

**DETERMINANTS OF CONSUMER LEAPFROGGING, CONSUMER
KNOWLEDGE AND INTENTION TO LEAPFROG
IN MOBILE PHONE INDUSTRY: SELECTED
COUNTIES IN KENYA**

BY

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**A THESIS SUBMITTED TO THE SCHOOL OF BUSINESS AND
ECONOMICS IN PARTIAL FULFILLMENT OF THE REQUIREMENT
FOR THE AWARD OF THE DEGREE OF DOCTOR OF PHILOSOPHY
IN BUSINESS MANAGEMENT (MARKETING OPTION)**

MOI UNIVERSITY

2021

DECLARATION

Declaration by the Candidate

I declare that this thesis is my original work and has not been submitted for examination in any institutional body. No part of this thesis may be reproduced without the prior written permission of the author or Moi University.

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DEDICATION

This work is dedicated to my nephew, Ian Bruno and my nieces, Ashlie Adams, and Alexis Naila to inspire and challenge them to creativity and hard work.

ACKNOWLEDGEMENTS

I wish to sincerely acknowledge God for His sustenance and Grace that saw me through the strenuous task of preparing this dissertation.

I thank my supervisors Prof Charles Lagat and Prof Gary Frankwick who helped me to crystalize my thinking on this dissertation. Prof Fernando R. Jimenez for his guidance, encouragement and contribution, Prof Paul Koku for reading and correcting the final document and other lecturers, students and staff of Moi University.

I also want to thank Moi University for giving me the opportunity and funding to travel to the University of Texas at El Paso (UTEP) in U.S.A. Thank you UTEP for providing me the facilities that generously made available to me, and for the guidance of the various Professors that I interacted with, and for the eye-opening opportunity on how to teach and conduct research in your institution. I will forever be grateful for the once-in-a-lifetime opportunity.

Mr. and Mrs. Korir my parents, for their prayers, believe in me, patience, financial support and pushing me to achieve my dreams in life.

I thank all those who read through drafts of this thesis and provided valuable comments, additional information and suggestions that helped me improve its quality and all unmentioned people who in their special ways contributed towards this accomplishment.

Thank you so very much, and may God bless you.

ABSTRACT

Intention to leapfrog is described as making a decision to wait to replace a current product with a future product instead of the latest version currently available in the market. A comprehensive examination of consumer determinants of intention to leapfrog is missing from literature. Thus, this study sought to fill this void by evaluating the moderating effect of consumer knowledge on the relationship between the determinants of consumer leapfrogging and the intention to leapfrog in the mobile phone industry in selected counties in Kenya. The specific objective was to determine the effect of perceived product quality, perceived switching cost, urgency to replace, and consumer knowledge on intention to leapfrog, and to establish the moderating effect of consumer knowledge on the relationship between the determinants of consumer leapfrogging and intention to leapfrog in the mobile phone industry in Kenya. The study was guided by the Schumpeterian Growth Theory, Theory of Planned Behavior (TPB) and the Unified Theory of Acceptance and Use of Technology (UTAUT). Positivism research philosophy approach was used for the study. The study adopted explanatory research design, stratified and simple random sampling techniques in collecting data from a sample size of 349 employees of three selected counties in Kenya, namely, Nairobi, Nakuru and Trans-Nzoia. Data were obtained using structured questionnaires. Cronbach's alpha and factor analysis were applied to test reliability and validity of research instrument, respectively. Analysis of the data was done using hierarchical regression to test the hypotheses. The study found that; perceived product quality ($\beta = 0.511$, $p = 0.000$) and perceived switching cost ($\beta = 0.099$, $p = 0.030$) positively and significantly affect Intentions to Leapfrog while Urgency to replace ($\beta = 0.073$, $p = 0.109$) was not significant. The moderator (consumer knowledge) was found to have a positive and significant effect on the intention to leapfrog ($\beta = 0.378$, $p = 0.000$). Additionally, the interaction effects indicate that consumer knowledge moderates the relationship between perceived product quality and intentions to leapfrog ($\beta = -0.047$, $p = 0.005$) thus an enhanced moderation and the link between perceived switching cost and intentions to leapfrog ($\beta = 0.039$, $p = 0.012$) thus an antagonistic moderation. Thus, the moderating effect of consumer knowledge brings new insights into literature and theory in relation to the study variables which has implications for managers and policy makers. The large effect of perceived product quality suggests that marketing practitioners should consider a broader perspective of the competition such that a product not only competes with the products of other providers, but with its expected future generations and align their strategy concerning the quality in the lifecycle of their products. The study used quantitative data; future studies should consider using mixed methods as these may reveal other determinants that may influence leapfrogging intentions.

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ABBREVIATIONS

CK	:	Customer Knowledge
GDP	:	Gross Domestic Product
ITL	:	Intension to Leapfrog
ITU	:	International Telecommunication Union
P0	:	Current product owned by a customer
P1	:	Product available in the market/ Latest version of the product
P2	:	Next generation of the product not yet available in the market but has been announced to be rolled out in a later time
PBC	:	Perceived Behavioural Control
PPQ	:	Perceived Product Quality
PSC	:	Perceived Switching Cost
SN	:	Subjective Norm
TPB	:	Theory of Planned Behaviour
TRA	:	Theory of Reasoned Action
UTAUT	:	Unified Theory of Acceptance and use of Technology
UTR	:	Perceived Urgency to Replace

DEFINITION OF TERMS

Consumer knowledge	defined as the amount of experience with particular products or product categories (Bettman/Park 1980; Sujan 1985).
Leapfrogging	consumers skipping existing technologies and waiting for newer generations (Chen & Li-Hua, 2012).
Perceived product quality	quality is customer perception of general quality or superiority of one product or service - with attention to the purpose of that product or service- in comparison to other alternatives (Keller, 2008).
Perceived switching cost	consider costs associated with switching product generations involving a replacement, rather than a first time purchase (Chanda & Bardhan, 2008.)
Purchase intention	decision-making that studies the reason to buy a particular brand by consumer (Shah <i>et al.</i> , 2012).
Urgency to replace	perceived condition of the currently owned item impacting the intentions to replace the item (Labay & Kinnear, 1981)

OPERATIONALIZATION OF TERMS

Consumer Knowledge: Amount of information a customer has about the brand or make of phone they have.

Intension to Leapfrog: Intent to wait for a future or next generation mobile phone product.

Leapfrogging: skipping the current product: mobile phone, available in the market and waiting for a future product that has been announced but not available in the market.

Perceived Product Quality: Features of the Mobile phone that will satisfy customers' needs that are different from other phones.

Perceived Switching Cost: Cost associated with moving from one product – Mobile phone you own- to the other when you think of replacing your phone.

Urgency to Replace: the need to replace or condition one is in when they think of replacing or buying a mobile phone.

CHAPTER ONE

INTRODUCTION

1.0 Overview

This chapter outlines the background of the study and the statement of the problem. It also identifies the specific objectives and the hypothesis of the study. It further discusses the significance of the study and the organization of the thesis.

1.1 Background of the Study

Intention to leapfrog is described as making a decision to wait to replace a current product with a future product instead of the latest version currently available in the market. Businesses are facing challenges because of changing consumer buying behavior in terms of taste and preferences which are largely influenced by the many choices available to them in the market. Given these changes, consumers make decisions to delay buying existing products and wait to buy more modified or improved product generation in the future (Herrmann, Sprott, & Schlager, 2017). For example, a consumer who wants to upgrade their iPhone 10, may decide to wait for iPhone 12 which would be launched at time in the future instead of buying iPhone 11 which is the latest version of the iPhone currently in the market.

In the literature, this phenomenon is referred to as leapfrogging and it occurs when businesses, consumers, or countries make the decision to adopt a new-generation product or technology while skipping the existing in anticipation of the future one. (Binz, Truffer, Li, Shi, & Lu, 2012); (Cripps & Meyer, 1994) (Holak & Lehmann, 1990). Recently, leapfrogging has become a subject of interest for scholars and practitioners as they seek to explore how, when, and why consumers skip existing technologies and wait for newer generations. However, there is paucity of literature

on the subject and what exists is not based on any theoretical frameworks. Thus, creating an opportunity for further investigation into this phenomenon.

For firms, it is crucial to understand leapfrogging since it means a displacement of sales and profits from the current period to one sometime in the future (Chen & Li-Hua, 2012). From this perspective, consumers' expectations about a future generation product can cannibalize the currently marketed generation of a product (Weiss, 1987). Intentionally skipping a product generation can be seen in many industries as in the software (Montini & Slobin, 1991; Schilling, 2003), the automotive (Druehl, Schmidt, & Souza, 2009) or the Mobile phone market (Danaher, Hardie, & Putsis, 2001)

Even in business-to-business markets, not all customers keep pace with the speed at which manufacturers launch their latest products. Some customers intentionally ignore individual product generations since adopting a new product would likely result in additional costs (Weiss & John, 1989). Even with the considerable economic consequences, leapfrogging appears to receive little attention when firms consider the life cycle of a product (Bayus, 1988). For example, several experts state that automotive industry managers often base decisions about introducing new product generations on development and production-related concerns (www.pubs.acs.org; www.automotive-online.com).

Consumer considerations, such as leapfrogging, appear to play a subordinate role in managers' rationale when determining intervals between successive product generations (Cripps, 1993). This mindset also applies when considering changes from one product generation to the next, which are predominantly considered from a technical perspective. In reality, however, the success of any new product is greatly influenced by the product's adoption by consumers (Antioco & Kleijnen, 2010;

Wang, Wenyu, & Zhou, 2008) many of whom are existing users of the product. Thus, the concept of leapfrogging and (in particular) consumer determinants of leapfrogging are critical for firms to understand when deciding to introduce and market a new generation of a product. Expectations as to the perceived product quality, perceived switching cost and urgency to replace (Bayus, 1988; Danaher, Hardie, & Putsis Jr, 2001) are some of the determinants driving consumers' decision to skip the version currently available in the market (P1) and to wait for the new generation (P2) to be released (Lee & Lim, 2001).

Consumers' Product knowledge is based on consumers' understanding or awareness of the product or consumers' confidence about it (Lin and Zhen 2005). Consumer knowledge has been defined as the level of experience with particular products or product categories (Bettman/Park 1980; Sujun 1985). Consumer product knowledge has been studied in a variety of different ways in recent years (for example Baker, Hunt and Scribner, 2002; Alba and Hutchinson, 2000; Brucks, 1986; Park, Mothersbaugh and Feick, 1994; Raju, Lonial and Mangold, 1995; Rao and Monroe, 1988). It has been recognized as a characteristic in consumer research as that which influences all phases in the decision process (Bettman and Park, 1980).

Consumers with various levels of product knowledge differ in their insights of product attributes (Laroche, Bergeron and Goutaland 2003; Baker, Hunt and Scribner 2002; Blair and Innis 1996). Marks and Olson (1981) propose that consumers with higher levels of product knowledge have a better developed and a more complex schemata with organized decision criteria. In the same way, Kemp and Smith (1998) suggest that consumers with higher levels of product knowledge are more diagnosing and better informed than those who have lower levels of product knowledge.

Therefore, the higher the level of product knowledge a consumer possesses, the less chance there is that they will generate evaluation bias.

Today, the mobile phone plays a key part in the lives of most consumers, including the lives of young teens. It is a gadget that many consumers cannot seem to do without; they always have it on and check it almost everywhere they go. For these consumers, the cell phone is not only a personal device used to stay connected with friends and family, but it is also a device that showcases the extension of their persona and individuality (Grant and O'Donohoe, 2007; Sultan and Rohm, 2005). For marketers, the prevalent adoption of cell phones signifies a huge marketing prospect to reach and serve cell phone customers anytime, anywhere (Grant and O'Donohoe, 2007; Roach, 2009; Barutcu, 2007). Furthermore, the brands of these mobile phones play an important role in the customer's daily life, and can present a big asset for companies owning them. Due to the massive presence of mobile phones, brands play an important role in the customer's decision making process of using or adopting a mobile phone.

The literature is incomplete with respect to three points. First and foremost, although the literature has investigated some of these factors and their influence on leapfrogging in isolation (Cripps & Meyer, 1994; Moorthy & Png, 1992; Padmanabhan, Rajiv, & Srinivasan, 1997), a comprehensive assessment of these factors and their differential importance for leapfrogging (Boone, 2001) is missing. Second, the primarily applied modeling perspective (Bayus & Gupta, 1992; Chanda and Bardhan, 2008; Erdem, Keane, neu' & Strebel, 2005) lacks a large-scale analysis that examines the interplay between individual consumer characteristics and consumers' perceptions of multiple product generations to determine leapfrogging.

Finally, prior work on leapfrogging primarily collected data in one step (Kim, Srivastava, & Han, 2001), while two steps are necessary to examine consumers' perceptions of product generations prior to their decision on leapfrogging and their actual leapfrogging behaviour.

In view of these shortcomings, it is essential to undertake a closer examination of intention to leapfrogging and its consumer determinants. Hence, the primary objective of this study is to evaluate consumer determinants of intention to leapfrog by putting these factors into one analytical framework.

1.2 Problem Statement of the Study

The link between product market competition, innovation and growth has been at the center of much of the theory of innovation, going back to the classic works of Schumpeter (1934), Arrow (1962) and Dasgupta and Stiglitz (1980). In recent years, largely because of the digital revolution and technological breakthroughs, many countries have leapfrogged to the newest technologies amid local innovations (African Business, 2014). The technological revolutions that have occurred in sectors such as the mobile, solar, and broadband which have all unleashed opportunities and challenges for nations.

The rise of the theory of "leapfrogging" has been necessitated by the fact that wide spread of the mobile technology in the developing countries especially in Africa, has lagged behind as compared to most of Asia and Latin America in closing the income gap with the west. This has it that, in the words of a World Bank study, countries can make "a quick jump in economic development" by harnessing technological innovation.

The information and communication technology industry captures telecommunications, Internet service and Internet cafes, information and communication technology education providers, data operators, and software development (African Business, 2016). An example of technological leapfrogging has been skipping of fixed-line telecommunications to embrace mobile technology across the continent (Toesland & Cross, 2015). It has been suggested that this has helped to bypass the prohibitive infrastructure costs related to landline and fixed-line telecoms (Toesland & Cross, 2015).

In 2014, around 600 million people—about 56% of Africa's population—owned a mobile phone, which was surprising as just one African owned a mobile in 2000 (Wall, 2014). Thank you partly to liberalization and market reforms, there are over 35 major mobile network operators expanding the scope and pace of their operations (Wall, 2014). Another source of technological leapfrogging has been the skipping of traditional computing technologies by using mobile phones to access the net (Espiner, 2014). Recently, technological innovations and developments that have transformed the business landscape and many of the technology-based start-up firms have seized the opportunities provided by emerging technologies to equip them to enter new markets.

The expansion of service-based enterprises and jobs is unsurprising provided in Africa accounts for a mere 1.5% share of worldwide manufacturing outputs (Soni, 2017). Besides helping to scale back the value of serving consumers across an array of industries like finance and banking, technology has also paved the way for “services and products that were traditionally only accessed by the privileged few to succeed in a large pool of latest customers” (Soni, 2017). New

technologies have also altered way of competition by creating conditions for firms to supply services that differ from those offered by incumbents. By blindsiding start-ups, which culminates in some loss of market share, incumbent firms are forced to enhance or adjust their offerings to keep up or develop new sources of competitive advantage. And yet, despite its many advantages, little research is currently underway on the Leapfrogging Technology Process. It is necessary therefore to address this knowledge gap whose exploitation will be beneficial to developing countries that have limited resources. It will provide guidance to policymakers on how best to harness and manage technological development in order get the most out their resources.

Furthermore, understanding how consumers decide to have an intention to leapfrog and upgrade to new-generation products is of strategic importance (Chen 2003; Lee and Lim 2001). Consumers may postpone upgrades to newer versions until some point in the future when an even newer version is released (Herrmann, Spott, and Schlager 2015; Brezis, Krugman, and Tsiddon1993; Mody and Sherman 1990). It is imperative to know which factors affect consumers' decisions to leapfrog given the fact that leapfrogging possesses challenges for consumers having information deficit and high product acquisition cost. Studies have shown that lack of awareness of the availability of next generation products among users of technology, and the lack of utilization of new technology to boost competitiveness are some of the problems facing intention to leapfrog (African Business 2014, Versi 2014, WDR 2016). Nonetheless, to better manage leapfrogging issues, mobile manufacturing companies need to fully understand consumers' behavioral patterns and factors pertaining to switching or skipping (Tesfom *et al.*, 2016).

Previous studies on leapfrogging have examined environmental and organizational issues. Regarding environmental leapfrogging, scholars have examined how firms and countries adopt and use new eco-friendly technologies (Goldemberg 1998). Developmental or organizational leapfrogging on the other hand refers to leapfrogging studies in the framework of national socio-economic development strategies. These studies investigate the economic benefit of leapfrogging ahead of other countries in relation to socio-economic development (Brezis *et al.*, 1993; Unruh and Carrillo-Hermosilla 2006). Discussions on leapfrogging in this context are often accompanied by political rhetoric as comparisons among countries lead to competitive attitudes (Borofsky 2009; Friedman 2009). A question that is frequently addressed is how latecomer countries can get closer to the industrialized countries and their level of industrial development? The answer lies in potentially skipping stages of their past development. In his seminal paper Soete (1985) states that an important advantage of leapfrogging is that neither the capital invested nor the skilled labor of the previous technological paradigm requires to be displaced.

Despite recent interest in this topic, little is known about the decision-making process that consumers in emerging markets undertake when choosing new technologies. Thus, this study seeks to fill this void by evaluating the moderating effect of consumer knowledge on the relationship between consumer determinants of leapfrogging and the intention to leapfrog in the different mobile phone technologies available in Kenya. Consumer knowledge has been described as the level of understanding of particular products or product categories (Bettman/Park 1980; Sujon 1985,) and is of paramount importance for investigating consumer behavior and by extension intention to leapfrog. Consumer product knowledge is based on the consumer's perceptive or awareness of the product or consumer's confidence about it

(Lin and Zhen 2005). It has been recognized as a characteristic in consumer research that influences all phases in the decision process (Bettman and Park, 1980) and yet none of the previous studies has linked consumer behaviour to the intention to leapfrog.

The context of the investigation in this study is the mobile phone market in Kenya. The mobile phone is of a special interest because it is one of the few consumer products to have gained global acceptance within a relatively short period of time (Barnes and Scornavacca, 2004). This study therefore sought to understand the moderating effect of consumer knowledge on the relationship between determinants of leapfrogging and the intention to leapfrog in the mobile phone industry in selected counties Kenya

The study aims to elaborate on the conceptual framework for intention to leapfrog based on consumer determinants perspective, and at developing an empirically illustrating respective typology of intention to leapfrogging trajectories that will enable a spatially explicit analysis.

1.3 Research Objectives

The main objective of the study is to examine the determinants of consumer leapfrogging, consumer knowledge and the intention to leapfrog in the mobile phone industry in selected counties in Kenya.

The specific objectives include:

- i) To establish the effect of perceived product quality on the intention to leapfrog in the mobile phone industry in Kenya

- ii) To determine the effect of perceived switching cost on the intention to leapfrog in the mobile phone industry in Kenya.
- iii) To analyse the effect of urgency to replace on the intention to leapfrog in the mobile phone industry in Kenya.
- iv) To examine the effect of consumer knowledge on the intention to leapfrog in the mobile phone industry in Kenya.
- v) a) To establish the moderating effect of consumer knowledge on the relationship between perceived product quality and intention to leapfrog in the mobile phone industry in Kenya.
b) To explore the moderating effect of consumer knowledge on the relationship between perceived switching cost and intention to leapfrog in the mobile phone industry in Kenya.
c) To determine the moderating effect of consumer knowledge on the relationship between urgency to replace and intention to leapfrog in the mobile phone industry in Kenya.

1.4 Research Hypotheses

H₀₁: Perceived product quality has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.

H₀₂: Perceived switching cost has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.

H₀₃: Urgency to replace has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.

H₀₄: Consumer knowledge has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.

H05a: Consumer knowledge has no significant moderating effect on the relationship between perceived product quality and intention to leapfrog in the mobile phone industry in Kenya.

H05b: Consumer knowledge has no significant moderating effect on the relationship between perceived switching cost and intention to leapfrog in the mobile phone industry in Kenya.

H05c: Consumer knowledge has no significant moderating effect on the relationship between the urgency to replace and intention to leapfrog in the mobile phone industry in Kenya.

1.5 Significance of the Study

The study contributes to theory by identifying the determinants to leapfrogging and developing a theoretical model that can explain and predict consumers' intention to wait for newer technologies. The results will help managers of technology products understand the factors that influence consumers' decision to skip product currently available in the market and wait to buy product that is yet to be introduced. By so doing, managers will be able to better predict consumer leapfrogging behavior and design marketing strategies to persuade consumers to buy the newest available model instead of waiting for one to become available in the future.

The research findings will also help managers understand which factors determine consumers' decisions to delay their purchase of new technology. By understanding these factors, managers will be able to create marketing strategies to encourage adoption and avoid delays. Together, this research study will help managers know how to better serve their customers by targeting and positioning their existing and potential products thus gaining more market share and profits.

1.6 Scope of the Study

With the development of mobile technology, the number of people using mobile devices has increased greatly in Kenya. While reports indicate that leapfrogging has occurred in third world countries, understanding how consumers decide when to upgrade to new-generation products is of strategic importance in Kenya.

