^{'}(x0).(x - x0) = 0 \qquad (18)$$

Solving for x, we have:

$$x = x0 - \frac{f(x0)}{f^{'}(x0)} \qquad (19)$$

This new value of x is the next approximation for the root. We let $x1 = x$ and continue in the same manner to generate $x2, x3, ...,$until successive approximations converge.

Generalizing Newton's method to a system of equations is not difficult. In our case, the equations whose roots we want to solve are those in Eq.11, the first derivative of the log-likelihood function. Since Eq.11 is actually a system of $K+1$ equations whose roots we want to find simultaneously, it is more convenient to use matrix notation to express each step of the Newton-Raphson method. We can write Eq.11 as $l'(\beta)$. Let $\beta(0)$ represent the vector of initial approximations for each β_k, then the first step of Newton-Raphson can be expressed as

$$\beta^{(1)} = \beta^{(0)} + \left[-l''(\beta^{(0)}) \right]^{-1} .l'(\beta^{(0)}) \tag{20}$$

Let μ be a column vector of length N with elements $\mu_i = n_i \pi_i$. Note that each element of μ can also be written as $\mu_i = E(y_i)$, the expected value of yi. Using matrix multiplication, we can show that

$$l'(\beta) = X^T(y - \mu) \tag{21}$$

is a column vector of length $K + 1$ whose elements are $\frac{\partial l(\beta)}{\partial \beta_k}$, as derived in equation 11. Now, let W be a square matrix of order N, with elements $n_i \pi_i (1 - \pi_i)$ on the diagonal and zeros everywhere else. Again, using matrix multiplication, we can verify that

$$l''(\beta) = -X^T W X \tag{22}$$

is a $K + 1 \times K + 1$ square matrix with elements $\frac{\partial^2 l(\beta)}{\partial \beta_k \partial \beta_{k'}}$. Now, Eq.20 can be written:

$$\beta^{(1)} = \beta^{(0)} + \left[X^T W X \right] \tag{23}$$

continue applying equation 23 until there is essentially no change between the elements of β from one interaction to the next. At that point, the maximum likelihood estimates are said to have converged, and equation 22 will hold the variance-covariance matrix of the estimates.

3.3 Methods for including variables

There are three methods available for including variables in the regression equation;

1. The simultaneous method in which all independents are included at the same time.

2. The hierarchical method in which control variables are entered in the analysis before the predictors whose effects we are primarily concerned with.

3. The stepwise method in which variables are selected in the order in which they maximize the statistically significant contribution to the model.

for all methods, the contribution to the model is measured by the model likelihood ratio statistic, a statistical measure of the fit between the dependent and independent variables.

witched banks; 0 otherwise.

3.4 Regression Coefficients(β_i)

The regression coefficients are the coefficients $\beta_0,\beta_1,.....\beta_i$ of the regression equation:

$logit(p) = \beta_0 + \beta_1 x_1 + ... + \beta_k x_k$

An independent variable with a regression coefficient not significant different from 0 ($p < 0.05$) can be removed from the regression model. If $p < 0.05$ then

the variable contributes significantly to the prediction of the outcome variable.

The logistic regression coefficients show the change (Increase when $\beta_i > 0$ decrease when $\beta_i < 0$) in the predicted log odds of having the characteristic of interest for one change in the independent variables. Given the models logit $p(x) = \alpha + \sum \beta_i x_i$, the parameter β_i refers to the effect of x_i on the log odds while controlling the others x_j. Exponentiating both sides shows that the odds are an exponential function of x_i. This provide a basic interpretation of the magnitude of β_i. For instance e^{β_i} is the multiplicative effect on the odds of a 1- unit increase in x_i, at fixed levels of other x_j. The sign of β_i determines whether $p(x)$ is increasing or decreasing as x increase.

3.4.1 The intercept(α)

This is the case where all the factors are not considered and the probability of customer switching in this case can be estimated.

3.4.2 The p-value

There are several different ways of estimating the p-value. The wald chi-square is fairly popular,but it may yield inaccurate results with small sample sizes. The likelihood ratio method may be better. It uses the difference between the probability of obtaining the observed results under the logistic model and the probability of obtaining the observed results in a model with no relationship between the independent and dependent variables. A p-value of 5% or less is the generally accepted point at which to reject the null hypothesis. With a p-value of 0.05 we can say with a 95% probability of being correct that the variable is having some

effect,assuming our model is specified correctly.