The study sought to assess how perceived product quality, perceived switching cost, urgency to replace and consumer knowledge affect the intention to leapfrog in the mobile phone industry in Kenya. The study was conducted on the employees of selected county government namely Trans-Nzoia county, Nakuru county and Nairobi county because these counties have a large number of residents who are cosmopolitan. The study was conducted between April 2019 and December 2019.

1.7 Organization of Thesis

This study is organized into five chapters. The first chapter introduces the research question, research objectives and elaborates on the contribution of this work. Chapter two provides a summary of research literature review on intention to leapfrogging since the introduction of the term in academic research. Also, this chapter discusses theories used for the study, presents the research model, and develops testable hypotheses. Chapter three proposes the research methodology used to test the hypotheses. Chapter four presents the results of the data analysis, interpretations and discussions. Finally, chapter five looks at the summary, conclusions and recommendations of the study.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter provides literature on intention to leapfrog, technological leapfrogging, the concept of consumer leapfrogging, leapfrogging behavior in other areas, concept of perceived product quality, perceived switching cost, urgency to replace and consumer knowledge, theoretical perspective Schumpeterian growth theory, theory of planned behavior, UTAUT, empirical review, perceived product quality, perceived switching cost, urgency to replace, consumer knowledge and the leapfrogging behavior. It also looks at the summary of leapfrogging gaps, leapfrogging examples in Africa and finally, it gives the conceptual framework of the study.

2.1 Concept of Intention to Leapfrog

Intention to leapfrog is described as making a decision to wait to replace a current product with a future product instead of the latest version currently available in the market. This concept borrows from purchase intention which is the kind of decision-making that studies the reason to buy a particular brand by the consumer (Shah *et al.*, 2012). Morinez *et al.*, (2007) defined purchase intention as the circumstances where the consumer tends to buy a certain product and in a certain situation. Customers' purchase decision is a complex process. The aim of a purchase is usually related to the behavior, perceptions, and attitudes of consumers. Purchase behavior is a key point for consumers to access and evaluate the specific product. Ghosh (1990) affirms that purchase intention is an efficient means to forecast the buying process. Buying intention may be affected by the influence of price or perceived quality and value. Additionally, consumers are affected by internal or external stimuli during the purchase process (Gogoi, 2013). Researchers have proposed six stages through which

a consumer goes before deciding to buy the product. These are: awareness, knowledge, interest, preference, persuasion and purchase (Kotler & Armstrong, 2010, Kawa *et al.*, 2013).

Leapfrogging has been used to explore how, when, and why consumers skip existing technologies and wait for newer generations. In this research domain, leapfrogging can be defined as a consumer's intention to skip a new technology in anticipation of purchasing the next generation. This topic is not only relevant from an economic standpoint, but it is increasingly important for technology-driven companies. Amongst fierce competition, firms in technologically driven industries must innovate and launch new technologies at an increasing rate, and sometimes even pay the price of cannibalization (Sood and Tellis 2005).

In addition, there is a vast literature examining the rate of diffusion of new products in different markets that can be tied to leapfrogging. Steinmueller (2001) showed that the transmission of leapfrogging is challenged by the degree of adaptation of the technology to local needs, costs, knowledge and skills required for effective adoption as well as limitations due to local market dynamics. These challenges are exacerbated in developing countries and thereby hinder the swiftness of diffusion. The results evidence how relevant social and cultural conditions are in the adoption and diffusion of new technologies (Herbig and Dunphy 1998).

Although a vast literature exists on how people perceive and adopt radical technologies and how fast new products spread across a population, only a handful of studies have examined consumers' decisions to postpone buying a new generation product at some point in the future. In a recent study in the United States, Herrmann, Sprott, and Schlager (2017) examined several drivers of consumer leapfrogging in the

locomotive industry. The authors proposed that perceived urgency, quality of the new product, perceived condition, switching costs determine the occurrence of intention to leapfrog. Interestingly, they found that switching cost was the most relevant predictor of the intention to leapfrog. The authors also found that the link between leapfrogging intention and leapfrogging behavior was stronger as consumers' income increased. Unfortunately, no theoretical framework was proposed to explain the findings.

Other studies have shown that the decision to upgrade depends on consumers' expectations about future prices, quality levels, and product availability (Similarly, Song, and Chintagunta 2003). Further, diffusion studies suggest that the decision to adopt a newer version is determined by consumers' purchase history, expectations about the new generation's performance, and preferences for the current generation (Chanda and Bardhan 2008). Also, the perceived condition of the existing product is related to replacement intentions (Bayus and Gupta 1992). These studies shed some light on factors associated with consumer leapfrogging in developed countries. Unfortunately, previous studies are limited in that they do not propose a theoretical mechanism for the findings and the sample of countries investigated hinders the generalizations of the findings to developing nations. Therefore, the purpose of the present study is to fill this void in the literature by explaining how consumers decide when to wait for a next generation technology.

2.1.1 Technological Leapfrogging

Technology Leapfrogging, described as the introduction of a new and up-to - date technology in an application field where at least the previous iteration of that technology has not been implemented (Davison, Vogel, Harris, & Jones, 2000), is one of the most cost-effective and efficient ways to achieve an advanced state of ICT

growth and connectivity for developing countries (Liu & Yuan, 2015). This is because Leapfrogging Technology helps emerging countries to benefit from developed countries' experience and skills while they avoid both the risks associated with research and development (R&D) and exploration (Gray & Sanzogni, 2004). Moreover, since leapfrogging technology eliminates the need to invest in successive ICT generations (Alzouma, 2005), developing countries will be able to escape the inertia that could arise from legacy ICT infrastructures (Kleine & Unwin, 2009).

Technological leapfrogging often involves the latecomer assuming new technologies ahead of the forerunners, consequently leaping over them. This is a necessary step to getting around forerunners' technology, which can be achieved by jumping ahead into new generations of technologies. Therefore, technological leapfrogging is exceedingly likely to succeed when it is implemented during a paradigm or generation shift or during an exogenous moment of disruption, which early Schumpeterians such as Perez and Soete (1988) coined as "windows of opportunity." Finding ways to prevail over entry barriers is one of the key incentives for technological leapfrogging. A window of opportunity is a moment in time in which entry barriers for latecomers reduce. The concept of product space and economic complexity as postulated by Hidalgo *et al.*, (2007), does not consider entry barriers and related opposition with the incumbent.

Latecomers tend to find difficulties because of entry barriers that exist in many product spaces, and because they have to compete with the incumbents to be able to enter and occupy the product spaces. Hence, in the dynamics of economic catch-up, the role of leapfrogging is analogous to "flying on a balloon when the traditional ladder to catch up has been kicked away" (Lee, 2019). As we will only fly balloons

under favourable weather, economic leapfrogging only becomes successful when exogenous windows of opportunity become available. Certain preconditions for flying also require navigating skills. Otherwise, we'd fall to the bottom rather than flying into the sky.

In his most up-to-date book, Lee (2019) proposes a comprehensive theory of economic catch up, consisting of “late entry→ three detours→ leapfrogging”, and views leapfrogging as the ultimate stage of the catching-up process following several detours to create technological capabilities. The detours, in terms of innovation, include the following: during the primary detour, minor innovations are promoted via petit patents instead of high-level innovations via regular patents(Lee, 2019). Within the second detour, firms concentrate on short cycle instead of long cycle technologies, although they might need to shift towards long cycle technologies eventually; within the third detour, while the latecomers would ultimately be highly integrated within the GVC, they need to first increase their share of domestic value added in exports, which suggests less backward participation in GVCs. Consistent with this theory, leapfrogging is important because the detours don't suffice to boost latecomers to the high-income level beyond the middle-income trap.

The discussion about the origins of the leapfrogging thesis goes back to the theory of the so-called latecomers' advantage introduced by Gerschenkron (1962; 1963). Countries that use the approach only adopt and use technologies after they need matured enough to possess standardized capital goods that are suitable for production. This approach, however, was limited to catching-up to mature technologies. Freeman and Soete (1997) and Perez and Soete (1988) apply this notion with attention to the role of the new technological paradigm which brings

forth a cluster of latest industries. They conclude that emerging technological paradigm functions as a window of opportunity for latecomers who are not any longer locked into the old technological system and are thus ready to seize new opportunities in emerging industries.

Perez and Soete (1988) discuss latecomers' advantages in leapfrogging in terms of three factors, namely entry barrier, accessibility of data, and the likelihood of lock-in by the incumbents. First, since the required equipment to supply new industry goods has not yet been developed, general-purpose machines should be used, as such production volumes are going to be low. Therefore, the entry barrier related to economies of scale doesn't exist. Second, within the initial stages of a replacement technological paradigm, the performance of technologies isn't stable, which suggests that there are no dominant players. Hence, if only human resources can access the knowledge sources and generate new additional knowledge, the entry by latecomers into an emerging technology could be easier than during a later stage of technological evolution.

Third, catching-up countries is often said to be during a relatively advantageous position, as they're not locked into old technologies whereas advanced countries tend to be locked into old technologies, thanks to the sunk costs of their investment. Lee and Lim (2001) argued that the thought of leapfrogging started gaining more attraction following the presentation of samples of industries within the Republic of Korea. The idea was further expatiated to include the basis of the technological development of latecomers that is defined as path-following, stage-skipping or direction-developing. In this respect, path refers back to the trajectory of technologies and level to the ranges inside this trajectory.

Lee and Lim (2001) further posit that the direction-developing and level-skipping techniques constitute versions of leapfrogging. Following Lee and Ki (2017), this study illustrates these three techniques in Figure 1 which offers one type of tendencies of productiveness of technology of different generations (shown at the vertical axis); the horizontal axis represents time. Let us assume that the cutting-edge term is 91 in Figure 1, and that the incumbent corporations have followed the most up to date, second technology era, and for that reason reached the peak in their productiveness. Latecomer corporations can pursue three options or strategies to make an overdue access.

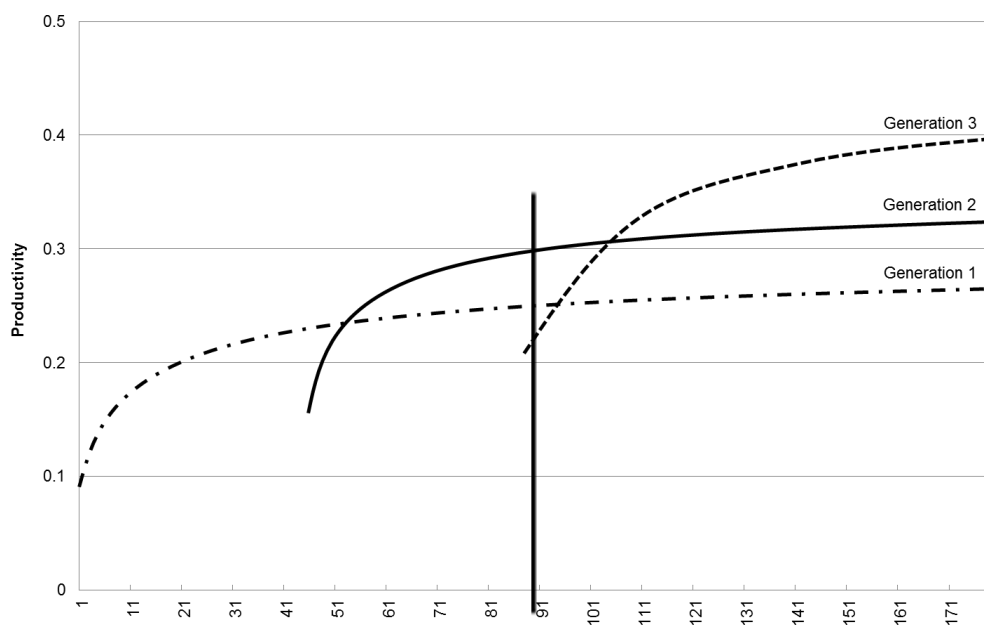


Figure 2.1: Leapfrogging and path-following strategies of latecomer firms.

Source: Lee (2019: Figure 5-1), taken from Lee and Ki (2017), adapted by Lee *et al.*, (2016)

The first option for latecomers is the adoption of first-generation technologies (the oldest technology) at rock bottom price, that is, to pursue a path-following strategy, meaning the latecomer moves along the previous technological

trajectory of incumbents. One advantage of this strategy is that established firms are not any longer preoccupied with the results of transfers or leakages of proprietary technologies. Old technologies tend to be readily available at low prices, particularly during business downturns. However, given their low level of productivity, late entrant firms cannot compete with incumbents within the same market. Thus, these firms must attempt to enter a special segment (low end segments).

The second option is for latecomers to implement a stage-skipping strategy, during which the latecomer firm follows an equivalent path as that of incumbents but skips over older generations of technology (Generation 1 in Figure 1) to adopt the foremost up-to-date technology (Generation 2 in Figure 1); this technology is the same that's getting used by incumbents. Thus, fierce competition may ensue between incumbents and late entrants because the latter adopts the foremost recent technology. Apart from the difficulty of obtaining financial resources to get up-to-date technology, the market availability of such new technologies or the willingness of established firms to transfer such technologies to latecomer firms represents another problem (Lee and Ki, 2017). During this context, IPR-based protection of technologies could also be an obstacle to catching up.

If the late entrant is successful in resolving the difficulty of technology transfer or acquisition, it's going to emerge as a strong rival of the incumbent because the late entrant doesn't only attain an equivalent productivity levels as the incumbent, but also benefits from low labour costs. The third option for latecomers is to pursue a path-creating strategy. During this scenario, the latecomer explores a

replacement path of technological development supported a replacement generation of technology. During this strategy, the late entrant chooses an emerging or third generation technology before the incumbent, which is according to the theory of leapfrogging as discussed by Perez and Soete (1988)

One advantage of this path-creating strategy or leapfrogging is that it focusses on technologies that have a high and long-term potential or productivity as illustrated in Figure 1. However, the danger is that the emerging or new technology is neither stable nor reliable, which leads to low productivity or high costs at the initial as shown in Figure 1. Despite the high potential of such emerging technologies, a firm that adopts them will need to bear high costs. Thus, latecomers might incur losses during the initial stage within the market. Consistent with Lee and Ki (2017), latecomers' approach to leapfrogging is according to the idea of S-curves (Foster, 1986), which states that the inferiority of a replacement technology when it first emerges discourages incumbents from introducing it. During this stage, a replacement technology can represent a trap for the incumbent, but a window of opportunity for latecomers that are free from the "replacement effect of latest technology" (Arrow, 1962). In other words, incumbent firms supported by rational calculation or thanks to faulty decision-making tend to disregard emerging technologies that have great potential and remaining complacent with the high productivity of current technologies.

Although the decision to disregard emerging technologies that have great potential could be rational within the short run, incumbent firms may lose to other firms that are willing to put up with the danger of adopting emerging technologies and achieve higher productivity and thereby steal the market from incumbents.

Interestingly, late entrants or inferior firms with lower productivity levels than leading firms have numerous reasons to quickly shift to new technologies. Latecomers do have a greater incentive than incumbents to adopt new technologies. For latecomers, taking high risks, however, usually requires some initial support from the government. Without subsidies or incentives, few latecomer firms will or can take the danger of adopting emerging technologies because they may face low or weak demand during the initial entry stage, and thus face difficulties in achieving the initial production volume that generates economies of scale.

Thus far, technologies are treated as exogenous, and firms, particularly latecomer firms, are seen as facing a binary choice of either adopting new technologies or not. Latecomers, however, don't usually only assimilate adopted technologies, but instead substantially improve them, an approach often referred to as a follow-on innovation, incremental innovations, or reinvention (Lee and Ki, 2017). Rogers (2003) observes that reinvention occurs for varied innovations and for several adopters at the stage of implementation, and reinvention results in an increased rate of adoption of an innovation.

Following this line of reasoning, imagine two sorts of path creation, 1) counting on whether a replacement path is made by in-house, endogenous innovation activities of the latecomer, or 2) whether an exogenous or supplier-driven innovation is adopted before the incumbent improves the adopted the technology further. Note that the former path is common in product innovations or IT industries for example, semiconductors, whereas the latter path is found in

industries characterized by process innovations such as the steel industry and may be termed the adoption and follow-on innovation mode.

Another dimension of leapfrogging is often conceived in terms of inter-sectoral and intra-sectoral leapfrogging, which count on whether the leapfrogging takes place within an equivalent sector or across different sectors. Inter-sectoral leapfrogging, to a particular extent, is analogous to a “long jump” consistent with Hidalgo et al., (2007), who argue that latecomer economies must shift to core product space located distant from their current or periphery position. Against this backdrop, intra-sectoral leapfrogging involves jumping across generations of technologies within an equivalent sector. Intra-sectoral leapfrogging is simpler or less risky than the inter-sectoral long jump, if latecomers have already built certain absorptive capabilities, for example, manufacturing experience, within the relevant industries

2.1.2 Consumer Leapfrogging

The term leapfrogging has assumed different meanings depending on the context of its use. Steffen (2006) describes leapfrogging as the idea that describes a condition where areas which have poorly developed technology or economic bases can change themselves and move forward rapidly through the adoption of recent systems without browsing intermediary steps. Furthermore, (Steffen (2006) argues such a strategy is consistent with the changing world in which one doesn't “need a 20th century industrial base to create a 21st century bio/nano/information economy”.

Leapfrogging as a procedure was first noted back in 1962 by a political philosopher named Alexander Gerschenkron in his contribution titled "Economic Backwardness in Historical Perspective" (Gerschenkron, 1962). He argued that sometimes not having

invested in a particular industry or technology can be beneficial when a paradigm shift occurs, as the society in which the firm exists does not have to deal with sunk costs and legacy issues. This society can adopt the new systems more rapidly and completely than can other societies, ostensibly more "advanced," societies, gaining the social and economic benefits that had been realized earlier (Ibid). Leapfrogging can be done by skipping over generations of technologies for example, the use of cellular phones in rural Africa skipping landlines, or avoiding the use of fossil fuels, and going straight to renewable energies. It can also be evidenced in urban development policies that avoid the proliferation of private cars, and promote sustainable mobility in the urban, medium cities.

Leapfrogging can also mean leaping further ahead to become the technological leader, surpassing contemporary leaders, for example Korean leapfrogging in the steel sector (Gallagher (2006). Industrial systems in a given area, say a country or region, can undergo technological evolution through three patterns of catching-up, namely path-creating catching-up, path-skipping catching-up, and path-following catching-up (Lee and Lim (2001). The first two cases of catch-up can be interpreted as leapfrogging. Leapfrogging can happen accidentally, situationally, or intentionally (Steffen (2006). A situation that fits the first case well is where the only systems around for adoption in the area under consideration are better than legacy systems elsewhere. In the second case where leapfrogging occurs situationally is where, for example, in a sprawling rural area decentralized communication system are adopted. The intentional leapfrogging happens in the circumstance where policies by design are developed, for example, to promote the installation of WiFi and free computers in poor urban areas.

Reliant upon the research tradition, the literature contains various ideas about leapfrogging (Badawy, 2009; Boone, 2001; Chen & Li-Hua, 2012). The common denominator is that leapfrogging occurs when consumers (or businesses and countries) make the decision to adopt a new-generation product or technology (Binz, Truffer, Li, Shi, & Lu, 2012; Cripps & Meyer, 1994; Holak & Lehmann, 1990). During this process, the customer must choose between purchasing the product that is currently available on the market or postponing the purchase for a future anticipated (improved) product from the following generation (Bell & Bucklin, 1999). Leapfrogging thus revolves around three different groups of a product: The older product (P0) in current use by the consumer; the new product (P1), which is from the latest generation of product currently available on the market; and the future product (P2), which is the anticipated, but not currently available, future generation of the item.

Leapfrogging refers to skipping the latest product generation offered on the market (P1) in anticipation of purchasing a future generation (P2), which is characterized by an improvement in relation of performance. Leapfrogging involves a conscious decision and does not reflect situations when consumers miss the adoption of a new product or unintentionally postpone a purchase. Further, leapfrogging does not occur when consumers postpone the acquisition of a new product until the same product becomes available under more favorable conditions or the replacement purchase becomes necessary due to defects or wear. Also, leapfrogging can only occur if the product used by the consumer does not correspond to the new product currently available on the market. Thus, the key feature in leapfrogging is that current users of a product (P0) decide against purchasing the new product (P1) with the intent of waiting to purchase the future product generation (P2) once it becomes available.

Academic research on leapfrogging has explored three general areas. The first stream investigates the effects of market, company, and competitor characteristics on leapfrogging behaviour and optimal multi-generation product development strategies (Morgan, Morgan, & Moore, 2001; Ofek & Sarvary, 2003). Overall, this stream of research provides a macro view on leapfrogging. The second research stream investigates the effects of marketing-mix variables on leapfrogging and the development of optimal multi-generation products (e.g. Danaher *et al.*, 2001; Druehl *et al.*, 2009; Kornish, 2001; Speece & MacLachlan, 1995). This set of research provides clear evidence that marketing-mix variables controlled by firms can influence consumer leapfrogging.

A final research stream, the one most applicable to the current research, has explored the influence of consumer characteristics on leapfrogging behaviour. Gordon (2009) developed a vibrant model of consumer demand that accounts for the replacement decision when consumers are unclear about future price and quality. The results reveal disparity in replacement behaviour over time, with such heterogeneity providing an opportunity for companies to tailor their product introduction and pricing strategy to target particular market segments (Erdem *et al.*, 2005). Similarly, Song and Chintagunta (2003) developed a model for the acceptance of new durable products that accounts for consumer heterogeneity, as well as consumers' forward-looking behaviour. These researchers demonstrated that consumers who look forward optimise purchase timing by trading off the utility from buying the product and expectations about future prices, quality levels, and product availability.

Further, Chanda and Bardhan (2008) studied the relative changes of diffusion parameters for both first-time purchasers and upgraders. The results of their work for

first-time purchasers suggest that the contribution of innovators to total sales is reduced and the value of imitation parameters increases as newer technologies come to the market. For repeat purchasers, the relationships are exactly opposite. Kim *et al.*, (2001) developed a model whereby purchase chances for buyers are captured as a function of purchase history, expectation about future generations, and preferences for the present generation.

Finally, Bayus and Gupta (1992) explore the impact of variables associated with product and household characteristics on replacement intentions. Results demonstrate that the perceived condition of the currently owned product and its age are significantly related to replacement intentions.

Although the published literature has examined a variety of factors that are likely to influence leapfrogging, what is missing is an overall model that demonstrates the relative importance of consumer determinants of leapfrogging. Indeed, no published research has yet provided a comprehensive assessment of leapfrogging determinants. Further, there are limited studies that have examined boundary conditions for the observed effects of the consumer determinants of leapfrogging. I address these issues by developing hypotheses regarding both issues in the following sections.

Technology leapfrogging is mostly discussed in the business to business (B to B) context in previous studies (Hwang, *et al.*, 1990). In that context, it has been suggested that economic development (Hwang *et al.*, 1990), major disruptive changes in technology (Amiti 2001, Brezis, *et al.*, 1993) cost concerns (Sherman 1990) and R&D capacity and collaboration (Lim, 2001) may explain the phenomena in which developing countries jump older modes of technologies, leap on to the adoption of the most recent ones, and thus may surpass more-developed countries in certain areas.

The favored narratives of telecoms leapfrogging argue that leapfrogging during a similar fashion occurs in mobile adoption for developing countries. Such opinions, however, have not been seriously investigated.

To systematically attack problems with telecom leapfrogging, this study takes a step back to ascertain what the word “leapfrog” means. According to Webster's Third New International Dictionary, leapfrog as a noun is “a game during which one player bends down on high-low-jack and another places his hands on the primary player's shoulders or back and leaps over him”. As a transitive verb form, to leapfrog is “to leap or progress in or as if within the game of leapfrog” so on either (1) “move from one locality to a different in one or more jumps” or (2) “pass or go ahead of one another in turn”. Interestingly, the difference between these two connotations (i.e., locality move vs. to pass one another) here is strictly reflected within the confusion upon defining a technological leapfrog.

Within the literature, numerous studies on leapfrogging looks at the difficulty of the locality move of technology and focuses more attention on the skipping of dated technology for a country's development (Sharif 1989), whereas other studies focus on specific countries “going before one another” and emphasizes more on cross-country comparisons (Howard 2007, Arthur, 2008, Amiti,2001). The “going before one another” metaphor of the latter echoes popular beliefs that generally “many developing countries are ready to leapfrog rich ones” (Economist 2009), and specifically, for instance, “Africa was the primary region within the world where mobile phones overtook the number of fixed-line telephones” (Wright 2004).

Apparently, leapfrogging during this sense implies that countries once considered third world not only actually skipped old technology models, but also that they saw

the skip before the formerly more advanced countries. Consistent with Hobday 1995, leapfrog implies not only bypassing earlier modes of technology, but also a catching-up process. Further studies reiterate such a view, but do not reach an agreement on the relationship between leapfrogging and catching-up. As an example, while Lee and Lim (2001) take leapfrogging as a sort of catching-up, Sharif (1989) in contrast has catching-up together with other types of leapfrogging. These views nevertheless point to a uniform direction that another layer of telecom's leapfrog that is taken by many to imply former laggards catching up then passing over the previous leaders (Economist 2009). Within the technology leapfrogging literature, this "catching-up and passing-over" feature is usually taken to characterize leapfrog when a formerly less-developed country, skips an old mode technology and adopts a more efficient, new technology and thereby surpasses a formerly more-developed country in productivity (Amiti, 2001; Lee, Lim, 2001)

Although telecom leapfrogging may be a widely accepted "hypothesis," according to Howard (2007) "it has rarely been tested." A sensible picture of telecom leapfrogging is only attainable if researchers have good metrics on how developing countries skipped the fixed-line telecom systems and directly adopted mobile ones. The research literature presents only limited efforts on developing such metrics. These limited efforts nevertheless have some flaws. James (2009) suggests measuring leapfrogging using a multiple of two ratios where the primary ratio is the size of a country's mobile user base over that of its fixed-line user base, and the second being per capita use within the country over the per capita use in others. This, however, is essentially a static measure and thus cannot characterize the dynamics of the supposed "leap." Additionally, such a measure varies widely across time in that leapfrogging

measured for one year would be widely different from that measured a couple of years later.

Howard (2007), on the other hand, focuses on the change of the second ratio. This approach, though introducing dynamics into the measurement, totally neglects the landline component that is being compared with the mobile component when leapfrogging is being measured. Furthermore, both of the aforementioned measures fail to deal with the important verb “skip” on which the leapfrogging hypothesis hinges. Neither of those two measures can represent how the landline systems are “skipped” while the mobile systems are growing during a country through the lens of technology diffusion.

Though it might have diverse meaning, the telecom “leapfrogging” metaphor is more realistically understood as attitude of technology diffusion. Within the rustic, leapfrogging relates to the relative diffusion paths of a replacement (here, mobile) technology and an old technology (here, landline). Extending Danaher *et al.*, (2001) to the end-user telecom market (another diffusion context), it is evident that mobile users include people who previously had no access to landlines, people who simultaneously use both mobile phones and landlines, and other people who switched from landlines. As landlines became, the prevalent mode of telecom technology for nearly a century, no country within the world has actually been insulated from their diffusion, regardless of how low its penetration level had been before mobile phones started their diffusion. Consequently, from the attitude of technology diffusion, we will check out telecom leapfrogging by comparing the diffusion paths of landline and mobile user bases within a country.

In this regard, it can be said that the dynamics of landline adoption are at a more mature stage of diffusion, whereas that of mobile phones are at a less mature stage. As such, no country actually leapt from nothing to mobiles, instead it has argued that a couple of countries saw very low landline penetration when mobile phones took off. In this sense, whatever proportion there's for landlines to be "leapt" or "skipped" (Economist 2008) is measured by their penetration level when the mobile user base first surpassed that of the landlines. The lower this level is for landlines, the more potential market there is for landlines that might be occupied by mobile phones. This level implies the reverse of the space for people that did not own landlines to directly move from nothing for telecommunications to mobile systems (Davison, *et al.*, 2000). There are two critical time points of leapfrogging over time. One is the time point when the number of the mobile phone user base first surpasses that of landlines. This point is referred to as when the "leap" (in terms of Soete, 1985) actually happened.

The other significant time point as far as leapfrogging of a technology in a country is concerned is the time point when the old technology stops to grow in terms of penetration. At this point, the number of switchers from landlines to mobile phones exceeds that of new landline users. Landlines hereby start to be cut out. Before this point is reached, we generally examine both fixed-line and mobile systems as growing concurrently (although at different rates) a situation not implied by "leapfrogging." After this point, the market condition of landlines meets the definition of leapfrogging for (Davison, *et al.*, 2000) "the execution of a new and up-to-date technology in an application area in which the previous version of that technology has not been deployed."

In addition to the “base level” and the two time points introduced above, people are also interested in the issue of “catch-up” while the new mode of technology in the process of diffusion (Antonelli 1990). In this sense, as is proposed by Antonelli (1990) and discussed by James (2009), the ratio of mobile phone subscriptions to fixed-line subscriptions is a popular measure that is used. In the past, studies applied such a measure (Antonelli 1990) or its extension (James 2009) by assuming that it is static. Looking at diffusion paths of both landlines and mobile phones, however, one soon realizes that this ratio not only changes over time, but also (at least during the past) generally increases.

Theories concerned with leapfrogging encompass relationships between successful users of established technologies, those who have limited access to established technologies, and new technologies (Fudenberg *et al.*, 1983). In particular, successful users of reputable technologies may have much less inducement to switch to a new technology than others who have limited access to well-known technologies. At the firm level, this can lead to creative destruction when those with restricted access to established technologies create new attractive offerings by using new technologies to leapfrog over incumbents’ offerings (Schumpeter *et al.*, 1942). It has also been argued that countries, as well as firms, can leapfrog (Brezis *et al.*, 1993). The principle of leapfrogging over reputable technologies is also applied in the international growth of various technologies, including but not limited to mobile phone banking, and renewable energy provision as examples. Here, the focus is not initially on competition to get more wealth, rather, the initial focus is upon enabling access to technical systems that can alleviate poverty (Steinmueller, 2001).

2.1.3 Leapfrogging behavior in other areas

Human preference behaviour is seen here as a mental process that changes perceptions of several voluntary courses of action into a choice. It is considered to cover any kind of spontaneous, automatic, and impetuous choice behaviour as well as conscious-purposeful decision making. Thus, it includes a huge, heterogeneous variety of processes, lasting from months for long-standing, multi-substitute, multi-attribute choices (for example, relocation of households, vehicle ownership decisions) to split seconds for short-term choices with few alternatives and few attributes. Depending on the character and impact of the preference decision one might determine strategic, tactical and operational choice behaviour. Super fine dividing lines between these categories are not useful, as any such delineation within the continuum might rightfully be disputed. However, the duration, the complexity and the impact of the individual processes might better be considered as moderately correlated elements of continuums. Though the functions of these choice categories to some extent differ from the same mental processes carry them out.

Several definitions of leapfrogging have been proposed (Badawy 2009; Boone 2001; Chen and Li-Hua 2012). However, the common denominator is that leapfrogging occurs when businesses (consumers or countries) make the decision to adopt a new-generation product or technology (Binz, Truffer, Li, Shi, & Lu, 2012; Cripps & Meyer, 1994; Holak & Lehmann, 1990). Researchers introduced this concept in the context of firm innovation and competition to explain why companies holding monopolies based on incumbent technologies often succumb to new entrants that leapfrog to new radical technologies (Schumpeter 1942).

Extant academic research on organizational leapfrogging concentrates on three contexts: technological, developmental, and environmental leapfrogging. Developmental leapfrogging refers to leapfrogging studies in the context of national socio-economic development strategies. These studies investigate the economic benefit of leapfrogging ahead of other countries in terms of socio-economic development (Breziset *al.*, 1993; Unruh and Carrillo-Hermosilla 2006). Discussions on leapfrogging in this context are often accompanied by political rhetoric as comparisons among countries lead to competitive attitudes (Borofsky 2009; Friedman 2009). Another common question that is often dealt with in the literature is how latecomer countries can catch up with industrialized countries and their level of industrial development – also by potentially skipping stages of their past development? In his seminal paper Soete (1985) states that an important advantage of leapfrogging is that neither the capital invested, nor the skilled labor of the previous technological paradigm need to be displaced.

In this context, the literature builds upon the historical evidence that shows how leapfrogging benefits a country's competitiveness and economy. For example, in the 17th century, England adopted a new technology to produce cotton and took over Holland's market dominance. In the 20th century, the United States and Germany pioneered the automobile industry and ended Britain's economic leadership position (Schroeder 2010; Soete 1985). More recently, studies show how leapfrogging has benefited Germany, France, the United States, Japan, and Israel (Schroeder 2010; Grinstein 2008; Gallagher 2006; Perez and Soete 1988).

Following the examples of leapfrogging success in developed nations, scholars have investigated the success or failure of leapfrogging in developing nations. In the

1980's, Asian countries such as Singapore, Malaysia, and China made leapfrogging a national strategic priority. Rather than catching-up to existing technology used by their developed counterparts, these countries aimed at developing the next generation of technology. This strategy has positioned these countries as technological leaders in the sector of microelectronics (Hobday 1994; Soete 1985). In Singapore, for instance, the electronics sector industry became the country's largest industry. Parenthetically, these countries are also expected to achieve market dominance in semiconductors and consumer electronics.

However, not all the evidence favors leapfrogging. Huang (2010) observed that people in developing countries have a difficult time leapfrogging. The author examined how people in developing countries skip landline-based telecommunication systems by directly adopting mobile phones. Using a sample of 159 countries over a time span of 19 years, the author analyzed four factors: 1) the time point when the size of the mobile phone user base first surpassed that of landlines, 2) the time point when the mode of technology to be skipped (i.e., landlines) peaked in the number of users, 3) the penetration level of landlines at the time point when the size of the mobile phone user base first surpassed that of landline, and 4) the annual compound growth rate of the ratio of mobile phone subscriptions to fixed-line subscriptions over time on.

It was found that the time telecom leapfrogging occurred varied widely across these countries, whereas lagged countries in the landline era still fell behind in the penetration of mobile technology. Thus, it was concluded that leapfrogging did not bring the lagged countries to the same level of or even passing over the leading ones in end-user telecommunications. Hence, although leapfrogging is a good idea, the

adoption of new technologies, especially in developing nations, continues to be a challenge.

In the context of environmental leapfrogging, scholars examine how firms and countries adopt and use new eco-friendly technologies (Goldemberg 1998). A special topic has been how developing countries could skip inferior, less efficient, more expensive and more polluting technologies and adopt more advanced ones, particularly in the energy sector (Goldemberg 1998; Perkins 2003). This topic is especially relevant for emerging economies such as the BRIC countries (Brazil, Russia, India, and China), but also pertinent to other developing nations in former Soviet nations, Southeast Asia, and Latin America where economic growth, population increase, and industrialization appear likely to take place over the next decades. In this domain, the results show that the rate of leapfrogging to eco-friendly technologies depends on the institutional environment. For example, Gallagher (2006) found that China's ability to leapfrog to substantially cleaner automobiles is constrained by Chinese policies and laws. The author argues that a combination of government policies, regulations, and nongovernmental initiatives are required to adopt newer technologies.

The concept of environmental leapfrogging also includes a social development dimension which should not be neglected. The diffusion and application of environmental technologies not only reduces environmental impacts, such as those from CO₂ emissions, but at the same time can contribute to sustainable economic. For example, currently nearly one third of the world population still has no access to electricity and another third has only poor access. Reliance on traditional biomass fuels for cooking and heating can have a serious impact on health and the

environment. Indeed, there is not only a direct positive link between sustainable renewable energy technologies and climate change mitigation, but also between clean energy and health, education and gender equity outcomes (Modi *et al.*, 2004, Haines *et al.*, 2007)

Table 2.1: Summary of the various definitions of leapfrogging

CONTEXT	AUTHOR	MAJOR FINDINGS
Technological context	Schumpeter (1942)	Radical innovations eventually becoming the new technological paradigm and the newcomer companies go ahead of former leading firms.
	Perez and Soete (1988)	Latecomers avoiding heavy investments in older technologies, investing directly in affordable up-to-date technologies and finally, catching up with advanced industrialized countries through further innovation.
National Development Context	Goldemberg (1998)	Developing countries leaving some of the steps originally followed by industrialized countries and incorporating currently available modern and efficient technologies into their development process.
Environmental Context	Steinmueller (2001)	Bypassing some of the processes of accumulation of human capabilities and fixed investment in order to narrow the gaps in productivity and output.
	Gallagher (2006)	Skipping over generations of technology in terms of moving ahead of existing technologies to become technological leader.
	Perkins (2003)	Developing strategy for industrializing countries to bypass the ‘dirty’ stages of economic growth through the use of modern technologies that use fewer resources and/or generate less pollution”
	Unruh and Carrillo-Hermosilla 2006	Climate-relevant adoption of zero emission technologies.

Source: Researcher (2020)

2.1.4 Determinants of intention to leapfrog

Adoption theory involves the mental process of adopting an innovation (also a new product generation) or its (preliminary) rejection by consumers and the factors that

impact this decision-making process (Clark & Staunton, 1994; Thomas & Charlotte, 1999; Turnbull & Meenaghan, 1980). Wheelwright and Clark (1992) develop a scheme for classifying innovations, pursuant to Rogers' (1995) definition of an innovation. According to Wheelwright and Clark (1992), breakthroughs are defined as radical, revolutionary innovations introduced to the market that can be typified as Schumpeterian shocks.

New markets or new product categories emerge through the introduction of such breakthrough products (for example the Mobile phone or the CD media). Product derivatives, on the other hand, develop from modifications of products already available in the market. The aim of these innovations is to address new market segments by providing improvements to existing products (for example, by improving a service component or enhancing functionality). The introduction of various vehicle types, such as station wagons or convertibles, is an example of the product derivative. Finally, next-generation products are central to leapfrogging and represent significant developments of existing products (those that do not qualify as either breakthroughs or product derivatives).

Next-generation products are better capable of meeting consumer needs than are product derivatives. An example would be the carving ski, which represents a new generation of sporting equipment and replaced the traditional Alpine ski. The process, duration, and outcome of the adoption process, particularly for next-generation products, depend on numerous factors that can be generally classified, in line with Rogers (1995), to include awareness of the need for an innovation, decision to adopt (or reject) the innovation, initial use of the innovation to test it, and continued use of the innovation (the adoption of the innovation).

Rogers also proposes that there are four main essentials that influence the spread of a new idea: the innovation itself, communication channels, time, and a social system. This process relies heavily on human capital. The innovation must be extensively adopted in order to self-sustain. Within the rate of implementation, there is a point at which an innovation reaches significant mass. The information flows through networks. The nature of networks and the roles opinion leaders play in them determine the likelihood that the innovation will be adopted. In line with the above, it can be argued that diffusion is component that helps determine the intention to leapfrog.

2.1.5 The Concept of Perceived Product Quality

Consumers use an array of variables when assessing the quality of a commodity. These factors depend on the understanding of consumers. Consequently, we first incorporate the notion of perception in order to provide a deep understanding of what the perceived output of consumers implies. The perception of consumers varies from person to person, according to Kotler (1997), and it depends on the way we perceive stimuli. Besides, the understanding of customers is affected depending on-knowledge enters our senses. External stimuli, such as product characteristics and internal stimuli, such as the motivations and aspirations of the consumer (Agyekum, Haifeng, & Agyeiwaa, 2015) may attract the attention of the consumer.

It is important to consider the expectations of customers, as it is what most affects perceived quality. To explain the notion of perceived efficiency, there are various approaches. According to Aaker (1991) the understanding of consumers' products overall dominance is based on multiple reasons and alternatives (Aaker, 1991). Aaker & Joachimsthaler (2000) add that, since it affects both brand affiliation and brand

equity, perceived consistency is a sort of affiliation. The perception of quality is affected by two kinds of signals: intrinsic and extrinsic indicators. Intrinsic indicators, for example, are the interpretation of innovation by a buyer of the product, while extrinsic indicators are the characteristics of the product itself, such as price and brand name (Teas & Agarwal, 2000). Several studies have shown that intrinsic signals are more important in the interpretation of quality for a range of goods much of the time (Fiore & Damhorst, 1992). Similarly, several streams of research have been conducted with the objective of identifying the elements that influence perceived quality, however, there is no general consensus on the particular factors that influence the perception of quality by consumers. One may then wonder what the relation between perceived and objective quality is.

Perceived quality is the opinion of the consumer on the superiority of a product (Zeithaml, 1988). The requirement of product quality production in the chemical industry is discussed by some previous studies that include product development in relation to environmental concerns, energy cost, safety risk, and level of emissions (Saling *et al.*, 2002; Shonnard, Kicherer, & Saling, 2003). These might ultimately be validated by the industrial consumer who agrees to buy the goods and services as a whole package, thereby providing value to the customer in terms of tangible products and intangible services (Ulaga & Eggert, 2006). Product quality has a beneficial effect on industrial consumers who are pleased with the value of the product (Baumgarth & Binckebanck, 2011).

A significant number of empirical studies have confirmed the positive impact of industrial product quality on consumer satisfaction (Berens, Van Riel, & Van Bruggen, 2005; Cretu & Brodie, 2007). If there is no point of distinction in the

tangible product, then the competitiveness must lie in the efficiency of the service. Improving the standard of quality of service will help a business distinguish between competition and gain a competitive advantage (McKecnie, Ganguli, & Roy, 2011).

Perceived quality is expressed by product quality and service dimensions in this empirical analysis. Service dimensions apply to the RATER definition of (Asubonteng, McCleary, & Swan, 1996), but exclude the tangible dimension, as it is not applicable in this context; efficiency, assurance, empathy and responsiveness are therefore service dimensions. For further strategy and consequences, analysis of both product quality and service performance is important. Service is an operation or advantage offered to the purchaser or prospect by the seller (Armstrong, Kotler, Harker, & Brennan, 2018). Grönroos & Ojasalo, (2004) describe service as an interactive process between clients and staff, physical resources, goods or systems, and the impact on customer satisfaction of perceived service quality (Hong & Goo, 2004).