3.5   Reliability

Reliability was used to assess the degree of consistency between multiple measurements of variables. Examining the internal consistency or homogeneity among the items is the common measurement of reliability. According to, [Hirchman(1970)], Cronbach's Alpha is one of the most widely used measures to test internal consistency and considered adequate if it exceeds 0.6. [Churchill(1979)] notes that for the purpose of consistency, the coefficient alpha should be calculated prior to any further data analysis. Cronbach's alpha was applied in this study to test the reliability of the measures.

3.6   Goodness of fit

In logistic regression model, the global fit is described with the statistics derived from the likelihood of the model.There are different statistics that describe the global fit of the model to the data. One of them is the $-2loglikelihood = -2LL$. If the fit of the model is perfect, then $-2LL = 0$. In other words, this value can be regarded as a descriptor of the goodness of fit of this model, and the closer it is to zero, the better the fit of the model. The deviance is basically a measure of how much unexplained variation there is in our logistic regression model – the higher the value the less accurate the model. It compares the difference in probability between the predicted outcome and the actual outcome for each case and sums these differences together to provide a measure of the total error in the model. This is similar in purpose to looking at the total of the residuals (the sum of

squares) in linear regression analysis in that it provides us with an indication of how good our model is at predicting the outcome.

There are two indexes that represent the proportion of uncertainty of the data explained by the adjusted model. Through analogy with the determination coefficient in the linear regression, they are represented by R^2 corresponding to the R^2 of Cox and Snell and the R^2 of Nagelkerke.

The value of the R^2 of Cox and Snell has the inconvenience of not reaching 1 when the model reproduces the data exactly. For this reason ,Nagelkerke proposed the corrected R^2 of Nagelkerke which yields a value of 1 if the model explains the of the uncertainty of the data:

$$R_c^2 = \frac{R^2}{R_{max}^2}$$

Another measure that describes the global fit of the model is the chi-squared goodness of fit test. This is a chi-squared goodness of fit statistic that compares the observed values Y_i with the values $p(x_i)$ predicted by the model. This indicator of goodness of fit have been presented from purely descriptive perspective in relation to fitting of the model. Since the model has been estimated by maximum likelihood method, its global significance, i.e ,the significance of the set of included predictor variables, is assessed with the so called ' likelihood ratio test '. The likelihood ratio test for studying the significance of the model involves comparing the goodness of fit of the saturated model (including all the variables) with the null model (adjusted by a constant) through the deviations ratio (deviance=-2log(likelihood)). We thus construct a statistic that follows a

chi-squared distribution with (Number of variables of the saturated model -1) degrees of freedom (df).

An analogous procedure could be considered for testing the significance of the coefficient associated to a co variable by simply comparing the complete model excluding the co variable of interest. Wald demonstrated that the sample distributions of the maximum likelihood estimations of the parameters β are distributed according to normal laws when the samples are large. Thus the significance of the parameters can be studied with the ratio

$$z = \beta/SE(\beta)$$

which follows a standardized normal distribution,or with the square of this ratio, which is know as the Wald statistic, and follows a chi-square law:

$$\chi^2_{wald} = [\beta/SE(\beta)]^2 \rightarrow \chi^2_1$$

.The likelihood ratio test is more powerful than wald test. Different studies have demonstrated the lack of power of this test when the value of the parameter β moves away from zero, and recommend that a likelihood ratio test $(-2lnLR)$ should be used instead.

4 Result and Discussion

4.1 Results

Table 1: **Reliability test**

Factors	Cronbach's Alpha	N of Items
Effective advertisement	.793	3
Service Products	.668	4
Service quality	.803	6
Involuntary switching	.655	4
Bank Reputation	.933	5
Customer satisfaction	.773	3
Price	.736	4

All of the items in the questionnaire used to measure each construct were subjected to reliability tests using a Cronbach's Coefficient Alpha cut-off value of 0.6. [Hirchman(1970)] All the items were found to reliable and other analysis were hence carried out.