Quality of service is an organizational advantage and a critical component that affects financial results (Kassim & Abdullah, 2010). Conceptually, service is a critical component that greatly contributes to the success of businesses/organizations. Zeithaml, Bitner & Gremler (2018) have established a model with a positive relationship between service quality and customer satisfaction in which the five dimensions of Parasuraman's RATER principles represent service quality (See Parasuraman, Zeithaml & Berry, 1983, 1988). Perceived consistency has a positive impact on consumer satisfaction in the American Customer Satisfaction Index (ACSI) model and in the European Customer Satisfaction Index (ECSI) (Alvin et al., 2019; Askariazad & Babakhani, 2015; Johnson, Nader, & Fornell, 1996). The positive

relationships between perceived quality and customer satisfaction are supported by past studies (Baumgarth & Binckebanck, 2011; Cretu & Brodie, 2007, Taylor *et al.*, 2007; Berens *et al.*, 2005)

2.1.6 The Concept of Perceived Switching Cost

Switching costs apply to expenses when customers change their service, product, or supplier (Zhang, Chen, Zhao, & Yao, 2014). Jones, Reynolds, Mothersbaugh, & Beatty (2007) described the cost of switching as the perceived economic and psychological costs associated with changing suppliers, including financial costs, as well as the psychological, physical and emotional sacrifices perceived by consumers during this process. These costs may either be actual or only perceived monetary or non-monetary costs, or a combination of both, such as search costs, transaction costs, learning costs, loss of loyal customer discounts, emotional and cognitive costs, and psychological risk associated with changing suppliers on the part of the consumer. Ghazali, Nguyen, Mutum, & Mohd-Any (2016) indicated that the rise in the cost of switching would directly increase the barriers to switching that inhibit switching actions.

These findings suggest that even if clients lament about or are unhappy with their incumbent service provider, they will not necessarily turn to another service provider. Nagengast, Evanschitzky, Blut, & Rudolph (2014) proposed three dimensions to cost which include: procedural, economical, and emotional with respect to classifying switching costs. In the context of this analysis, only procedural and relational switching costs are taken into account. Because consumers have to assess the latter and create new memberships in mobile systems when switching from a physical store to a mobile store, as well as assume the personal relationship cost of the physical store

salesperson's loss. In addition, it is important to note that financial switching expenses are not borne because cell stores do not charge a subscription fee.

Switching costs are therefore characterized as the procedural and relational switching costs perceived by the client associated with switching from a physical store to a mobile store. The cost of procedural switching involves assessing new suppliers, assuming the risks associated with switching, setting up new systems, and learning new services while switching. The costs of procedural switching can also be characterized as the costs that include the perception of a person of the time and effort required to collect information and determine the necessary steps associated with switching. The psychological or emotional distress due to the loss of identity and breaking of ties is referred to by relational switching costs. Customers may experience affective losses associated with breaking the identity bonds that have been established with an original provider because the customer-familiar employees of an incumbent provider establish a degree of comfort for the customer that is not immediately available with a new provider.

2.1.7 The Concept of Urgency to Replace

Scarcity seems to amplify the sense of urgency among consumers generally (Aggarwal, Jun, & Huh, 2011). When there are limited time periods for purchasing limited goods, the sense of urgency is more noticeable, thus buyers appear to create "urgency to purchase" in their minds. The authors argue that because of the consumer's willingness to purchase the merchandise immediately the "urgency to get" restricts the consumers power to postpone purchasing decisions. Other researchers characterize the sense of urgency as a selected need within the immediate or near future to undertake and complete an act (Swain,

Hanna, & Abendroth, 2006). The impulse to shop for a product stems from a fixation on the product or a sudden and spontaneous desire to shop for it (Rook, 1987). As noted by Beatty & Ferrell (1998), buying urgency may be a state of desire that precedes the particular action of impulse and is encountered within the atmosphere when an object is seen. This implies that a change occurs within the point of reference of an individual when being physically close to the merchandise and this may end in certain desires and decisions to acquire the merchandise.

It is unlikely that a person showing an impulse to buy would postpone the transaction to gather more information, engage in comparison shopping, and seek advice. The will to get a product is caused by both internal and external signals (Wansink 1994; Youn & Faber, 2000). Internal indications or signals include the self-feelings, moods, and emotional states of consumers, while external indications/signals include environmental and sensory factors regulated by retailers. Studies indicate that within the retail setting, ambient signals (such as sights, sounds, and smells) are significant external stimuli that affect the will of consumers to make a purchase (Eroglu & Machleit, 1993); Mitchell 1994). Additionally, the marketing mix such as point-of-purchase, displays, promotions, and advertising can also influence the consumer's willingness to make a spontaneous decision to purchase.

The present study indicates that external indicators such as the retailer's 'strategically enforced scarcity environments' produce a perception of scarcity in the consumer's mind, thus challenging his / her right to postpone purchase decisions. Retailers transmit signals such as "purchase now, otherwise you will miss out tomorrow" by implementing fast-fashion tactics and purposely exploiting product availability within

their stores to undermine the liberty of consumers to postpone a purchasing decision. This tactic triggers a psychological reaction and motivates consumers to take an immediate action to safeguard their freedom of conduct.

Consumers generate an urgency and a desire in their mind to immediately buy the product, thus restricting their freedom to postpone a purchasing decision in lifestyle, people may pursue urgency over importance for potential normative reasons. Second, important tasks are often harder, and individuals are reluctant to take a position or the trouble to perform those tasks (O'Donoghue & Rabin, 2001). Furthermore, often urgent tasks affect each other; missing one urgent task in the future may result in a series of losses. Third, there might be insufficient supply or high demand for urgent assignments, either of which can increase the assignment's perceived value (Brock, 1968; Cialdini, 2009; Worchel, Lee, & Adewole, 1975). Fourth, the payoffs of urgent tasks are often realized earlier, and individuals often value immediate payoffs more than future payoffs (Frederick, Loewenstein, & O'donoghue, 2002; McClure, Laibson, Loewenstein, & Cohen, 2004). Fifth, significant task payoffs might be further away from the completion of a goal as well as being less certain, which can reduce motivation (Kivetz, Urminsky, & Zheng, 2006). Finally, individuals will want to stay all viable alternatives in order to first complete the urgent tasks, then specialize in significant tasks later (Shin & Ariely, 2004)

2.2 The Concept of Consumer Knowledge

Product knowledge is of supreme importance for the exploration of consumers' behavior. Consumers Product awareness supports consumer's understanding or knowledge about the merchandise or consumer's confidence about it (Lin and Zhen 2005). Consumer knowledge has been defined in terms of the level of experience that

the consumers has with particular products or product categories (Bettman Park 1980; Sujan 1985). Consumer product knowledge has been studied in a sort of alternative ways in recent years (Baker, Hunt and Scribner, 2002; Alba and Hutchinson, 2000; Brucks, 1986; Park, Mothersbaugh and Feick, 1994; Raju, Lonial and Mangold, 1995; Rao and Monroe, 1988). In marketing research, it has been recognized as a characteristic that influences all phases within the decision process (Bettman and Park, 1980).

Knowledge is a crucial construct in behavioral research. It plays an important role in individuals' choice (Kaplan, 1991). Behavior-related knowledge means knowing the way to perform the intended behavior, to work out responsibility for the intended act, and to gauge the perceived effectiveness of the behavioral act (Park *et al.*, 1994). If consumers have a far better understanding of the characteristics and attributes of a product, it will not only improve the accuracy of consumers in behavior decision-making, but also reduce the danger of decision-making. A large number of studies have shown that individuals' knowledge of a product plays an important role in their attitudes and intentions to settle on and use a merchandise (Park *et al.*, 1994; Wei-Yun *et al.*, 2010; Qian *et al.*, 2017).

Simsekoglu *et al.*, (2019) found that the shortage of knowledge of e-bikes could also be a possible obstacle to residents' use of e-bike in Norway. The research of Barth *et al.* (2016) and Krause *et al.*, (2013) have shown that knowledge of electric vehicle can significantly improve the acceptance of electric vehicle, whereas the shortage of knowledge is often an obstacle to use electric vehicle. In the current study, knowledge was defined as the product attribute or product knowledge. The merchandise knowledge included the performance attribute and therefore the advantages of mobile

phones. Supported by the previous studies, it is inferred that consumers' individual knowledge of the mobile technology plays a crucial role in regulating and influencing the formation of choice intention.

Consumer brand knowledge includes two main components namely, brand awareness and brand image. Brand awareness that has two sub-components; brand recognition and brand recall is one among the key factors that play a crucial role in consumer decision-making (Keller, 1993; Ingsa and Mai; 2017). Brand image is another sub-component of brand name knowledge. It has been defined "as how the brand is perceived by the consumers" (Aaker, 2010; Ingsa and Mai; 2017). Furthermore, brand image was defined as "a set of associations, usually organized in some meaningful way" (Aaker, 1991). Brand image includes different sorts of associations such as brand uniqueness, strength of brand name associations, and favourability of brand name associations (Keller, 1998). The connection between brand awareness and brand image is anticipated to be positive when analysing the impact of luxury brand knowledge on the intention of luxury purchase (Keller, 2012; Ingsa and Mai; 2017).

Consumers with various levels of product knowledge differ in their perceptions of product attributes (Laroche, Bergeron and Goutaland 2003; Baker, Hunt and Scribner 2002; Blair and Innis 1996). Marks and Olson (1981) propose that buyers with higher levels of product knowledge have better developed and more complex schemata with well-formulated decision criteria. Within the same vein, Kemp and Smith (1998) suggest that buyers with higher levels of product knowledge are more diagnosing and better informed than those that have lower levels of product knowledge. Therefore, the higher the extent of product knowledge a consumer possesses, the less chance there's that he or she is going to generate evaluation bias. Consumers' intention to

know the merchandise description are often explained by getting to make more appropriate choice. Consequently, consumers become more assured about the standard of their choice and thus they estimate their experience more favorably. In all, consumers' product knowledge is taken into consideration when accounting for the robust bond between product information that customer can access and customers' behavioral response.

The current study proposes that knowledge could be a moderator as well as a mediator, in relationships. Beyond the organic literature, product knowledge is regarded as moderator within the relationship between attitude-behavior. Specifically, Berger *et al.*, (1994) take into consideration knowledge as a moderating variable within the relationship between attitude and ecological behavior by studying different sorts of heating systems. These authors note that knowledge increases, attitude strengthens, consequently, the effect of the attitude on behavior increases. In fact, subjective knowledge is going to be a crucial indicator in high involvement, high risk, and the of search product categories. Information is collected over time for those cases. So, attitude would be stronger as subjective knowledge increases and, accordingly, has an impact on behavior. Wang *et al.*, (2012) examined the consequences of product knowledge on perceived newness and adoption intention and posited that product knowledge had a large positive effect on perceived newness and, subsequently, on adoption intention. Ho and Svein (2011) showed that higher product knowledge results in higher intention to purchase. In addition to the direct effect, the authors also found that product knowledge was a positive moderator within the satisfaction and buy intention relationship.

Mourali, Laroche, & Pons (2005) found that product knowledge reduced perceived risk within the information search context. Furthermore, the authors found that product knowledge lowered the will for interpersonal information, and with higher knowledge consumers tend to rely less on interpersonal information sources and proactively seek information elsewhere.

Consumer knowledge is usually recommended to affect how consumers gather and organize information, what products they buy and the way they use them (Alba and Hutchison, 1987). Knowledge has traditionally been considered a multidimensional construct and mostly categorized as familiarity and expertise (Cordell, 1997). Familiarity may be a function of product-related experiences that are accumulated by the buyer, whereas expertise is the ability to perform product-related tasks (Alba and Hutchison, 1987).

Knowledge is usually measured either objectively or subjectively (Cordell, 1997). While subjective knowledge refers to a person's perception of the quantity of data he or she has about an object and activity, objective knowledge pertains more to the particular amount of data that the person stores in his or her memory (Klerck and Sweeney, 2007). Although subjective and objective knowledge is usually correlated (Cordell, 1997), objective knowledge is usually considered to represent the particular memory content (Brucks, 1985). Stored product class information (Park *et al.*, 1994) is a far better measure than subjective knowledge to reflect the predictive strength of attitudes (Fabrigar *et al.*, 2006).

Naturally occurring correlations between subjective and objective knowledge poses a drag with separating the effect of every knowledge type if both are included in a model (Raju *et al.*, 1995). Additionally, the moderating effect of subjective

knowledge on its consequences is difficult to isolate from those of other constructs with which it relates, such as accessibility or certainty because both subjective knowledge and these related constructs are all results of objective knowledge (Smith *et al.*, 2008). Thus, in the current study, consumer familiarity as a moderator is defined as objective evaluations about the familiarity and expertise that the person has with a product category (Alba and Hutchison, 1987; Cordell, 1997; Klerck and Sweeney, 2007).

Thus, the current study expects that, to the extent that the intention to leapfrog is in line with a previous study conducted by Fabrigar *et al.*, (2006) which states that satisfaction is formed from underlying relevant knowledge and the satisfaction ratings of consumers with higher objective knowledge about a product will be more methodical in their assessment of the product and more stable in their opinions of the product than consumers with lower knowledge. This implies that increased objective knowledge is likely to enhance the strength of intention to leapfrog. Thus, general attitude strength theory (Fabrigar *et al.*, 2006) suggests that more knowledge forms stronger attitudes (intention to leapfrog) and increases the correspondence between attitude and behavioural components.

The study conducted by Satish and Peter (2004) explains that knowledge about the product possessed by the consumer plays an essential role during the product buying decision. Other studies such as Rao and Monroe (1988) argued that knowledge of the product is the main factor in product purchasing decision.

2.3 The Theoretical Perspective

Theories concerned with leapfrogging include relationships between successful users of reputable technologies, those who have limited access to reputable technologies,

and new technologies (Fudenberg, *et al.*, 1983). In particular, successful users of established technologies may have much less inducement to switch to a new technology than others who have restricted access to established technologies. At the firm level, this can lead to creative destruction when those with limited access to established technologies create new attractive offerings by using new technologies to leapfrog over incumbents' offerings (Schumpeter, 1942). It has also been argued that regions and nations, as well as firms, can leapfrog (Brezis *et al.*, 1993). According to (Steinmueller, 2001), the theory of leapfrogging over established technologies is also useful in the international development of, for example, mobile phone banking and renewable energy provision. At this point, the center of attention is not initially on competition to get more wealth. Rather, the initial focus is upon facilitating access to technical systems that can alleviate poverty.

The current study is guided by three theories: Schumpeterian Growth Theory, Theory of Planned Behavior and the Unified Theory of Acceptance and Use of Technology (UTAUT) discussed in the following sections.

2.3.1 The Schumpeterian Growth Theory

Economics as a scientific discipline starts with development-oriented questions, such as why some cities, like Venice, surged ahead while others, like Naples, fell behind. In that regard, Antonio Serra's 1613 highly significant essay, titled as *A short treatise on the causes that make kingdoms abound in gold and silver even in the absence of mines*, with particular reference to the Kingdom of Naples should be taken as a well-argued starting point. It is no coincidence that Schumpeter greatly praised Serra since he defined capitalism as a process grounded on wealth creation (of new things 'competing old things out of existence' – 1939). To that matter, his, perhaps,

oversimplified reflection of Sombart and Weber is telling: Schumpeter argues that it makes no sense to look for a new spirit or new rationalism in order to “decode” capitalism, it is rather the process by which capitalism incessantly moves forward – innovations and their impact on competition – that economists should try to understand (Schumpeter 1939)

Furthermore, Schumpeter’s theory of innovation is an application to economics and business of his wider theory of how evolutionary change takes place in societies Andersen (2009). In his 1939 *Business Cycles*, Schumpeter states that he “believes, although he cannot stay to show, that theory [of innovation] here expounded is but a special case, adapted to the economic sphere, of a much larger theory which applies to change in all spheres of social life, science and art included.” (1939)

In Schumpeter’s framework the core of the ‘process of economic development’ is not restricted to technology. It springs from virtuous relations among finance (credit), entrepreneurship and competition by means of innovation, which builds up as a struggle for survival and growth in a structurally uncertain environment (Schumpeter 1942 [1992], Profits that result from leading market positions are always under threat from imitative strategies or other firms’ inventive behaviors; they can only be maintained by continuous product differentiation and productivity enhancement. Very importantly though, neither the process nor the outcome – successful innovations and structural change – are granted. For each Thomas Edison, Henry Ford or Steve Jobs, there are hundreds of failed attempts that end up in bankruptcy courts. Divergence again. It is important to note that such Schumpeterian divergence is a powerful force of changing economic behavior of individuals and firms. In one sentence:

Schumpeterian divergence which enforces diversity, and diversity – not convergence – is at the heart of leapfrogging processes

Creative destruction processes therefore, bring forth not only technological changes at company level, and are not restricted to a sectorial level but these processes generate entire new industries based on technological, organizational, spatial and cultural restructuring. Electricity for example, made use of radios possible, but also home appliances that transformed how food is stored that consequently made suburban living and mass consumption possible (Landes 1969, Chandler 2001, Perez 2002). In one sentence: electricity provided open-ended possibilities for developing new technologies in a whole host of sectors. Corporations used that to re-design, over and over, the ‘technological frontier’ and leapfrog.

Google, Apple¹⁷ and Amazon provide us with clear examples of our main proposition. Those companies have changed the way we organize our daily activities as through successful “gales of creative destruction”. Technological, organizational, spatial, legal, financial and strategic. The full Schumpeter catalogs. Most importantly, however, they didn’t “catch-up. They leapfrogged their competitors and redesigned the “frontier”. They have revolutionized entire industries and became dominant players on a global scale in a very short period of time (Levy, 2011, Isaacson, 2012, Stone, 2013) obviously, these socio-economic changes are not bound by national borders. However, the nature of trade regulations and agreements makes a huge difference on how creative destruction works out in a given country, and this should be perhaps a key theme in a development agenda for the twenty first century. Leapfrogging processes not necessarily depend on, or spring from, groundbreaking

scientific advances. Their kernel is the strategic use of both old and new technologies in creative ways.

The Schumpeterian Growth Theory is the branch of innovation-based growth theory, advanced by Aghion and Howitt (1992). This latest paradigm was born from modern industrial organization theory. It is often argued that because the Schumpeterian growth theory focuses on quality-improving innovations that render old products obsolete, the Schumpeter theory should be rightly called the theory of creative destruction. The primary implication of the Schumpeterian model is that faster growth generally implies a better rate of firm turnover because the method of creative destruction generates the entry of latest innovators and therefore the exit of former innovators. Although the idea focuses on individual industries and explicitly analyzes the microeconomics of commercial competition, the idea that each industry is ex ante identical gives it an easy aggregate structure. There are two main inputs to innovation in this model: private expenditures made by the potential innovator, and the stock of innovations that have already been made by past innovators (Aghion and Howitt 1992). The latter input represents the publicly available stock of data which current innovators hope to exploit.

The idea is flexible enough in modeling the contribution of past innovations. It encompasses the case of innovation that leapfrogs the simplest old technology.

It also encompasses the case of innovation that catches up to a worldwide technology frontier, which represents the stock of worldwide technological knowledge available to innovators in sectors of all countries. Within the former case, the country is making a leading-edge innovation that builds on and improves the vanguard technology in its

industry. Within the latter case, however, the innovation simply involves implementing technologies that have already been developed elsewhere.

2.3.2 The Theory of Planned Behaviour

The theory of planned behaviour (TPB; Ajzen, 1991) argues that an individual's behavioural intention depends on the person's attitude towards the behaviour, the subjective norms, and on the perceived behavioural control. An attitude is defined as “a person's favourable or unfavourable evaluation of the behaviour” and is made by the beliefs about the likely outcomes of the behaviour (salient beliefs) and therefore the evaluations of those outcomes (Fishbein & Ajzen, 1975). The subjective norm is the perceived social pressure to perform or to not perform the behaviour and is made by beliefs about the perceived expectations of others to hold out the behaviour (normative beliefs) and therefore the motivation to suit these expectations. Perceived behavioural control reflects the extent to which the individual feels he or she is in a position to truly perform the behaviour, which is predicated on beliefs about factors which will facilitate or impede performance of the behaviour (control beliefs) and therefore the perceived power of those factors (Ajzen, 1991). Together, the attitude toward the behaviour, the subjective norms, and therefore the perception of behavioural control cause the formation of a behavioural intention, which successively results in the performance of the behaviour (Ajzen, 1991).

The theory of planned behavior (Ajzen, 1991) is an extension of theory of reasoned action (TRA) which was established to get around the limitation within the theory of reasoned action (Ajzen, 1975 and Fishbein, 1980). Theory of planned behavior comprises attitude towards the behavior, subjective norm (SN) and perceived behavioural control (PBC) (Ajzen, 1985, 1991). Consistent with the theory, attitude

toward behavior, subjective norms, and perceived behavioral control, together cause individual's behavioural intention and behavior. Theory of planned behavior has been applied to varied studies in varied sectors to review consumer behaviour such as e-coupon usage (Kang *et al.*, 2006), green consumption (Sparks *et al.*, 1992), smoking (Godin *et al.*, 1992), and e-commerce services (Bhattacharjee, 2000; Tonglet *et al.*, 2004).

A large number of studies supporting the idea of Planned Behavior are evident in this sphere of research (Yadav & Pathak, 2017). These studies present evidence that the intentions are the projection of actual behavior (Rahimah *et al.*, 2018). The current research intends to include various factors that culminate into behavior intention using the idea of Planned Behavior (TPB) (Fishbein & Ajzen, 1975). Furthermore, the current study is focused on finding a positive attitude and subjective norm in purchase behavior. Among the various psychological theories, TPB has been widely accepted amongst consumer behavior scholars (Cheng *et al.*, 2011) as the more insightful theory in explaining the relationship between intention and behaviour. TPB is the extended version of Fishbein's theory of reasoned action (TRA) (Abraham & Sheeran, 2003; Schierz *et al.*, 2017).

According to Abraham and Sheeran (2003) in the TPB (a) is the simplest to predict personal behavior is to know the intention, (b) the intentions are described by people's judgment of performing behavior and by their social issues (subjective norms), and (c) the external determinants only show the indirect impact on behavior – these could be moderator, mediator and components of the model. Lastly, TPB extends the idea of reasoned action by adding another important construct-perceived behavioral control (PBC), which refers to people's assessment of their ability to perform a behavior.

Abraham and Sheeran (2003) also specified that TPB receives considerable support for correlation study. The study supported attitude, subjective norm, and perceived behavioral control has received much attention in several literature (Armitage & Conner, 2001). Past studies have identified different variables including personal, social, economic, and demographic becoming the prime factors resulting in purchase intention for fake luxury goods (Jason & Karen, 2011; Ang *et al.*, 2001). Stravinskiene *et al.*, (2013) considered situational factors including the merchandise price, product availability and luxury goods promotion becoming the significant influencers regarding the shopping behavior of counterfeit luxury goods. However, the main focus of the current study is merely on investigating the moderating effect of consumer knowledge on the connection between the determinants of leapfrogging (perceived product quality, perceived switching cost and urgency to replace) and therefore the intention to leapfrog.

This theory supports the study since the theory of planned behaviour (TPB; Ajzen, 1991) argues that an individual's behavioural intention depends on the person's attitude towards the behavioral outcome, in this case intention to leapfrog and perceived behavioural control factors which will facilitate or impede performance of the behavior. These include the perceived product quality, perceived switching cost, and by extension urgency to replace included in the study. Together, the attitude toward the behaviour, and the perception of behavioural control cause the formation of a behavioural intention.

2.3.3 The Theory of Unified Theory of Acceptance and Use of Technology (UTAUT)

In addition to the idea of planned behavior, the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh, Thong, & Xu, 2012) was used for the current study. The latter theory may be a comprehensive synthesis of prior research on technology acceptance, supported critical factors and contingencies concerning the prediction of intention to use the technology within the context of consumer location. Extensive replications, applications, extensions, and integrations of the UTAUT have made a crucial contribution to the understanding of technology adoption and extended the theoretical boundaries of the idea. Consistent with UTAUT-2, performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, price value, and habit influence the intention to use and therefore the continued usage of technological products or services. However, UTAUT has been modified and extended to accommodate a broader perspective. Some personal factors are incorporated into UTAUT studies to predict usage through intention. Oshlyansky, Cairns and Thimbleby (2007) incorporated self-efficacy and anxiety to validate the UTAUT model cross culturally.

Dulle and Minishi-Majanja (2011) also adjusted UTAUT to research Internet self-efficacy of open access, while Ahmad, Tarmidi, Ridzwan, Hamid and Roni (2014) proposed that UTAUT be used to study self-efficacy as individual factor influencing behavioural intention. Using awareness as a construct in UTAUT, Abubakar and Ahmad (2013) posit that there are a few studies that examined the connection between awareness and behavioural intention. The results of such studies found awareness to possess a significant influence on behavioural intention. Using awareness as moderating variables in UTAUT, Tibenderana and Ogao (2008) and Dulle and

Minishi-Majanja (2011) examine its impact on attitude on hybrid library services in Uganda and Open access respectively. Ayele and Sreenivasarao (2013) also used awareness as moderating factor on independent constructs towards their respective dependent constructs in a SO-UTAUT model.

Noor *et al.*, (2014) added awareness as an external variable to review taxation in Malaysia and predict all UTAUT constructs therein. In Nigeria, Abubakar and Ahmad (2013) proposed awareness as a moderating variable of UTAUT constructs to research adoption and use of Point of Sale (POS) in Nigeria. On the other hand, McElroy *et al.*, (2007) directly tested the effect of personality and cognitive style on three measures of Internet use. The results support the utilization of personality - but not cognitive style - as an antecedent variable. After controlling for computer anxiety, self-efficacy, and gender including the “Big Five”, personality factors within the analysis significantly added to the predictive capabilities of the dependent variables. Similarly, Barnett *et al.*, (2014), Venkatesh *et al.*, (2003), and (Sykes *at al.*, 2009) adapted UTAUT by adding individual-level technology adoption model with five personality constructs to predict perceived and actual usage of technology directly, and indirectly through behavioural intention.

These models, based on the three theories, underscore the core determinants that predict the intention to use, actual usage, continued usage, and post adoption behavior of users with reference to innovative technology. Additionally, the theories enable researchers to research agents that might expand or contract the consequences of the core determinants. These theories are empirically tested and proven worthy; therefore, they were chosen to make the inspiration for this study.

The theory anchoring the study is the theory of planned behavior since the study looks at the perceptions of customers on the intention to leapfrog. Customer's Perceived behavioural control reflects the extent to which the individual customer feels he or she is in a position to truly perform the behavior. This is dependent on the beliefs about the factors which will facilitate or impede performance of the behaviour (control beliefs) and therefore the perceived power of those factors (Ajzen, 1991). The study is further supported by the Schumpeterian Growth Theory and UTAUT.

2.4 The Empirical Review

2.4.1 Perceived product quality and intention to leapfrog

To consider the new product (P1) as a replacement for the old one (P0), the former must represent an improvement (even if just perceived so by consumers) upon the latter. The willingness to switch to the new product therefore increases with greater quality advantages being offered by the new product compared to the older item (Boone, 2001; Druehl *et al.*, 2009). If improvements in P1 (compared to P0) exceed a certain threshold level, consumers will show less interest in leapfrogging to P2 since adopting the currently available product provides considerable benefit to the consumer, over the older product. Hence, we hypothesize that product quality has no significant effect on the intention to leapfrog in the Mobile phone industry in Kenya.

Product quality is a key factor in assessing purchase intention and intentions to leapfrog. It is the continuous process of improvement on the product features that increases product performance and consequently the satisfaction of customers' needs. Quality should be improved every time to keep pace with the changing customer tastes and preferences (Mirabi, Akbariyeh, & Tahmasebifard, 2015). Moreover, quality is an important tool for creating competitive advantage (Zeeshan & Obaid,

2013). Chi, Lee, and Weng (2008) and Madahi and Sukati (2012) posit that customers purchasing intention depends on product quality. It is therefore assumed in the current study that the perceived product quality will lead to a delay or postponement of the purchase of the current product in the market as consumers wait for the next generation of the product to be perceived as having better satisfaction or performance.

For example, Desai *et al.*, (2014) argues that consumers are more quality conscious in purchasing cosmetic products because they patiently wait for the forthcoming brand during non-availability period. It has been noted that if the product meets the requirements of the consumer, the customer will be satisfied and feel that the product is reasonable or even of high quality (Alhedhaif, Lele, & Kaifi, 2016). In the other hand, if its expectations are not met, the consumer would consider the product to be of poor quality. Accordingly Wright *et al.*, (2006) explain that the nature of the product includes the features and characteristics of a product or service that is capable of meeting specified or implied needs.

Research has also indicated that consumer anticipations of future product generations serve as an influence on leapfrogging (Kim, Srivastava, & Han, 2001; Song & Chintagunta, 2003). In addition to material-related changes, the old product (P0) is subject to perceived devaluation by the mere presence of an improved successor on the market (P1). Such perceived obsolescence could also be driven by perceptions that the old product is no longer the state of the art in terms of design. Consumers may also consider real obsolescence, if the new product is a functional improvement over the older one. For example, the old product may no longer reflect the latest technology with the new product fulfilling its function better, quicker, and simpler. Thus, consumer anticipations of various product generations are likely to be impacted

by psychological obsolescence (Antioco & Kleijnen, 2010; Holak & Lehmann, 1990; Levinthal & Purohit, 1989).

Product quality is the key for the company because the quality of the product also impacts on customer satisfaction and confidence that will ultimately impact on increasing intentions of consumer purchases. Product quality has a very close relationship with customer trust and satisfaction. The higher the level of consumer confidence in a product, the higher will be the purchase intention of the product. Tsiotsou (2006) indicated in his research that the overall satisfaction of the good quality of the product perceived by consumers has a positive and important effect directly on the purchasing intention of the customer. This assertion received support from Chinomona, Okoumba and Pooe (2013) who showed that product quality has an influence on trust and trust affect the purchase intention.

Quality may be a blend of properties and characteristics that determine the extent to which output can meet the wants of consumer needs. Previous research conducted by Ziaullah, Feng and Akhter (2014) examined the connection between product quality and delivery service, trust, satisfaction and loyalty in China. The results showed that product quality and delivery service have an immediate effect on satisfaction and trust. Determinants of consumer confidence are consumer perceptions of the standard of a product/service. Likewise, Chinomona, *et al.*, (2013) in his research found that product quality features a significant influence on consumer confidence. Companies that are ready to consistently provide good product quality are probably going to be ready to build good relationships with customers and thus foster consumer confidence.

In the cognitive-affective model, researchers recognize perceived quality as a cognitive response to a product which influences product purchase (Kumar *et al.*, 2009). In the field of sales, the construct of perceived quality has been widely accepted because of the primary driver of buying intention (Jacoby and Olson, 1985). Perceived quality also provides value to consumers by providing them with a reason to shop for and by differentiating the brand from competing brands. Perceived quality is defined as a consumer's evaluation of a brand's overall excellence supported intrinsic (performance and durability) and extrinsic cues (brand name).

Thus, quality is defined as judgment about the general excellence or superiority of a product or service. It is often defined at the instant at which the buyer receives information or cues about the characteristics of the product/service while buying or consuming it. It also means that the perception of quality varies and depends on a variety of things such as the instant at which the consumers make the acquisition or consume a product, and therefore the place where it is bought or enjoyed. The consumer's implied awareness of quality from the brand surpasses its price when he is making purchase decision (Dodds *et al.*, 1991).

It is expected that product-specific variables such as perceived purity for consumables and quality for durables will exhibit significant power as a forecaster of product bias (Thelen *et al.*, 2006). Thelen *et al.*, (2006) assessed Russian consumers imported versus domestic product bias by measuring product preferences based on consumer ethnocentrism levels and merchandise characteristics. The authors concluded that product distinctiveness may sway product preference (domestic versus imported) and consumer ethnocentrism levels. Consumers of the developing countries will choose

non-local products because they are generally deemed to be of top quality (Khattak and Shah, 2011).

Khattak and Shah (2011) hypothesized that quality of products and consumer attitudes towards non-local products are positively related. There is a direct correlation between these two variables. Products of the economically developed countries do not only have outward appearance, but they also need fine workmanship and are considered as technologically simpler. Low incomes notwithstanding, consumers in developing countries are increasingly aware, through television, the web, and usually improved communications worldwide of the superior quality of products available to consumers in developed countries and that they too want an equivalent. This is true not just for consumers within the former socialist countries of Eastern and Central Europe, but also of consumers in developing countries of Latin America, Africa and Asia.

Perceived quality is customer perception of general quality or superiority of a product or service as compared to other alternatives (Keller, 2008). It is important to note here that it is perceived quality that is established because the customer's perception of the general quality or superiority of the product or service is interpreted in the light of its intended purpose relative to other alternatives.

Perceived quality can be a general and subjective feeling about a brand. However, perceived quality is usually accompanied by main dimensions that contain the product specification (reliability, performance and brand). The identification and measurement of its main dimension are going to be useful, but it shouldn't be forgotten that perceived quality may be a general perception (Kia, 2012; as cited in Aker, 1991). Quality is beneficial for creating competitive advantage (Zeeshan, 2013). Product

quality may be key thing in assessing purchase intention. It is through an endless process of improvement and continual changes that increase product performance and consequently the satisfaction of customers' needs. According to (Tariq *et al.*, 2013), quality should be improved every moment. Chi *et al.*, (2008) concluded that if a product features a better quality, customers are going to be more inclined to get it. Furthermore, the authors emphasized that product quality features a positive impact on customers' purchase intention. Tsiotsou (2005 and 2006) posited that higher quality product creates higher purchase intention than lower quality products.

Desai (2014) argues that consumers are more quality conscious in the case of purchasing cosmetic products because they patiently await the brand during non-availability. Alhedhaif (2016) suggests that the customer would be pleased and conclude that the merchandise is of acceptable or maybe high quality, if a product fulfills the customer's expectations. If his or her expectations are not fulfilled, then the customer will conclude that the merchandise is of inferiority. This suggestion indicates that the standard of a product could also be defined as "its ability to satisfy the customer's needs and expectations". Accordingly, Russell and Taylor (2006) describe that the nature of the product incorporates the features and characteristics of a product or service that is capable of meeting specified or implied needs. Quality is divided into two categories, i.e. product quality and repair quality. Product quality is described as "fitness for use" or "compliance with requirements" (Khraim, 2011)

Research indicates that consumer anticipations of future product generations function an influence on leapfrogging (Kim *et al.*, 2001; Song & Chintagunta, 2003). In addition to material-related changes, the old product (P0) is subject to perceived devaluation by the mere presence of an improved successor on the market (P1). Such

perceived obsolescence could be driven by even by mere perceptions that the old product is no longer state of the art in terms of design. Consumers can also consider real obsolescence, if the new product may be a functional improvement over the older one. For instance, the old product may not reflect the newest technology with the new product fulfilling its function better, quicker, and simpler. Thus, consumer anticipations of varied product generations are likely to be impacted by psychological obsolescence (Antioco & Kleijnen, 2010; Holak & Lehmann, 1990; Levinthal & Purohit, 1989).

2.4.2 Perceived Switching Cost and Intention to Leapfrog

When customers think of changing whatever product they want to, the aspect of cost incurred in changing it is paramount. Switching cost is defined as the risk, investment and loss experience by customers as a result of changing the product or in the context of this study a mobile phone. Some studies have divided switching cost into several components for example, the loss of finance, time, psychology and relationship (Whitten & Wakefield, 2006). Switching costs represent an impediment to exploring new suppliers of products (Wathne, Biong, & Heide, 2001) to the extent that when individuals perceive costs or barriers to exit, they tend to maintain their current supplier (Burnham, Frels, & Mahajan, 2003; Quoquab, Mohammad, Yasin, & Abdullah, 2018). If switching costs are low, dissatisfaction with the service quality, price or firm will motivate the intention to switch suppliers. In contrast, if they are high, many dissatisfied consumers are likely to manifest a “false loyalty”.

Numerous studies have shown that switching costs may act as a moderating variable that negatively affects the relations between satisfaction and intention to maintain the relationship (Burnham *et al.*, 2003; Oliva, Oliver, & MacMillan, 1992; Sharma &

Patterson, 2000). As the costs rise, the influence of satisfaction on the intention to maintain the relationship declines, and vice versa. Kim, Park, and Jeong (2004) examined switching costs in the mobile phone service context, and considered it as a combination of loss cost, adaptation cost and move-in cost. According to the authors, loss cost refers to the consumers' perception of losing social status, relationship and performance when switching the existing service provider, whereas adaptation cost refers to the problems related to adopting a new service provider after switching the existing one.

The current study considers switching costs in the mobile phone usage context as a one-time cost that mobile phone users incur with in the process of switching from one mobile generation to another. This cost is the combination of loss cost, adaptation cost and move-in cost (Burnham *et al.*, 2003; Kim *et al.*, 2004).

According to cost models in consumer behaviors, before terminating any existing relationship, consumers consider the change in net utility before switching to another generation (Quoquab *et al.*, 2018). If the switching costs are found to be larger than an increase in utility, consumers prefer not to switch. Thus switching cost significantly contribute or predicts customer retention and/or switching behavior (Kim *et al.*, 2004)

Pricing of a newer generation product (either P1 or P2) is a result of the product's features and performance, the pricing policy of the manufacturer, and where applicable, the discount policy of any intermediaries. Prior research indicates that the price for the future product is an important consideration for leapfrogging (Song & Chintagunta, 2003). Consumers will consider more than just the price of the newer product when making the product adoption decision. Given that many consumer

goods markets are saturated, the decision to adopt a new product frequently involves a replacement, rather than a first-time purchase (Chanda & Bardhan, 2008), thus consumers also consider costs associated with switching product generations. Since the old product has often not reached the end of its life cycle at the time of replacement many consumers try to resell their old when they replace it. Hence, the consumer assumes the role of buyer of the newer product (either P1 or P2), as well as the seller of the older product (P0). Thus, costs involved in purchasing one of the newer products can be offset from proceeds of selling the older product (depending upon the residual value of the old product (Cripps & Meyer, 1994).

In the final decision, consumers will likely consider the costs involved in switching from the old product (P0) to the new product (P1), as well as the costs associated with switching from the old product to the future product (P2). Studies conducted in the automotive market show that the switching costs (from P0 to P1 or from P0 to P2) play a central role in opting for the new or future vehicle (Gatignon & Robertson, 1985). It must be assumed, however, that the costs resulting from the switch from P0 to P1 or from P0 to P2 have differential effects on the occurrence of leapfrogging. If the switch from the old product to the new product is associated with higher costs, the new product is less attractive, and consumers tend to be predisposed to leapfrogging (Levinthal & Purohit, 1989). If the costs involved in switching from the old product to the future product are higher, however, the new product becomes more attractive, in which case consumers would avoid leapfrogging. Hence, we hypothesize that switching cost has no significant effect on the intention to leapfrog in the Mobile phone industry in Kenya.

Through literature review and focus group interview, Burnham, Frels, and Mahajan (2003) concluded that there were in actuality eight relevant cost dimensions that consumers incur; namely risk cost, evaluation cost, learning cost, setup cost, benefit loss cost, monetary loss cost, personal relation loss cost and brand relationship loss cost, and they are further classified into three groups (procedural switching costs, financial switching costs and relational switching costs), and procedural switching costs include time and effort costs. Financial switching costs include the loss of financially quantified capital. Relational switching costs include psychological or emotional distress caused by a loss of identity and thus a break in the bonding of the relation. Procedural switching cost includes risk cost, evaluation cost, learning cost and setup cost. Financial switching cost includes benefit loss cost and monetary loss cost.

Relational switching cost includes personal relation loss cost and brand relationship loss cost. Risk cost refers to the value of possible negative results when consumers switch to the unfamiliar service providers. Evaluation cost means the value of your time and efforts to gather and analyze information for switching deciding. Learning cost refers to the value of your time and efforts to accumulate new skills and knowledge so as to effectively use the services provided by new service providers. Setup cost refers to the value of your time and efforts when start to use the services of latest service providers. Benefit loss cost refers to the loss of monetary benefits provided by the first companies after the switching, like the accumulated points or discount.

Monetary loss cost on the other hand refers to the value promised or provided at just one occasion before receiving the services of the first companies, like payment for

signing the contract and forfeit for breach of contract. Personal relation loss cost refers to the loss incurred by losing consumers' personal relation with the past service personnel after switching the enterprises. Brand relationship loss cost refers to the loss of consumers' benefits, which derive from the positive image of the past companies, after switching the enterprises. The current study follows the classification of Burnham, Frels, and Mahajan (2003) and uses its framework categorization of switching cost.

In switching to a different generation, if the switching costs are found to be larger than a rise in utility, consumers prefer to not switch. Past studies reveal that switching costs significantly contribute to predicting customer retention and/or switching behaviour (Kim *et al.*, 2004).

As mentioned above, it involves all potential costs incurred by the customer as a punishment for demonstrating disloyalty to the present partnership by switching to a special service provider (Chen and Hitt, 2002). Therefore, switching costs create barriers that consumers have to overcome.

In the service context, Burnham *et al.*, (2003,) defined switching cost as “the one-time cost that customers encounter during the process of switching from one provider to another”. However, during a subsequent study, Kim *et al.*, (2004) examined switching costs within the mobile service context, and operationalized it as a combination of loss cost, adaptation cost and move-in cost. According to the authors, loss cost refers to the consumers' perception of losing social station, relationship and performance when switching the prevailing service provider, whereas adaptation cost refers to the issues associated with adopting a replacement service provider after switching the prevailing one (e.g. search cost and learning cost). Move-in cost indicates the

“perception of economic cost involved in switching to a replacement carrier”, such as the acquisition of a replacement device and subscriber fee. Thanks to the suitability and similarity of context, this study considers Burnham *et al.*, (2003) and Kim *et al.*, (2004) conceptualization of switching costs and defined it within the mobile service usage context because the one-time costs that mobile service users are related to the process of switching from one provider to a different, and which is that the combination of loss cost, adaptation cost and move-in cost. Therefore, this study posits that there is a positive relationship between switching costs and the intention to leapfrog.

2.4.3 The Urgency to Replace and Intention to Leapfrog

Another determinant of leapfrogging considered in this study was urgency to replace the product. Consumers intending to buy a future generation product must be able to bridge the period before that product becomes available to replace the currently owned product (P0). It is expected that customers owning a product will differ in the perceived urgency of replacing the current item and that this urgency will be motivated by several factors.