	Frequency	Percent
Gender: male	107	53.5
Female	93	46.5
Age:18-25yrs	74	37
26-35yrs	92	46
36-45yrs	24	12
Above 45yrs	10	5
Education:Primary	2	1
Secondary	22	11
Post secondary	18	9
Diploma	57	28.5
Bachelor and Above	101	50.5
Occupation:Farmer	1	.5
Professional	115	57.5
Unemployed	19	9.5
Students	34	17
Business	31	15.5

Table 2: Descriptive Statistics

The data that was used in this survey was collected using a self administered questionnaire. The sample consisted of 200 respondents. From this sample, 53.5% were male and 46.5% were female, 46% were aged between 26-35 yrs, 50.5% had attained a bachelor and above, while 57.5% were professionals thus different groups in terms of age, occupation, education level and Gender were interviewed. For the analysis, software was used to establish relationships between variables. First the data was cleaned where all the missing values were replaced using the method of series mean. The expected tests were;

1. Variables in the equation(showing B-values, standard errors, Wald, Degree of freedom(df), significance of values(sig), Exp(B), Confidence interval(C.I) for Exp(B))

2. Omnibus test of model coefficient

3. Model summary

4. Classification table.

4.1.1 Empirical analysis

1. **Classification table**

In logistic regression to assess the goodness of fit of the model one can use the classification table. There is classification table for block 0 and block1. For this analysis the block 0 was able to classify of the customer 61% correctly, while block 1 was able to classify 90% of the customers correctly. The sensitivity of the model is the percentage of the customers that has the characteristic of interest (e.g switching) that has been accurately been identified by the model. Therefore block 1 gave a better model and was adopted.

Table 3: Classification table:Block 0

Observed		Predicted		
		Churn		Percentage correct
		No	Yes	
Churn	No	122	0	100%
	Yes	78	0	0
Overall Percentage		61%		

Classification table for block 1

Table 4: Classification table:Block1

Observed		predicted		
		Churn		% correct
		No	Yes	
Churn	No	117	5	95.9%
	Yes	15	63	80.8%
	Overall Percentage	90%		

Table 5: Omnibus Tests of model coefficients

	Chi-square	df	Sig
Step	165.038	7	.000
Block	165.038	7	.000
Model	165.038	7	.000

The omnibus test of model coefficients gives us the overall indication of how well the model performs,with predictors entered into the model. This is referred to as a 'goodness of fit' test. This set of results gave a highly significant value of $0.000 (p < 0.05)$. The chi-square value, in the result is 165.038 with7 degree of freedom.

Table 6: Model Summary

Step	-2loglikelihood	Cox & Snell R Square	Nagelkerke R Square
1	102.462	0.562	.762

The model summary provides information about the usefulness of the model. The Cox &Snell R Square and the Nagelkerke R square values provide an in-

dication of the amount of variation in the dependent variable explained by the independent variables and should range from$0 - 1$. For this model their values were 56.2% and 76.2% respectively. Using Nagelkerke R square which is more preferred the independent variables (predictors) can explain 76.2% of the variation in the dependent variable.

Table 7: Variables in the equation

	β	S.E	Wald	df	sig.	Exp(β)
Price	1.514	0.477	16.096	1	0.000	4.545
Service quality	1.934	.581	11.083	1	.001	6.919
Involuntary switching	-0.434	0.378	1.321	1	0.25	0.648
Bank reputation	2.174	.401	29.383	1	0.000	8.792
Service product	1.144	0.643	3.168	1	0.075	3.139
Customer satisfaction	-0.582	0.509	1.308	1	0.253	0.559
Effective advertisement	-0.546	0.364	2.247	1	0.134	0.579
Constant	-5.067	1.350	14.089	1	0.000	0.006

In this research variables that were found to be included into the logistic regression equations were Price, Service Quality and Bank reputation. This was due to the fact that their p-value was less than $0.05. (p < 0.05)$ hence they have a significant effect on customers switching their banks. Since Service product is also significant at 0.1 thus we will include it into the model. Factors such as Involuntary switching, Effective advertisement and Customer satisfaction were found to be insignificant at $p = 0.05$ and also at $p = 0.1$and were thus not included into the model. The customer switching logistic regression model was found to be,

$$P(Switching intention) = \frac{1}{1 + e^{-(-5.067+1.514P+1.934SQ+2.174BR+1.144SP)}}$$

4.1.2 Effect of $\beta - values$ in relations to the customers intentions to switch banks.

The B-values tell the direction of the relationship (which factors increase the likelihood of a Yes answer and which factors decrease it). Negative $B - values$ indicates that an increase in the independent variable score will result in a decreased probability of the case recording a score of 1 in the dependent variable. For the four significant independent variables (Price,Service quality, service products and bank reputation), the $B - values$ are positive. This suggests that those customers who have a problem with Price, Bank reputation, Service product and Service quality are more likely to say Yes to the question whether they have switched their principal bank.

4.1.3 Effect of Exp β-Odds Ratios(OR) to the customer's intentions to switch banks .

According to Tabachnick and Fidell (2001), the odds ratio is " the increase(or decrease if the ratio is less than one) in odds of being in one outcome category when the value of the predictor increases by one unit."

From table the odd or risk of a customer answering yes, they have switched their bank, is 6.919 times higher for a customer who has a problem of service quality than for those who do not worry about service quality all other factors being equal.

The Price is also a significant predictor, according to the sig. Value ($p = 0.000$). The odds ratio for this variable however is 4.545 a value greater than 1. This indicates that, the more customers receive low pricing the less he/she will be

willing to switch the bank. For every extra pricing received the risk of having problem switching the bank decreases by 4.545, all other factors being Constant.

The bank reputation is also a significant predictor, with sig. value ($p = 0.000$). The risk for this variable is 8.792, This indicates that, the risk of a customer switching bank for bad bank reputation is 8.792 times higher than a customer who doesn't have a problem with the reputation of the bank.

The Service Products is also a significant factor at 0.1. The odds ratio for this variable is 3.139 , this implies that the chances of a customer who have problems with service products switching banks are 3.139 higher than for those who do not worry about service products all other factors being equal.

4.2 Discussion

From this research a logistic regression model for the customer churn behavior was developed and can be used to predict the customers who are about to churn. We were also able to identify the factors that are significant in contributing to the churn behavior of the bank customers. These factors included Pricing, Service quality, Service Product and Bank reputation . The extent of effect of each of this factor in the churn behavior was also determined using the Odd Ratio (OR). Where the order was found to be Bank reputation, service quality, Pricing and Service products ranging from the most significant to the least significant.

4.2.1 Theoretical implication

This research makes a number of contributions to customer's switch behavior in the banking industry.

First, this research contributes to the limited empirical studies currently available on customer's retail bank switching behavior, especially in the Kenyan banking context. This study provides useful knowledge about customer's switching behavior in the Kenya retail banking industry by empirically identifying the factors that influence customer to switch banks.

Secondly, a logistic regression analysis is used as the methodology to examine customer's switching behavior in this research. The results of this research support logistic regression analysis as an appropriate methodology that can be applied in examining customer's bank switching behavior.

Thirdly, this research confirms that some of the factors influencing customer's switching behavior identified in previous research can be applied to Kenyan banking, such as Price, Bank reputation, Service product and Service quality. However some factors that apply in other countries context do not apply in our Kenyan case. These include Involuntary switching,Customer satisfaction and effective advertisement. This could be attributed to our diverse cultural environment.

4.2.2 Managerial Implication

The research model and the empirical findings of this research have some practical implications for bank managers. Bank managers may use the research model of switching behavior developed in this research as a framework to investigate the reasons why their customers switch, or do not switch banks. In this research four factors were identified as being significant in determining the customer's switching behavior namely, Price, Service quality, Bank reputation and Service products.

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a) Price

The results of this study confirms that price is one of the factors influencing customers to switch banks, [Gerrald and Cunningham(2004)]; [A and J(1998)]; [Keaveney(1995)]. Due to the complicated nature of the banking industry, price includes not only fees implementation, and bank charges, but also the interest rates charged and paid, [Gerrald and Cunningham(2004)]. As a result of banking complexities, banks find it challenging to develop pricing strategies that are markedly different from their major competitors. Occasionally, banks may offer low borrowing rates or high deposits rates to attract customers to reduce defection. however, focusing only on the price variable may not be an optimum strategy. Simply offering high deposit rate, imposing minimum charges on customers, and increasing fee rates at the same time, is not an effective way to reduce customer defection rates, [Gerrald and Cunningham(2004)]. These pricing changes may result in negative effects, such as encouraging customers to switch to another bank that provides better price options, [Gerrald and Cunningham(2004)].

Reducing a bank's own costs is one strategy that may reduce the number of customers who switch. For example, electronic banking plays an important role in reducing services costs. Customer using electronic banking and mobile banking can experience lower fixed and operations, variable costs that are associated with banking operations,due reductions in human errors and savings in labor costs, [M and B(2001)]. Similarly, [Hull(2002)] identify that cost savings through electronic banking makes a significant contribution to reducing costs.