The consistency in quality of the old product is clearly an important factor when choosing to forgo the new product (P1) and instead to wait for the future product (P2). Indeed, the urgency to purchase the new product is essentially determined by the customer who is influenced by the functionality of the current product (Evans *et al.*, 1989; Rogers, 1995). As time passes, the functionality of any product is adversely affected by wear and tear and, with increasing age, increased breakdowns of most items can be expected. In support of this view, Bayus & Gupta (1992) demonstrate that the perceived condition of the currently owned item impacts intentions to replace

the item (Labay & Kinnear, 1981). Further, consumers' desire for variety and change also influences the urgency to replace the current product (P0) by the next generation (either P1 or P2). Such stimulation of wants by a new product has proved a central determinant in buying behavior (Wang, Dou, & Zhou, 2008). Further, the introduction of a new generation product leads to the obsolescence of the existing generation, which, from the consumer's perspective, reduces the value of the current item. Indeed, the mere perception of this value reduction can motivate the desire to replace P0.

Urgency to replace is an important component of retailer-brand partnerships that enables retailers to monitor the behavior of customers. In other words, with the variety items sold by retailers on discount and on a continuous basis, buyers prefer to delay their purchase until the retailer provides a promotional deal (Levy & Goldberg, 2014). Unfortunately, this is particularly true of fashion-related products that have a short selling season. However, resource shortages can bring pressure on consumers (Herrington & Capella, 1995). In other words, retailers selling limited -edition items can build a sense of novelty and undersupply in order to discourage customers from delaying their purchase despite having to pay full price. This is one of the tactics successfully used by fast fashion retailers (Jin, Jung, Matthews, & Gupta, 2012). In other words, consumers' greater sense of urgency to replace is the key that may help cultivate greater profits for retailers. In this sense, urgency to buy captures consumers' immediate responses whereas purchase intentions do not. It is particularly important to measure consumers' immediate responses because purchase intentions often do not predict behaviour (Chandon *et al.*, 2005). Hence, we hypothesize that urgency to replace has no significant effect on the intention to leapfrog in the Mobile phone industry in Kenya.

2.4.4 Consumer knowledge and intention to leapfrogging.

Consumer knowledge as a construct is important in understanding consumer behavior like information search (Brucks1985;Rao and Sieben1992) and processing(Alba and Hutchinson 1987;Bettman and Park 1980;Rao and Monroe1988).Objective knowledge which is accurate information about a product which is stored in long term memory while subjective or self –assessed knowledge is a person’s perceptions of what or how much they know about a product, are the two knowledge constructs that have been distinguished(Brucks1985 and Lessig1981).

Similarly, consumer knowledge is the first point of reference in information search before a decision is made and has not received as much attention. Consumer knowledge, often labeled “product related knowledge” represents the degree of experiences, expertise and familiarity consumers get with a product. It is the internalized information that consumers’ resort to, when making decisions (Kolyesnikova, Laverie, Duhan, Wilcox, & Dodd, 2010). Inversely, consumer knowledge describes the product related knowledge that consumers gather over time from exposure through advertising, salespeople or from using the product (Alba & Hutchinson, 2000), and on which they rely to help them in their purchase decision-making and by extension intention to leapfrog.

It is common knowledge in consumer behaviour studies that the information-search-stage of the decision making process starts with internal search. It is only where internal search fails to give up a solution to an identified need that consumers resort to external information search. Consumer knowledge is therefore is a strong driver of intention to leapfrog; and requires increased research attention. Consumer knowledge is a multidimensional construct consisting of experience, expertise and familiarity

(Kolyesnikova *et al.*, 2010; Kerstetter & Cho, 2004; Alba & Hutchinson, 1987). Consumer experience represents accumulated skills that enable individuals to acquire and process information (Kerstetter & Cho, 2004). The basic level of consumer knowledge is knowledge retained from consumption experiences (Clarkson, Janiszewski, & Cinelli, 2013). Consumption knowledge is extensive; and consists of coarsely defined pleasant or unpleasant consumption experiences (Clarkson *et al.*, 2013); and also forms the basis for brand preference for food, entertainment and other service-dominant products.

Research in the area of consumer product knowledge and consumer behavior is of great importance. Fu, Chui and Helander (2006) assert that product knowledge is a component of proposed notions, principles and techniques that lead a customer to perform an operation. This is information that is filtrated by a consumer mind. Consumers execute some cost and benefit analysis and the gained information or knowledge impels consumer draw the conclusion that will or will not be buying behavior.

Research conducted by Bian and Moutinho (2011) consumer knowledge was described to indicate characteristics of product that influence the whole flow of decision making. Additionally, owing to diverse levels of sensitivity of consumer's mind the knowledge will fluctuate from buyer to buyer. Due to the concentrating predominantly on intention to leapfrog, product knowledge will strongly affect buying behavior of customers. During product selection process consumers estimate product relying on understanding of it, and this will have an impact on information seeking, the volume of information search and behavior (Zhu, 2004)

According to Lin and Chen (2006) research, consumer intention to buy is clearly affected by product knowledge, product involvement and country of origin image. There is a significant effect of product knowledge on consumer purchase intention under different product involvement. In their investigations Brucks(1985) and Rao and Sieben (1992) mentioned that the level of customer's product knowledge guidance's his/her information quest of behavior. Moreover, it affects consumer's information, decision information and intention to purchase (Lin, Chen 2006). Customer's knowledge of product will not only define buying decision but also have indirect impact on intention to buy (Lin, Chen 2006).

Lin, Yeh, Chung, Wen (2011) conducted study with participation of 292 respondents according to which customers' intention to purchase positively affected their product knowledge. Furthermore, Pedersen and Nysveen questioned 874 people and according to the results of this survey they established that product knowledge has direct positive influence on intention to buy. Finally, Eze, Tan and Yeo in their study also focused attention on influence of product knowledge in intention to purchase. Their data was collected on 204 Chinese youngsters with their age ranging from 21 to 31 and according to their findings; it was revealed that customer purchase intention positively affected by product knowledge.

2.4.4.1 Moderating role of consumer knowledge

This research can be differentiated from the previous by adding the moderating role of consumer knowledge on the relationship between the determinants of leapfrogging and intention to leapfrog. Consumer knowledge of the product has been studied in the field of consumer behavior (Blair & Innis, 1996; Li, Daugherty, & Biocca,2002; Wang & Hazen, 2016). It has been defined as the memory of one's experience about a

certain product (Brucks, 1985). It is widely known that consumers show different consumption behaviors depending on their level of product knowledge. Lee and Lee (2009), state that, consumers with a high level of knowledge about a certain product are likely to be familiar with the product since product knowledge is formed on the basis of individual experience or known information. Additionally, consumers with a high level of knowledge about a particular product are less likely to feel anxious when purchasing the product (Cacciolatti, Garcia, & Kalantzakis, 2015). That is, product knowledge plays an significant role in influencing the purchase decision making process (Bettman & Park, 1980).

Consumer product knowledge moderating function is theoretically supported by knowledge-sharing behavior. Prior studies have consistently showed that consumers who are knowledgeable about a particular product have a lot of experience with the product. In addition, they have a high level of understanding of the product, which means they can accurately distinguish the advantages and disadvantages of the product (Pillai & Hofacker, 2007; Roy & Cornwell, 2004). More significantly, consumers with a high level of understanding about a particular product are more likely to share their knowledge about the product to other people, which thus helps them to choose new products or services (Bock, Zmud, Kim, & Lee, 2005; Hsu, Ju, Yen, & Chang, 2007). People who are knowledgeable are more likely to share their knowledge with others than those who do not (Bilgihan, Barreda, Okumus, and Nusair, 2016). For this reason, it can be suggested that consumers with high levels of knowledge and assurance about a certain product tend to encourage other consumers to use the product. In contrast, consumers with a low level of knowledge about a particular product are less likely to recommend the product to others since they are not confident.

Empirical research supports the role played by consumer product knowledge as a moderator in consumer behavior. Hwang and Lee (2018) for instance examined the moderating role of consumer product knowledge in the context of an overseas package tour. They found that knowledge moderated the relationship between rapport and word-of-mouth and tour satisfaction and word-of-mouth. In other words, rapport and tour satisfaction were more effective in creating word-of-mouth for the high-product knowledge group than low-product knowledge group.

Another study by Mohd Suki, (2016) explores the role of knowledge as a moderating variable on the purchase intention of consumers in relation to organic food products. Knowledge of green brands allows consumers to cultivate a positive organic product marketing awareness and strengthen their interest in prevention of degradation of and revitalization the environment. According to a focus group research (Padel, *et al.*, 2005) buyers and non-buyers long to be better informed and appreciate supplementary information about the organic certification process when they make a purchase. Prior competitive studies noted that consumers' positive attitude toward organic products can influence their purchase intention (Chang *et al.*, 2015, Laroche, M.; Bergeron, J.; Barbaro-Forleo, G.2001).This approach has developed from the knowledge that consumers have collected about a product.

Furthermore, Smith and Paladino stated that knowledge of organic foods positively influences the development of organic attitudes (Smith and Paladino;2010). Padel and Foster (2005) specified that the lack of knowledge negatively influences green purchase behaviour. As a result, individuals are willing to accept health information with an external source and are inclined to opt to improve their health behaviours (Padel and Foster ,2005).

Numerous studies report that environmental knowledge positively affects consumer purchase intention and actual purchase of organic products (Mohd Suki, 2016 Paul, J.; Modi, A.; Patel, J 2016, Chen, and Chang, C.H ,2012, Mohd Suki 2017). The context of the study was to investigate the moderating role of consumer knowledge on the relationship between the determinants of leapfrogging and intention to leapfrog in the mobile phone industry in Kenya.

2.5 Summary of Leapfrogging Gaps

As the global pace of technological change has rapidly accelerated over the last half-century, and particularly during the past 20 years, experts in business, government, and academia have increasingly adopted the idea of “leapfrogging” for the potential future growth of emerging economies and developing countries. This idea recognizes that advanced technologies will enable these rising nations to sooner catch up and even surpass the developed world in terms of recent infrastructure and innovation.

Lack of clear strategy may be a missed opportunity. There’s tremendous potential for leapfrogging to drive growth if done correctly. Developing nations have a latecomer’s advantages over more developed countries when it involves technology adoption. Lack of legacy infrastructure and entrenched vested interests could lead to the rapid adoption of emerging technologies, particularly compared to developed nations that are pressured to undertake more gradual transition plans. This flexibility could encourage developing nations to prepare their strategies, innovation ecosystems, and infrastructure with emerging technologies in mind from the outset. This strategy would speed up their transition to more productive systems and provide their entrepreneurs with an early opportunity to become a value chain neighborhood that would make those developments older.

To the best of our knowledge, the role of consumer knowledge when it involves intention to leapfrog behavior has not been adequately explored in literature, thus the current study explores the moderating effect of consumer knowledge on the connection between consumer determinants of leapfrog and intentions to leapfrog.

2.6 Leapfrogging Examples from Africa

The rapid spread of mobile technology in the developing world—particularly in Africa, which lagged behind most of Asia and Latin America in closing the income gap with the West—has given rise to the "leapfrogging" phenomenon. That is why, in the words of the World Bank report, countries can make a "fast jump in economic development" by harnessing technological innovation.

The concept "leapfrogging" is also used in Africa, although it is also used to describe the direction that India is expected to pursue, which is said to have skipped straight to a technology-driven economic model without an intense manufacturing process that has stimulated growth in Japan, South Korea and China. As in Africa, India's tech entrepreneurs are said to thrive where the government has struggled. Author Gurcharan Das said that India is rising at night while the government sleeps.

Several cases of leapfrogging exist in Africa. One notable example is the M-Pesa in Kenya, which serves as an efficient and convenient mobile banking and payment system for Africans without access to offline banking. M-Pesa's creators were looking for a way to apply their mobile payment system to resolve other problems. They have also established another company known as MKopa Solar which provides solar energy to rural households in Africa.

M-Kopa Solar uses three readily available technologies, namely solar generation and low-energy LED lights, mobile payments similar to M-Pesa and the SIM cards embedded in the M-Kopa control unit. The innovation introduced by M-Kopa is packaging these technologies and combining them with a mobile payment system, thereby providing solar energy products at affordable prices. M-Kopa is an effective off-the-grid solar system for countries in Africa which largely have poor land-based infrastructure and frequently erratic electricity supply. M-Kopa enables children in rural areas to study after school and relieve residents from the burden of fetching firewood and burning fossil fuel (kerosene) late into the night. M-Kopa has leapfrogged out of kerosene-based lighting, bypassing grid-based electricity, into off-grid renewable energies.

This system is an innovation not only in technological terms, but also in terms of business models adapted to African conditions. Another example of leapfrogging from Africa is the use of solar power in desert grasslands in rural areas in Jigawa, Nigeria (Lee and Mathews, 2013). This semi-desert area has no water supply. The traditional option was to open wells with ropes and buckets, hand pumps or government-supplied diesel-powered pumps that were operational until they broke down or until villagers ran out of money and could no longer afford the expensive diesel. This problem was resolved using solar-powered pumps designed to run maintenance-free for up to 10 years.

The spread of mobile and emerging technologies is seen as the gateway to leapfrogging. According to Miles Morland, a veteran investor in Africa, Nigeria had 100 000 working landlines for a population of about 140m in 2001. When MTN, a South African telecommunications firm, tendered \$285 million for a mobile operating

license that year, it claimed that no more than 15 million Nigerians could ever own a mobile phone. The nation now has 162m users, according to Jumia, an online retailer.

In sub-Saharan Africa as a whole, GSMA Intelligence reports that there were 444m unique mobile subscribers in 2017, a penetration rate of 44%. This compares with a global average of 66%, though in countries like South Africa and Nigeria, where nearly nine in 10 people subscribe, mobile phones are as common as in the US, according to Pew Research.

Another example of leapfrogging is the O&L Group in Namibia (Lee *et al.*, 2014). This company started in retail and brewery and later diversified into dairy and solar energy. O&L expanded quickly with government support (against a South African company's effort to sabotage the company by price dumping) with sales reaching approximately 4 per cent of Namibia's GDP. O&L plans to expand the energy business to include the wind power industry because Namibia imports electricity from South Africa and Angola. However, the company must first resolve the hurdle of a government-imposed grid monopoly.

2.7 The Conceptual Framework

A conceptual framework is a model of presentation where a researcher conceptualizes or presents the relationship between independent and dependent variables in a study and shows the relationship diagrammatically. The purpose of the conceptual framework is to help the reader to quickly see the proposed relationships. Figure 2.1 below shows the moderating effect of consumer knowledge on the relationship between determinants of leapfrogging and the intention to leapfrog.

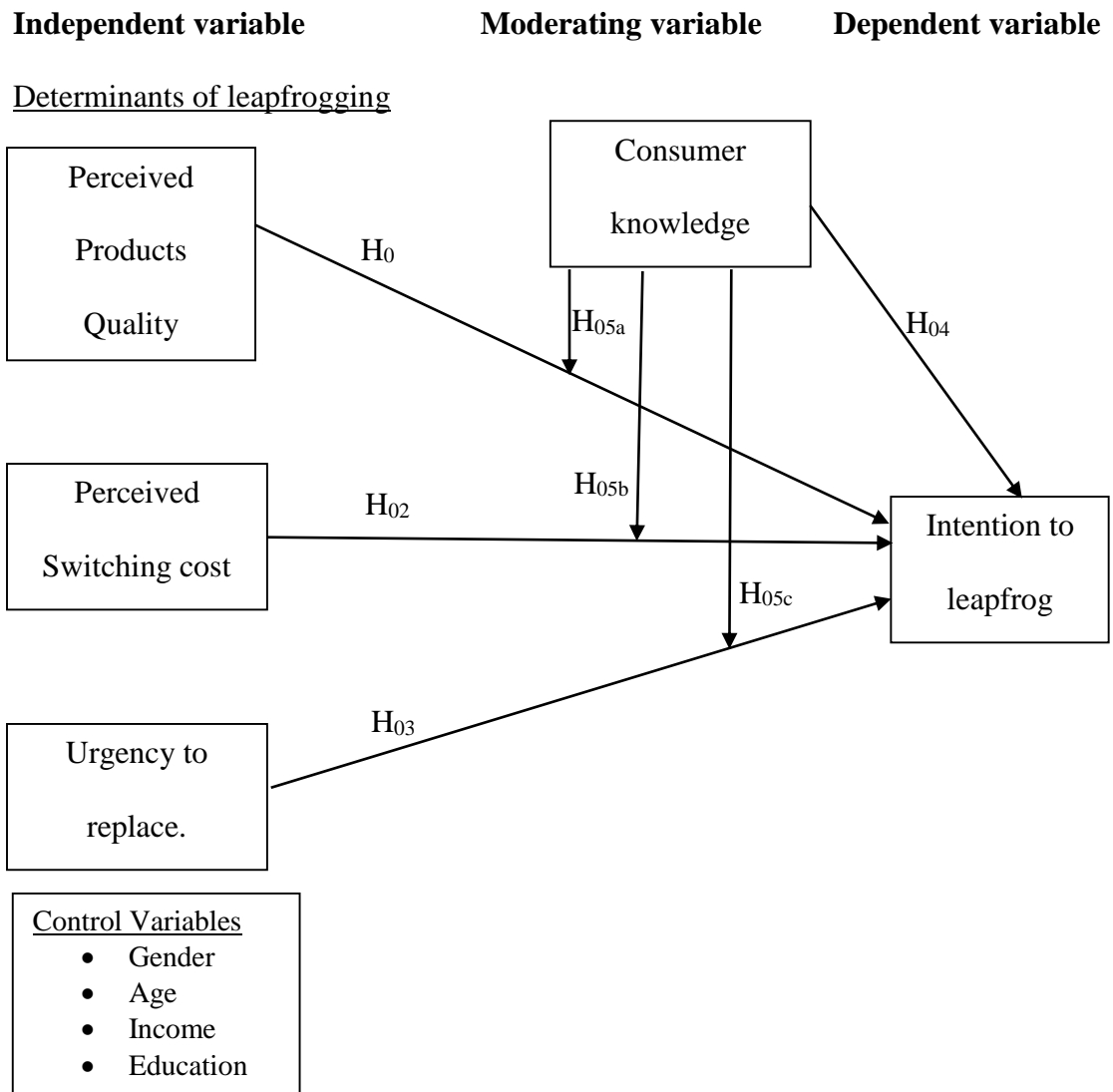


Figure 2.2: Conceptual Framework

Source: Adopted and modified from Herrmann *et al.*, (2015)

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter describes the research methodology in the following order: philosophical foundation, research design, study area, target population, sampling procedures used to get the appropriate sample size, data collection procedure, measurements of variables reliability and validity, data analysis procedures, model specification, assumptions of regression and ethical considerations.

3.1 Research Philosophy

A research philosophy is a belief about the way in which data about an occurrence should be collected, analysed and used. The term epistemology (what is known to be true) as opposed to doxology (what is thought to be true) encompasses the various philosophies of research approach. The purpose of science, then, is the process of transforming things believed into things known: doxa to episteme. Two major research philosophies have been identified, namely positivist (sometimes called scientific) and interpretivist (also known as anti-positivist) (Galliers, 1991).

Positivists believe that reality is stable and can be observed and described from an objective viewpoint (Levin, 1988), without interfering with the phenomena being studied. They contend that phenomena should be isolated and that observations should be repeatable. This often involves exploitation of reality with variations in only a single independent variable so as to identify regularities in, and to form relationships between, some of the constituent elements of the social world.

Forecasting can be made on the basis of the previously observed and explained actualities and their inter-relationships. "Positivism has a long and rich historical

tradition. It is so entrenched in our society that knowledge claims not grounded in positivist thought are simply dismissed as unscientific and therefore invalid" (Hirschheim, 1985). This view is indirectly supported by Alavi and Carlson (1992) who, in a review of 902 IS research articles; found that all the observed studies were positivist in approach. Positivism has also had a particularly successful association with the physical and natural sciences.

This study is in line with positivism approach, which sought to use existing theory to deduce and formulate variables, assume hypotheses that are tested and established wholly, in part, or otherwise refuted leading to further development of theory to be tested with future research. Saunders *et al.*, (2009) affirms that through positivism a study is concerned with proofs and not impressions that could be studied empirically. The positivist paradigm emphasizes that genuine and factual occurrences could be studied and observed scientifically and empirically (Aliyu *et al.*, 2014). The scientific approach to research consists of the familiar process of proposing hypotheses as explanations of phenomena and then collecting data to scientifically test the hypotheses. Therefore, the current study derived variables, constructs and formulated hypotheses based on existing theories of logistic capabilities and then statistically verified through rational investigation and analysis.

3.2 Research Design

The study adopted explanatory research design of a cross sectional nature. Orodho (2003) argues that explanatory research design analyses the cause-effect relationship between two or more variables. Hence using explanatory research design analyses in the current study is appropriate because the research sought to establish a cause-effect

relationship. Explanatory research focuses on the *why* questions and also establishes causal relationships.

The study also employed cross-sectional survey as it sought to describe and establish associations among key study variables, namely, perceived product quality, perceived switching cost, urgency to replace, consumer knowledge and intention to leapfrog in the mobile phone industry in Kenya. The study used cross-sectional survey as data was collected at a given point in time (Creswell, 2014). The design is suitable where the study seeks to describe and portray characteristics of a phenomenon. It also enables the study to profile the sample of a population by collecting accurate information (Burton, 2000). Cross-sectional survey is appropriate for the study because the data collected from employees of selected counties that will generalize the whole population. Additionally, cross-sectional studies have been found to be robust for effects of relationships studies (Coltman, 2007).

The study adopted explanatory design since it uses theories and hypothesis to account for the forces that cause a certain phenomenon to occur (Cooper and Schindler, 2011). The design is also appropriate for the study as it allows the survey to be carried out in the natural settings and permitted the study to employ probability sampling. This enhances statistical inferences to be made to the broader populations and permits generalizations of findings and thereby increase the external validity of the study (Frankfort-Nachmias and Nachmias, 2008). The probability sampling minimizes bias and enhances reliability of data. Additionally, the design will allow the use of questionnaires and inferential statistics in establishing the significant relationships between the variables (Hair *et al.*, 2007).

3.3 Research Study Area

The research context of this investigation was the mobile phone industry in Kenya. Kenya is found in the eastern side of Africa bordering Uganda in the west, Tanzania to the south, Somalia to the east, Sudan and Ethiopia to the north. Kenya has a population of approximately 47,251,449 with a GDP of approximately US\$ 70.6 billion with 6.6 % growth rate (Kenya GDP& Economic Data 2015). Approximately 37.8 million Kenyans own mobile phones. Trans-Nzoia, Nakuru and Nairobi counties were the research study areas for the study.

3.4 Target Population

The target population of the study was employees of three purposively selected county governments, namely, Trans-Nzoia, Nakuru and Nairobi who are mobile phone users. This was because the three counties are cosmopolitan in nature and are believed to portray a representation of most communities in Kenya. Also, county employees have a steady income so are likely to change their mobile phones depending on their needs and situations. The total population in these counties was approximately 15056 as shown in table 3.1

Table 3.1: Target population

Name of County	Approx. number of employees	Percentage Number of employee representation
Nairobi	6256	42%
Nakuru	4925	32%
Trans- Nzoia	3875	26%
Total Employees	15,056	100%

Source: County Records, (2016)

3.5 Sampling Procedure

The study used stratified and simple random sampling procedures to select the respondents for the study. Stratified random sampling is the process of selecting a

sample in such a way that the identified subgroups in the population are represented in the sample in the same proportion as they exist in the population (Frankel *et al.*, 2000). The strata were the 10 devolved departments in the county. Simple random sampling is the process of selecting a sample in which each item is selected entirely on the basis of chance. A proportional number from each department was included in the sample. The research used the two techniques to pick the respondents from the departments in the counties. These approaches are considered suitable since it will give all the respondents equal probability of being selected as irrespective of their status. The study further used purposive sampling to select the counties in Kenya that are cosmopolitan for the research. The identified counties were Trans-Nzoia, Nakuru and Nairobi counties.

3.5.1 Sample Size Determination

Since the target population is more than 10,000 employees in the mentioned counties, the sample size was determined by the use of Fisher *et al.*, (1983) formula and distributed according to the percentage of the number of employees in the various departments as indicated by table 3.2.

$$n = \frac{Z^2 pq}{d^2}$$

Where:

n = the desired sample size

z = the standard normal deviate at the required confidence level (1.96)

P = the proportion in the target population estimated to have characteristics being measured (0.5)

$$q = 1 - p (0.5)$$

d = the level of statistical significance set (0.05)

$$N = \frac{(1.96^2 \times 0.5)(1 - 0.5)}{0.05^2} \quad N = 384 \text{ (The sample size of the study is 384.)}$$

Table 3.2: Distribution of respondents (sample size)

Name of County	Target Population	Sample size per county (N*% employee rep)
Nairobi	6256	160
Nakuru	4925	125
Tranz- Nzoia	3875	99
TOTAL		384

Source: Researcher, 2020

3.6 Data Collection and Measurement

3.6.1 Data collection

Primary data collection was used in the study. The primary data was collected using a questionnaire that related to the specific objectives of the study. The questionnaire had structured questions to ensure the data collected was valid and reliable and ensured deep insight on the variables. The structured questions were presented in the Likert scale to measure the respondents' opinions on various aspects of the determinants of their intention to leapfrog - the subject of the study. A seven-point likert scale "1" denoting strongly disagree (SD) "2" denoting as Disagree(D) "3" denoting slightly disagree l(SD) "4" denoting Neutral(N) "5" denoting as Slightly agree (SA) '6' denoting Agree (A) and '7' denoting Strongly Agree (SA) were used to measure the dependent, independent and the moderating variables.

The researcher sought a research approval authorization letter from the University and National Commission for Science, Technology and Innovation (NACOSTI) to

facilitate acquisition and permission to carry out the study. The researcher proceeded to the County Chief administrative Officer in respective counties and sought the consent to conduct the research. Once the permission was granted, the researcher arranged to visit each of the departments for familiarization purposes and sought permission from the heads of departments, concerning the intention of data collection within their county.

Respondents were informed about the purpose of the study and assured confidentiality of their responses. The researcher trained research assistants and supervisors during actual data collection where questionnaires were distributed to the county devolved departments. The research assistants were master's Students, specializing in the same discipline, who have already defended their thesis proposals. The essence of using the research assistants from same discipline is because they have a good background and understanding of subject area of interest, and also in the research instrument. Research assistants were trained for two days. The instructions on how to fill the questionnaires were carefully explained to the respondents. The respondents were allowed for them to respond to the instruments accurately. Research assistant collected the questionnaires for analysis after the respondents and thanked the respondents for their cooperation.

3.6.2 Measurements

The measurements that were used for the study, on the questionnaire were a combination of previously used instruments improved and modified to suit the current study. Intention to leapfrog measurements (I will wait until the next Mobile phone generation is available, I will wait provided that announcements pertaining to the next generation Mobile phones are already available, I will recommend other customers to

wait until a future model is released) were adopted and modified from (Venkatesh & Davis, 2000). Five items were used to measure Perceived Product quality (My Mobile phone has good security features than what is available currently, I like the design of my Mobile phone, I enjoy using my phone, I like the features in my phone and My mobile phone is environmentally friendly), Perceived switching cost also had five items (It will take a lot of time to learn to use a new mobile phone, It will take a lot of effort to learn to use a new mobile phone, The price of current phone is high, My phone will lose value with the introduction of a new phone, It will be costly to repair my old phone before I switch to the new phone).

Urgency to replace had six items (I like to change things in my life, I like variety in my life, I am not satisfied with my old phone, I like things of good value, I like things that make my work easy, when there is a need to replace my phone, I will do a replacement purchase) were adopted and modified from Herrmann *et al.*, (2015) and consumer knowledge (I have knowledge of several other mobile phone brands, I use several different mobile phone brands, I am an expert when it comes to mobile phones, My knowledge on different brands is based on previous experiences of using the brands.) were improved and modified from Lin and Zhen (2005) and Moorman *et al.*, (2004)

The control variables were also measured using gender (Female, Male), age (Below 28 years, 29-39, 40-50, 51 and above income (below 30,000, 31,000 -50000, 51000-70000, 71000-90000, above 100000) and education (Certificate and Below, Diploma, Bachelor, Masters, PhD).

3.6.3 Pilot test

A pilot test in Uasin-Gishu County was conducted on employees since it was a representation of the other purposively selected counties in that it is a cosmopolitan county. This assisted in revising and refining the data collection instruments and thus improving the reliability of the instruments.

The SPSS computer software aided in the calculating of the coefficient correlation that were achieved. From the findings from the pilot test, the overall cronbach's alpha for 27 items obtained from all the items explaining intensions to leapfrog (PQ, SC, ITL & Moderator CK) was .742.

The coefficient alpha of 0.742 obtained indicated that the research instruments were reliable and thus were adopted for data collection (Ocuwatayo, 2012).

3.6.4 Validity of Research Instrument

Validity refers to the accuracy of a measurement instrument and to the extent to which the instrument measures what it is intended to measure (Zikmund *et al.*, 2010). It also refers to the extent to which a specific measure is free from systematic and random errors (Malhorta and Peterson, 2009). There are two types of validity, including internal and external (Van Tonde and Ehlers, 2011). External validity refers to the extent to which the results of the study could be generalized to other particular research settings and other samples. In this study, to ensure external validity, the results will be generalized to other settings in Kenya, and in fact to other emerging economies. Additionally, content and construct validity will also be ensured.

Content validity refers to the extent to which a research instrument adequately covers the constructs under study. Content validity was ensured, this study, in various ways.

First, content validity was achieved by seeking opinion of experts (study's supervisors). As far as construct validity is concerned, Straub *et al.*, (2004) asserts that it is the extent to which a measurement instrument is grounded in theory. This means that the instrument must have existing conceptual or theoretical bases in the literature.

In this study, construct validity was assured by deriving dimensions of intention to leapfrog, product quality, switching cost, urgency to replace and consumer knowledge from existing literature. Consequently, the questionnaire was adopted and aligned with the research objectives. Further, essential adjustments were made to the questionnaire based on feedback obtained from the pilot study. Similarly, a large sample size was used to boost the accuracy of the results.

Straub *et al.*, (2004) further postulate that other aspects of construct validity are convergent and discriminant validity. This was ensured through Exploratory Factor Analysis (EFA). Hair *et al.*, (2006) posit that factor analysis basically involve four stages as follows; First, preparation of correlation matrix which is the number in main distance of matrix called communality. Second, factor extraction which is getting the main factors that have caused changes in the proposed variable. This may be done through commonly used methods like the Principal Component Analysis (PCA), maximum likelihood, principal axis factoring and least Square, among others. This study used PCA as the extraction method.

Third, the selection and rotation of factors. Factor loading for each item in the factor matrix which shows the amount of correlation each item is analyzed through PCA, used together with variance maximization (varimax) rotation and Kaiser normalization. This makes interpreting of the results easy as only components with

Eigen values greater than 1 are extracted and renamed accordingly as recommended by Hair *et al.*, (2010).

Finally, a statistical test of sampling adequacy using by Kaiser-Meyer-Olkin (KMO) was used to indicate the proportion of variance in the variables that might be caused by the underlying factors. The value of 1.0 is regarded as useful for factor analysis. Consequently, Bartlett's tests of Sphericity was used to check the hypothesis which states that the correlation matrix is an identity matrix. If the variables are unrelated then it is an indication that they are unsuitable for structure detection. Accordingly, Hair *et al.*, (2010) recommends that values of less than 0.05 indicate that the data is good for factor analysis.

3.6.5 Reliability of Research Instrument

Reliability is a measure of the degree to which a research instrument yields consistent results after repeated trials (Neuman, 2000). Reliability is a quality attributed to proposition or measures to the degree to which they produce consistent results. An attitude scale is considered reliable, for example, to the degree to which the same respondents, or very similar respondents, receive the same or very similar score upon repeated testing. This will establish the extent to which the questionnaire elicits the same responses every time it is administered.

For all Likert-type questions, Cronbach's Coefficient Alpha was computed for each item. A reliability coefficient of 0.7 or over was assumed to reflect the internal reliability of the instruments (Fraenkel & Wallen, 2000). This is because Likert-type questions are best tested for reliability using Cronbach's Coefficient Alpha which combines all the items and advises on which item to discard if it does not capture what it is intended to capture (Neuman, 2000).

3.7 Data Analysis

Data analysis was performed using multiple regression model, with the aid of SPSS version 24.0 (Hayes and Matthes, 2009), and both descriptive and inferential statistics. Descriptive analysis was done for comparison of means, frequency distribution, standard deviation, skewness and Kurtosis values.

The hypotheses were tested using moderated regression analysis to establish the extent that the moderator variable affects the relationship between the determinants of leapfrogging variables (Perceived Product quality, Perceived switching cost and urgency to replace) and the intention to leapfrog. The moderator effect was examined using hierarchical regression analysis procedures as outlined by Baron and Kenny (1986); Aiken and West (1991).

The moderating effect of consumer knowledge on the relationship between determinants of leapfrogging variables (Perceived Product quality, Perceived switching cost and urgency to replace) and the intention to leapfrog was consequently assessed using the following models.

3.8 Model Specification

Regression models

For the control variables effect

$$Y = \beta_0 + \beta_1 \text{Gender} + \beta_2 \text{Age} + \beta_3 \text{Income} + \beta_4 \text{Education} + e \dots\dots\dots \text{model 1}$$

Effect of control variables on the dependent variable

For the direct effect

$$Y = \beta_0 + C + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \dots \text{model 2}$$

This shows the direct relationship between the determinants of leapfrogging and the intention to leapfrog. **Effect of Perceived Product Quality, Perceived Switching Cost and Urgency to Replace on Intentions to Leapfrog**

For the moderating effect**Effect of Consumers Knowledge on Intentions to Leapfrog**

$$Y = \beta_0 + C + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 M + e \dots \text{model 3}$$

$$Y = \beta_0 + C + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 M + \beta_5 X_1 * M + e \dots \text{model 4}$$

The moderating effect of Consumers Knowledge on the Relationship between Perceived Product Quality and Intentions to Leapfrog

$$Y = \beta_0 + C + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 M + \beta_5 X_1 * M + \beta_6 X_2 * M + e \dots \text{model 5}$$

The moderating effect of Consumers Knowledge on Perceived Switching cost and Intentions to Leapfrog

$$Y = \beta_0 + C + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 M + \beta_5 X_1 * M + \beta_6 X_2 * M + \beta_7 X_3 * M + e \dots \text{model 6.}$$

The moderating effect of Consumers Knowledge on Urgency to Replace and Intentions to Leapfrog

Where Y = Intention to leapfrog

X_1 = Perceived Product quality

X_2 = Perceived Switching cost

X_3 = Urgency to replace

M = Consumer knowledge

C = Control variables

e = Error term

α = Alpha (constant)

β = Beta coefficients

Steps used in Testing for Moderation.

The following steps were used to test for moderation

First, all the variables were standardized to make interpretations easier and avoid multicollinearity. Secondly, categorical variables were dummy coded and product terms manually created for the predictor and moderator variables. Then a regression model predicting the outcome variable Y from both the predictor variable X and the moderator variable M was fitted. Both effects as well as the model in general (R^2) were found to be significant. Finally, the interaction effect was added to the previous model and checked for a significant R^2 change as well as a significant effect by the new interaction term. For the variables that were found to be significant, moderation had occurred.

3.9 Assumptions of the regression model

A regression model is a mathematical representation of what and how independent variables are related to the dependent variables. All regression models have

assumptions, and violation of these assumptions can lead to unreliable results. The following assumptions that underline multiple regression model of analysis will be assessed:

- i. Normality is the assumption that the scores on a continuous variable are normally distributed about the mean, (Tharenon *et al.*, 2007). Normality of independent variables was tested using mathematical methods. The normality of distribution was inspected using the degree of Skewness and kurtosis of variables.
- ii. Linearity refers to the degree to which the change in the dependent variable is related to change in the independent variables (Hair *et al.*, 2010). Linearity between the dependent variable and each independent variable was tested using Pearson Product Moment Correlation (**PPMC**). The goal was to assess the strength of linear relationships among variables.
- iii. Homoscedasticity refers to the assumption that dependent variable exhibits similar amounts of variance across the range of values for independent variable around the regression line, meaning they have equal spread. The Levene's statistic for equality of variances was used to test for the assumption of homoscedasticity.
- iv. Multi-Collinearity refers to the presence of high correlations between independent variables (Williams *et al.*, 2013). In this study, multi-collinearity was assessed by means of tolerance and Variance Inflation Factor (VIF) values. Normally, a tolerance value of below 0.10 or a VIF value greater than 1.0 reveals serious multi-Collinearity problem (Hair *et al.*, 2007; Leech *et al.*, 2011). Tolerance indicates the amount of variability of the particular independent variable not explained by other independent variables, whereas

VIF is the inverse of tolerance statistic.

- v. No autocorrelation – linear regression analysis requires that there is little or no autocorrelation in the data. Autocorrelation occurs when the residuals are not independent from each other. This study used Durbin-Watson test to check for autocorrelation.

3.10 Ethical Considerations

All materials and procedures used in this study were approved by the national commission for science and technology and the researcher was required to ensure a high degree of discretion, tolerance and patience. There was need to observe the ethical issues of integrity, honesty and confidentiality while dealing with the employees of the county governments while getting information from them.

Informed consent of all participants was assured by communicating the purpose, expected duration of participation and benefits of participating in the study. A letter stating the purpose of the study and how the researcher intended to maintain privacy, confidentiality and anonymity was attached to the questionnaire and given to the respondents during their participation.

In order to encourage honest reporting, the anonymity of the study participants was emphasized at the beginning of the session.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.0 Introduction

The purpose of the study was to understand the determinants of consumer intention to leapfrog and the moderating effect of consumer knowledge on the relationship between the determinants of leapfrogging and intention to leapfrog.

This chapter describes the Response Rate, Data Screening and Cleaning, Demographic Information of the Respondents, Results of Reliability Tests, Results of Validity Tests, Results of Factor Analysis, data transformation, assumptions for the regression, Correlation Statistics, and Hypotheses testing. Data was presented and interpreted in this chapter.

4.1 Response Rate

Data were collected from respondents taken from three purposively selected counties namely Nairobi, Nakuru and Trans-Nzoia. A total of 384 questionnaires were given out and 349 were filled and returned which represented a response rate of 90.89%. This response rate was regarded fit for the study since Nyanjom, (2013) argues a flat response rate of 75% is considered good and representation of the population. The response rate of the study was 90.89% which is more than 75% thus it is implied that the response rate was good. The success rate was attributed to the researcher first explaining what the concept of leapfrogging is before giving out the self-administered questionnaires. The researcher and research assistants were also there to clarify any queries that the respondents had. These actions, we believed enhanced response rate reported below:

Table 4.1: Response Rate

	Count	Percentage (%)
Returned	349	90.89
Not Returned	35	9.11
Total	384	100

Source: Researcher (2020)

4.2 Data Screening & Cleaning

Before analyzing the data, it was essential to check (the data) for any errors. This was done through the pre-analysis stage which involved screening and cleaning of data.

The pre-analysis stage involves three basic levels.

- a. Checking for missing values
- b. Checking for error
- c. Finding the error in the data file
- d. Correcting the error in the data file

Imputing Missing Values

The missing values were imputed using multiple imputation in SPSS syntax and the missing values were estimated using a regression model. This ensures that resulting estimates (i.e., regression coefficients and standard errors) will be unbiased with no loss of power in the sample. The multiple imputation procedures provided multiple versions of the data sets each containing its own set of imputed values. By performing this imputation, the parameter estimates for all of the imputed data sets were pooled, resulting in estimates that were generally more accurate than they would be with only one imputation. For missing observations which can be problematic, the missing values were replaced with estimates computed using the mean distribution method as recommended by Coakes and Steed (2007) to generate an error free data set.

Multivariate Outliers

In the data, there were chances of having some extreme values in a variable. These extreme values were the outliers. Kline (2011) states that outliers are scores that are different from others in a data set. They are observations with extreme value on either one variable, univariate, or unusual combination of scores on two or more variables – multivariate which distorts statistics (Tabachnic and Fidel; 2007) they distort the overall statistic of the variable under investigation. In this study, there were no univariate outliers in the data as no entry was outside the range($1 < X < 7$). However, respondents might respond to the extreme values (strongly disagree or strongly agree) and therefore they became outliers.

The researcher used Mahalanobis distance and chi square to check for multivariate outliers. This resulted in flagging 4 cases which were significant outliers. The researcher eliminated them for further analysis and therefore pursued the analysis with 345 cases. The outliers were shown in the study to be values that were out of the normal distribution in the study. The outliers could have been caused by the respondents not understanding the content. It could also be caused by the respondent not being keen on participating in the study, and therefore just fill the questionnaires to get rid of the research assistant.

4.3 Demographic Characteristics of Respondents

The demographic information sought from the respondents included their Age, Gender, level of education and income levels. All these were relevant in establishing the extent to which these characteristics could influence the moderating effect of consumer knowledge on the relationship between consumer determinants of leapfrogging and the intention to leapfrog in the mobile industry in Kenya.

Table 4.2 Summarizes the demographic information/characteristics. The majority of the respondents involved in the study were male who were 206 and represented 59.7%. The females were 139 and represented 40.3% of the respondents. This may represent a gender disparity in the employers who are consumers of mobile products and work for the counties. With regard to age, the majority of the respondents were between the ages of 29 and 39- 191 (55.4%), followed by those who were between the ages of below 28 who were 77 and represented 22.3% of the target population. Those who were of the ages between 40 and 50 were 58 (16.8%), and those above 50 were the least in number and represented 5.5% of the respondents. Hence the majority of employees working in the selected countries who owned mobile phone were of the ages 29 to 39.

With respect to academic/education level, 200 (58%) of the employees had bachelors' degree, 69(20%) had diplomas, 61(17.7%) had a master's, 10(2.9%) had the PhD, and 5 (1.4%) had certificate and below. The findings indicate that the majority of employees in the selected counties had at least a bachelor's degree as the highest level of education needed by the counties to work well. Regarding income earned, those who earned between 60,000 to 70,000 Kenyan Shillings were 137 (39.7%). Those who earned between 80,000 to 90,000 Kenyan Shillings were 71(20.6%), and those who earned below 30,000 were 64(18.6%). Those who earned between 40, 000 to 50,000 Kenyan Shillings were 64 (18.6%). Those who earned above 100,000 Kenyan Shillings were few, i.e., only 9 (2.6%) among the respondents who were employees.