Since Price is the strongest factor influencing customer churn behavior, any

change in interest rates and /or fees should be considered carefully by bank management before the changes are involved.

b) Service quality

This study also reveals that service quality is an important factor influencing customer's bank switching behavior. Several researchers indicated that service quality is an important role in supporting business development as service quality has favorable impact on customer satisfaction, repurchasing behavior and business profitability, [A and J(1998)]. [Julian and Ramaseshan(1994)] shows that service failure has a negative effect on customers loyalty behavior and it is one driver factor in switching. Service failures results in dissatisfying the expectations of customers and has negative effects on types of loyalty, word of mouth advertising and customer retention. Thus bank management needs to focus more on achieving high service quality as a competitive differentiation method. For convenience, bank managers may seek to improve the accessibility and delivery of their service products such as offering more geographically dispersed ATM and making mobile banking and electronic banking more user friendly. For reliability, managers need to ensure that all domestic and international transactions are secure and accurate. Managers should ensure all instructions to customers are clear and easily understood they should use human resource strategies and internal marketing programmes to hire and retain capable employees. [A and J(1998)] and [Gonzalez and Guerrero(2004)] suggested that employees are of prime importance in service organization in the customer,s eyes, they are all part time marketers, and they drive success in the quality dimensions. Bank managers also need to

ensure that they have technology in place that provides accurate recordings of all transactions between customers and the bank, and also provides the technological support required by their employees.Service attributes ,such as ease of access, provision of information and innovative products, can enhance customer loyalty, [Nguyen and LeBalnc(2001)].

Basically, service quality should focus not only on the service offered,but also on the people who deliver the service, [Gerrald and Cunningham(2004)]. The service characteristics of the banking industry make inter-actions between customers and employees necessary. Bank's staff should have good banking knowledge,act professionally,and have a courteous attitude towards all customers. An appropriate people management strategy is necessary is order for bank staff to deliver high quality services.

c) Bank reputation

Another valuable finding from this study is the importance of reputation as a factor influencing customers switch. Good reputation plays an important role in creating positive signals to the public about the firm's capability and reliability, [Hansen et al.(1998)Hansen, Jacobsen, and Jensen]. In particular , a good reputation helps to increase sales and exploits profitable marketing opportunities, [Nguyen and LeBalnc(2001)]. Therefore, bank management needs to strive to maintain the reputation of their bank and that of national brand at the highest level to improve customer retention. Bank managers also have to find ways to encourage the development of trust between customers and banks that eventually leads to loyalty of customer, particularly in the banking industry where qual-

ity can't be evaluated correctly before purchasing, [Nguyen and LeBalnc(2001)]. Similar to the results of this study, [Gerrald and Cunningham(2004)] have known bank trust as one of the contributing factors in customer switching of the bank in Asia financial market. [Weigelt and Camerer(1988)] urged that positive trust is a strategic tool that banks use to reach to more profit. [Yue and Tom(1995)] showed that bank choosing decision from customers can be affected by bank trust. Also, other than providing timely and accurate services, managers need to encourage their employees to communicate with customers in a manner that inspires trust and confidence. They should also timely solve any disputes between the bank and any customer since customer can bad mouth the bank.

d) Service Product

Another valuable finding from this study is the importance of Service Products as a factor influencing customers switch. Though this was found to be significant at 0.1. In a technology driven, fast paced environment, delivering a wide range of products to customer is essential for business's success and survival. Delivering a broad range of service products is very important in the banking industry because of the intensive competition between financial and non-financial institutions. [Denys(2002)] suggests that a key determinant in attracting customers is the diversity of features of service products introduced to the marketplace via different technology mediums. [K(1998)] reveals that it is necessary for banks to offer certain types of financial products, such as 24 hours ATM self service, Mobile banking and internet banking. [Gerrald and Cunningham(2004)] conclude that service products combined with high technology can attract the customers

who are tech-seekers to the more innovated banks, which offer a quick, convenient and high quality service. In Kenyan retail banking industry most of the bank offer almost similar if not the same products. Thus this factor was not significant at 0.05 but was significant at 0.1. Therefore banks have to innovate their products that are suitable to their own customers in order to avoid customers churn.

5 Summary, Recommendation and Conclusion

5.1 Summary

From the finding of this research it was found out that out of the factors measured,some were significant in influencing customer switch in our Kenyan banking context. These included Bank Reputation, Service quality, Price and Service Product. Though service Product was not significant at 5% but was significant at 10%. Factors such as Effective advertisement and Customer Satisfaction were found insignificant in determining whether or not customer was likely to switch.

5.1.1 Price

The research revealed that price is one of the factors influencing customers to switch banks. This was inline with previous research, [Gerrald and Cunningham(2004)]; [A and J(1998)];[Keaveney(1995)]. Due to the complicated nature of the banking industry, price includes not only fees implementation, and bank charges, but also the interest rates charged and paid [Gerrald and Cunningham(2004)]. This factor had an odd ratio of 4.545. Which indicates that a customer who have a problem with price has 4.545 more chances of switching compared to customer have no problem with pricing. It is the third most significant factor.

5.1.2 Service Quality

This study also reveals that service quality is an important factor influencing customer's bank switching behavior. The factor was found to have an odd ratio of 6.919. This indicates that a customer who have a problem with quality of

services offered by the bank have 6.919 more times of switch than a customer that has no problem with the quality of the services offered. Therefore, Bank's staff should have good banking knowledge,act professionally and have a courteous attitude towards all customers. An appropriate people management strategy is necessary is order for bank staff to deliver high quality services. It was found to the second significant factor in customer switching.

5.1.3 Bank reputation

Finding from this study also revealed that bank reputation is the most importance factor influencing customers switch. This factor was found to have an odd ratio of 8.792. This indicates that a customer who is concerned with bank reputation has 8.792 more chances of switching than a customer who have no problem. It was also inline with previous research where Good reputation was found to play an important role in creating positive signals to the public about the firm's capability and reliability, [Hansen et al.(1998)Hansen, Jacobsen, and Jensen]. In particular, a good reputation helps to increase sales and exploits profitable marketing opportunities, [Nguyen and LeBalnc(2001)]. Therefore, bank management needs to strive to maintain the reputation of their bank and that of national brand at the highest level to improve customer retention. Bank managers also have to find ways to encourage the development of trust between customers and banks that eventually leads to loyalty of customer, particularly in the banking industry where quality can't be evaluated correctly before purchasing.

5.1.4 Service Product

Another valuable finding from this study is the importance of Service Products as a factor influencing customers switch. Though this was found to be significant at 0.1. It was the least significant factor with an odd ratio of 3.139. This indicates that a customer who has a problem with the service products provided by the bank has 3.139 more chances of churning compared to a customer who has no problem with the service product. In a technology driven,fast paced environment,delivering a wide range of products to customer is essential for business's success and survival, [K(1998)] reveals that it is necessary for banks to offer certain types of financial products, such as 24 hours ATM self service,Mobile banking and internet banking. [Gerrald and Cunningham(2004)] conclude that service products combined with high technology can attract the customers who are tech-seekers to the more innovated banks,which offer a quick, convenient and high quality service. In Kenyan retail banking industry most of the bank offer almost similar if not the same products.thus this factor was not significant at 0.05 but was significant at 0.1. Therefore banks have to innovate their products that are suitable to their own customers in order to avoid customers churn.

5.2 Limitations and Future Research

Although this study provides contributions from both a theoretical and practical perspective, there are a few limitations.

First, this research was conducted in Juja where people's beliefs and attitudes

can be significantly different across different regions in Kenya.

Furthermore, the sample respondents were limited to the customers who were willing to be surveyed, and the non-probability sample does not allow assessment of sampling error. Therefore, a more extended geographic sample may reveal differences in customer's attitudes towards bank switching behavior, which would also have managerial implications.

Secondly, this study empirically examined seven factors that may influence customer's switching bank behavior. However, there maybe some factors that can have an impact on customer's switching behavior but were not examined in this study. e.g demographic factors such as Age, Occupation and level of education e.t.c.

Since the results of this study are based on customer's perceptions only, future research could explore the perceptions of bank employees to obtain the employees views on why customers switch banks. The perceptions of customers and employee should be compared for further understanding of bank customer switching behavior.

5.3 Conclusion

This research illustrates a range of factors that influence Kenya's bank customer switching behavior through an exploratory investigation. This study also shows that some factors are more influential than others. An understanding of these influencing factors allows managers to direct efforts and resources in the most effective and efficient way to prevent customer's departure, and reduce business

losses in the long run that result from customers switching banks.

Banks who try to attract new customers from their competitors will also benefit from an understanding of what factors cause customers to switch banks. Bank managers can make use of such information to develop appropriate strategies to attract new customers.

In general, the greater the knowledge the bank management has about the factors affecting their customers switching behavior, the greater their ability to develop appropriate strategies to reduce bank switching.

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