The findings showed that the majority of the employees earned between 60,000 and 70,000 Kenyan Shillings in the selected counties

Table 4.2: Respondents Demographic Characteristics

	Response	Frequency	Percentage
Gender	Female	141	40.4
	Male	208	59.6
	Total	349	100.0
Age	Below 28 yrs	79	22.6
	29-39	193	55.3
	40-50	58	16.6
	51 and above	19	5.4
	Total	349	100.0
Income	below 30,000	64	18.3
	31,000 -50000	67	19.2
	51000-70000	137	39.3
	71000-90000	72	20.6
	Above 100000	9	2.6
	Total	349	100.0
Education Level	Certificate and Below	5	1.4
	Diploma	70	20.1
	Bachelor	202	57.9
	Masters	62	17.8
	Ph.D.	10	2.9
	Total	349	100.0

Source: Research Data (2020)

4.4 Descriptive Analysis Results

Descriptive analysis was used to describe the features of the independent, moderating and dependent variables as they provide summaries about the variable measured. The dependent variable for the study was intention to leapfrog. Consumer determinants of leapfrogging were measured by perceived product quality, perceived switching cost and urgency to replace which were the independent variables. The moderating variable was consumer knowledge. The findings were based on a 7-point Likert scale “1” denoting strongly disagree (SD) “2” denoting as Disagree(D) “3” denoting slightly disagree l(SD) “4” denoting Neutral(N) “5” denoting as Slightly agree (SA) ‘6’ denoting Agree (A) and ‘7’ denoting Strongly Agree (SA). The descriptive analysis used included means, standard deviation, skewness, and kurtosis. The mean

was used as a measure of central tendency, while the standard deviation was used as a measure of dispersion to inform how the responses were dispersed from the mean. Normality was then measured using skewness and Kurtosis (Fidell, 2007 & Tabachnick). The distribution through the variable was considered to be normally distributed if skewness and kurtosis values fell between -20.0 to 3.0. When the skewness and kurtosis values for the study variable, ranged within the acceptance range the normality assumption was therefore considered to have been met.

4.4.1 Descriptive statistics for Intention to Leapfrog

Research respondents were asked to indicate on a seven-point Likert scale their level of agreement on several statements describing their intention to leapfrog as summarized in table 4.1. The majority of the respondents agreed that they were willing to wait until the next generation Mobile phone was available with a mean of 3.37. Provided that announcements pertaining to the next generation Mobile phones were already available, the respondents would wait (3.39). They would also recommend other customers to wait until a future model was released (4.21).

The findings showed that all the statements representing intention to leapfrog had a mean score of above 3.37, indicating that the respondents rated the variable. The standard deviation of the majority of the items ranged between 1.897 and 2.045. It could then be deduced that the responses to intention to leapfrog items were not deviating much from the expected responses. The skewness ranged between .312 and -.212 and kurtosis ranged between -1.052 and -1.383, indicating that the distribution of values deviates from the mean, but is within the stipulated values of < 3 for skewness and < 10 for kurtosis as per Kline (2005, 2010) respectively. Similarly, From the 3 statements used to explain intention to leapfrog had a mean score above

3.37 indicating that respondents agreed to the intention to leapfrog measures. This shows that the majority of the respondents agreed with the statements that were used to measure intention to leapfrog.

Table 4. 3: Descriptive For Intention to Leapfrog

	Mean	Std. Deviation	Skewness	Kurtosis
I will wait until the next Mobile phone generation is available.	3.37	2.027	.288	-1.362
I will wait provided that announcements pertaining to the next generation Mobile phones are already available	3.39	1.897	.312	-1.052
I will recommend other customers to wait until a future model is released	4.21	2.045	-.212	-1.383

Source: Research Data (2020)

4.4 2 Descriptive statistics for Perceived Product Quality

Research respondents were asked to indicate on a seven-point Likert scale their level of agreement on several statements describing product quality as summarized in table 4.3. The majority of the respondents agreed that their Mobile phones had good security features than what was available in the market as indicated by a mean of (5.30). Also, the respondents liked the design of their Mobile phones (5.53). They enjoyed using their phones (5.54), and like the features on their phones (5.85). The consumers believed that their phones were environmentally friendly (6.29).

The findings showed that all the statements representing Perceived product quality had a mean score of above 5.30. This indicates that the respondents highly rated the variable. The standard deviation of the majority of the items ranged between 1.169 and 1.691. It could then be deduced that the responses to Perceived product quality items

were not deviating much from the expected responses. The skewness ranged between -1.108 and -2.333 and kurtosis ranged between .730 and 6.251, indicating that the distribution of values deviates from the mean and is within the stipulated values of <3 for skewness and <10 for kurtosis as per Kline (2005, 2010) respectively. Similarly, From the 5 statements used to explain perceived product quality had a mean score above 5.30 indicating that respondents agreed on product quality measures. This shows that the majority of the respondents agreed with the statements that were used to measure perceived product quality.

Table 4. 4: Descriptive For Perceived Product Quality

	Mean	Std. Deviation	Skewness	Kurtosis
My Mobile phone has good security features than what is available currently	5.30	1.591	-1.143	.730
I like the design of my Mobile phone	5.53	1.419	-1.629	2.778
I enjoy using my phone	5.54	1.691	-1.108	.049
I like the features in my phone	5.85	1.389	-1.606	2.248
My mobile phone is environmentally friendly	6.29	1.169	-2.333	6.251

Source: Research Data (2020)

4.4.3 Descriptive For Perceived Switching Cost

Research respondents were asked to indicate on a seven-point Likert scale their level of agreement on several statements describing as summarized in table 4.4. The majority of the respondents agreed that it would take a lot of time to learn to use a new mobile phone (5.11), and it would take a lot of effort to learn to use a new mobile phone (4.41). The score for those who agreed with the statement that price of current phone was high was 4.52. The score for those who agreed with the statement that

their phone would lose value with the introduction of a new phone was 2.49. Finally, the score for those who agreed with the statement that it would be costly to repair their old phone before switching to the new phone was 2.36.

The findings showed that all the statements representing switching cost had a mean score of above 5.30, indicating that the respondents highly rated the variable. The standard deviation of the majority of the items ranged between 1.571 and 2.047. It could therefore be deduced that the responses to perceived switching cost items were not deviating much from the expected responses. The skewness ranged between -0.937 and 1.247 and kurtosis ranged between -1.362 and 0.637, indicating that the distribution of values deviates from the mean and is within the stipulated values of <3 for skewness and <10 for kurtosis as per Kline (2005, 2010) respectively. Similarly, From the 5 statements used to explain perceived switching cost had a mean score above 5.30 indicating that respondents agreed on switching cost measures. This shows that the majority of the respondents agreed with the statements that were used to measure perceived switching cost.

Table 4. 5: Descriptive For Perceived Switching Cost

	Mean	Std. Deviation	Skewness	Kurtosis
It will take a lot of time to learn to use a new mobile phone.	5.11	1.868	-.937	-.169
It will take a lot of effort to learn to use a new mobile phone	4.41	2.047	-.378	-1.362
The price of current phone is high	4.52	1.801	-.391	-.761
My phone will lose value with the introduction of a new phone	2.49	1.641	1.247	.637
It will be costly to repair my old phone before I switch to the new phone	2.36	1.517	1.162	.336

Source: Research Data (2020)

4.4.4 Descriptive for Urgency to replace

Research respondents were asked to indicate on a seven-point Likert scale their level of agreement on several statements regarding switching cost summarized in table 4.5. The majority of the respondents agreed to the statement that “I liked to change things in my life” (5.48), and “liked variety in my life” (4.65). Also, those who said that they were not satisfied with their old phones, but liked things of good value scored 5.64 and 5.50 respectively. Finally, those who said they liked things that made their work easy scored 3.82, and those who agreed with the statement that when there was a need to replace their phone, they did a replacement purchase was 5.34

The findings showed that all the statements representing urgency to replace had a mean score of above 4.65, indicating that the respondents highly rated the variable. The standard deviation of the majority of the items ranged between -1.467 and 2.187. It could then be deduced that the responses to urgency to replace items were not deviating much from the expected responses. The skewness ranged between -1.667 and 0.096 and kurtosis ranged between -1.432 and 2.458, indicating that the distribution of values deviates from the mean and is within the stipulated values of <3 for skewness and <10 for kurtosis as per Kline (2005, 2010) respectively. Similarly, From the 6 statements used to explain urgency to replace had a mean score above 4.65 indicating that respondents agreed on urgency to replace measures. This shows that the majority of the respondents agreed with the statements that were used to measure urgency to replace.

Table 4. 6: Descriptive For Urgency to Replace

	Mean	Std. Deviation	Skewness	Kurtosis
I like to change things in my life	5.48	1.467	-1.613	2.458
I like variety in my life	4.65	1.863	-.432	-1.071
I am not satisfied with my old phone	5.64	1.476	-1.667	2.230
I like things of good value	5.50	1.500	-1.107	.358
I like things that make my work easy	3.82	2.187	.096	-1.432
When there is a need to replace my phone, I will do a replacement purchase.	5.34	1.648	-1.027	.258

Source: Research Data, (2020).

4.4.5 Descriptive statistics for Consumer Knowledge

Research respondents were asked to indicate their level of agreement on a seven-point Likert scale their on several statements describing Consumer Knowledge as summarized in table 4.6. The majority of the respondents agreed that they had knowledge of several other mobile phone brands (6.41), and had used several different mobile phone brands (5.93), they also consider themselves “experts” when it came to mobile phones (4.82), and their knowledge on different brands was based on previous experiences of using the brands (3.76).

The findings showed that all the statements representing Consumer Knowledge had a mean score of above 5.30, indicating that the respondents highly rated the variable. The standard deviation of the majority of the items ranged between .954 and 1.883. It could then be deduced that the responses to Consumer Knowledge items were not deviating much from the expected responses. The skewness ranged between -2.806 and .002 and kurtosis ranged between -1.169 and 9.878, indicating that the distribution of values deviates from the mean and is within the stipulated values of <3

for skewness and <10 for kurtosis as per Kline (2005, 2010) respectively. Similarly, the 4 statements used to explain consumer knowledge had a mean score above 3.76 indicating that respondents agreed on Consumer Knowledge measures. This shows that the majority of the respondents agreed with the statements that were used to measure Consumer Knowledge.

Table 4. 7: Descriptive For Consumer Knowledge

	Mean	Std. Deviation	Skewness	Kurtosis
I have knowledge of several other mobile phone brands	6.41	.954	-2.806	9.878
I use several different mobile phone brands	5.93	1.151	-1.701	3.924
I am an expert when it comes to mobile phones	4.82	1.864	-.808	-.525
My knowledge on different brands is based on previous experiences of using the brands.	3.76	1.883	.002	-1.169

Source: Research (2020)

4.5 Reliability Results

Reliability is the extent to which a variable is consistent in what was supposed to measure (Hair *et al.*, 2006). Reliability relates to the consistency of a measure. According to Haele & Twycross (2015), the internal consistency of an instrument can be approximated using item-to-total correlation, split-half reliability, Kuder-Richardson coefficient, and Cronbach's alpha (α). This study used Cronbach's alpha (which varies between 0 and 1) which is the most commonly used test of internal consistency of an instrument. Cronbach's test found to be most appropriate in this case because the questionnaire had Likert scale-type questions (questions had more than two responses). Bonett & Wright (2014) express that there is fixed rule of the cut of Cronbach score in determining acceptable reliability. An alpha value between 0.6

and 0.9 would not differ significantly in terms of accuracy of reported results. In this study, an alpha value of above 0.6 is considered to be reliable (Haele & Twycross, 2015). A research instrument is reliable if after being administered to different groups of respondent's yields consistent results. The internal consistency reliability of the instrument was evaluated using Cronbach's alpha. In the study, Cronbach's Alpha was used as a measure of internal consistency.

In this study, any items that have consistently low correlations across the board were removed from the instrument to make it more reliable. Furthermore, the individual items Cronbach's Alpha was considered to determine which item could be deleted to improve the reliability of the questionnaire (Mun *et al.*, 2015).

4.5.1 Reliability Results for intention to leapfrog

The overall reliability for 3 statements explaining the intention to leapfrog was 0.600 and since the coefficient was greater than 0.5 the research instrument had attained internal consistency. All the items in the intention to leapfrog construct had recorded Cronbach's alpha reliability coefficient of 0.600 and acceptable. They were therefore retained for further analysis as shown in Table below:

Table 4. 8: Reliability Results for intention to leapfrog

Cronbach's Alpha	Number of items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
.600	3		
		.476	.395
		.473	.407
		.290	.670

Source: Research (2020)

4.5.2 Reliability Results for Perceived Product Quality

The study's findings depicted that overall, the Cronbach's Alpha 0.398 was obtained from the 5 statements explaining Perceived product quality. The cronbach's alpha column shows how much it will be increased if the item is deleted from the instrument. If item one (PPQ1) is deleted, then the Cronbach alpha value will increase from .398 to .468 and thus improving the Cronbach's alpha of the remaining items.

Table 4.9: Reliability Results for Perceived Product Quality

Cronbach's Alpha .398	Corrected Item-Total	Cronbach's Alpha if Item
Number of items 5	Correlation	Deleted
PPQ1	.056	.468
PPQ2	.193	.352
PPQ3	.236	.316
PPQ4	.404	.188
PPQ5	.169	.370

Source: Research Data (2020)

The study findings depicted that overall, the Cronbach's Alpha 0.468 was obtained from the 4 statements explaining product quality after deleting the first item. Therefore, some items have to be deleted. The one exception to this was item 2 which would increase the Cronbach alpha to .673. As such removal of this item should be considered since it will increase the Cronbach alpha from .468 to .673.

Table 4. 10: Reliability Results for Perceived Product Quality after deleting first item

Cronbach's Alpha	.468	Corrected Item-Total	Cronbach's Alpha if Item
Number of items	4	Correlation	Deleted
PPQ2		-.062	.673
PPQ3		.378	.270
PPQ4		.618	.028
PPQ5		.268	.408

Source: Research Data (2020)

The generally acceptable level of Cronbach's alpha is above 0.70 and it may decrease to 0.60 in exploratory research (Hair *et al.*, 2006) and the desired minimum level of Cronbach's alpha for this study was 0.60. The instruments were considered reliable when their reliability coefficients were above the recommended 0.6 thresholds (Fraenkel & Wallen, 2000). The corrected item – Total correlation column reveals how much each item correlates with the overall questionnaire score. Correlations less than $r = .30$ indicate that the item may not belong to the scale, hence should be removed. The results from the table below shows the Cronbach's alpha of 3 items as .673 which is in an acceptable range and all the values of corrected item – Total correlation column are above .30, thus all items are retained.

Table 4.11: Reliability Results for Perceived Product Quality on Total Correlation

Cronbach's Alpha	.673	Corrected Item-Total	Cronbach's Alpha if Item
Number of items	3	Correlation	Deleted
PPQ3		.486	.620
PPQ4		.728	.243
PPQ5		.320	.758

Source: Researcher (2020)

4.5.3 Reliability Results for Perceived Switching Cost

The overall reliability for 5 statements explaining social switching cost was 0.483 since the coefficient was less than 0.5 the research instrument had internal inconsistency. All the dimensions in the construct did not meet the recommended threshold value of 0.70 for Cronbach's alpha coefficients demonstrating internal inconsistency (Hair *et al.*, 2006). Therefore, individual items needed to be deleted to improve the Cronbach's alpha. From the results below removal of item 5 will lead the overall Cronbach's alpha to .463.

Table 4. 12: Reliability Results for Perceived Switching Cost

Cronbach's Alpha	Number of items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
.483	5		
		PSC1	.251
		PSC2	.270
		PSC3	.252
		PSC4	.201
		PSC5	.343

Source: Research Data (2020)

The overall reliability Cronbach's alpha for 4 statements explaining switching cost was 0.463 which is a decrease from the 5 items but on further deletion of item 5, the Cronbach alpha improves to .500 since the coefficient was at 0.5 the research instrument had internal consistency.

Table 4. 13: Reliability Results for Perceived Switching Cost for 4 items

Cronbach's Alpha	Number of items	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
.463	4		
		PSC1	.345
		PSC2	.354
		PSC3	.234
		PSC5	.129

Source: Research Data (2020)

The overall reliability for 3 statements below explaining switching cost was .500 and since the coefficient was at 0.5 the research instrument had attained internal consistency which according to Nunnally and Bernstein (1994) is considered acceptable, therefore the statements retained for further analysis.

Table 4. 14: Reliability Results for Perceived Switching Cost for 3 Items

Cronbach's Alpha	.500	Corrected Item-Total	Cronbach's Alpha if Item
Number of items	3	Correlation	Deleted
PSC1		.404	.250
PSC2		.421	.199
PSC3		.149	.645

Source: Research Data (2020)

4.5.4 Reliability Results for Urgency to Replace

The overall reliability for 4 statements urgency to replace the product was 0.386 and since the coefficient is less than 0.5 the research instrument had attained internal inconsistency which according to Nunnally and Bernstein (1994) is considered unacceptable and were therefore not retained for further analysis. There was therefore the need to reduce or delete some items.

Table 4. 15: Reliability Results for Urgency to Replace 4 Items

Cronbach's Alpha	.386	Corrected Item-Total	Cronbach's Alpha if Item
Number of items	4	Correlation	Deleted
UTR1		.308	.218
UTR2		-.023	.603
UTR3		.297	.231
UTR4		.345	.173

Source: Research Data, (2020).

After deleting the second item, the overall Cronbach's alpha for 3 items was .603. and since the coefficient was above 0.5 the research instrument had attained internal consistency which according to Nunnally and Bernstein (1994) was acceptable and therefore retained for further analysis.

Table 4. 16: Reliability Results for Urgency to Replace 3 items

Cronbach's Alpha .603	Corrected Item-	Cronbach's Alpha if Item
Number of items 3	Total Correlation	Deleted
UTR1	.386	.539
UTR3	.350	.588
UTR4	.503	.359

Source: Research Data (2020)

4.5.5 Reliability Results for Consumer Knowledge

The overall reliability for 4 statements explaining consumer knowledge was .590 and since the coefficient was greater than 0.5 the research instrument had attained internal consistency as shown below. All the items in consumer knowledge construct had recorded Cronbach's alpha reliability coefficient of .590.

Table 4. 17: Reliability Results for Consumer Knowledge 4 Items

Cronbach's Alpha .590	Corrected Item-Total	Cronbach's Alpha if Item
Number of items 4	Correlation	Deleted
CK1	.202	.620
CK2	.495	.456
CK3	.437	.469
CK4	.426	.480

Source: Research Data (2020)

From the above table, the reliability test conducted on consumer knowledge items scales comprising of 4 items indicates the overall Cronbach's alpha of .590 which is

at an acceptable range. But when item 1 is considered for removal, it increases the Cronbach's alpha from .590 to .620, therefore the item is deleted, and the Cronbach alpha improves. This means that the questionnaire was reliable in this particular section for giving accurate information.

Table 4. 18: Reliability Results for Consumer Knowledge 3 items

Cronbach's Alpha	Corrected Item-Total	Cronbach's Alpha if Item
Number of items	Correlation	Deleted
.620		
3		
CK2	.392	.601
CK3	.526	.368
CK4	.426	.537

Source: Research Data (2020)

4.6 Goodness of Measures

According to Mayers, Gamst, and Guarino (2006), the goodness of measures objective is to ascertain the factors or construct underlying the relatively set of variables. In this section, factor analysis was performed using SPSS version 22 to check the variables of each item of the questionnaires and each item that was correlated and related to each other was handled. A group of items is required to explain one variable as one item denotes only one part of the variable. Thus, this allows acceptable variables being used in this study analysis.

The factor analysis consists of two steps, namely extracting the items and rotating the items using the principal component factor analysis with varimax rotation. This process reveals the items that contribute to a factor that a frame of an element and rotation process refers to the interpretations that determine a simpler and more significant factor. As suggested by Kim and Mueller (1978), there should be at least three items for each construct with the minimum significant loading of $\pm.30$ that

indicates only 10% of the variance is accounted for by the factors, while $\pm .40$ loading is more vital; at $\pm .50$ the loading is more significant and above $\pm .70$ explains 50% of the variances. As the rule of thumb suggested by Hair et al., 2006, the significant loading should be .50 or higher.

Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy is an index used to examine the appropriateness of factor analysis that should be more than .50 in order to be acceptable according to (Hair *et al.*, 2006). Bartlett's test of sphericity is a test statistic used to examine the hypothesis that the variables are uncorrelated in the population. In other words, the population n correlation matrix is an identity matrix; each variable correlates perfectly with itself ($r = 1$) but has no correlation with the other variables ($r = 0$) (Malhotra, 2009).

4.7 Factor Analysis Results

Factor analysis was employed in this regard to help in identifying the actual number of factors that measured each construct as perceived by the respondents. The component factor analysis with varimax rotation was conducted in all variables to extract factors from each construct. Factor analysis was done twice, first with all factors without deletion and second after deletion to get the valid items for the study.

4.7.1 Factor Analysis with all items

The three tables show results of how items were loaded after factor analysis with all items without deletion. The KMO measure of sample adequacy was 0.516 above the recommended 0.5. Findings shows Bartlett's test for Sphericity was significant ($X^2 = 2987.672$, $p = 0.000$ with $df = 253$). The factor analysis process yielded nine components as indicated in the Table 4.20 with Eigen values above 1.0. The analysis yielded nine factors explaining a total of 73.170% of the variance for the entire set of

variables. The KMO of 0.516 and a significant Chi-square provided evidence for the suitability of factor analysis.

With items deleted because they did not meet the threshold, five variables of the study with twenty-two (22) items measuring the variables examined by principal components extraction with varimax rotation. The KMO measure of sample adequacy was 0.561 above the recommended 0.5. Findings shows Bartlett's test for Sphericity was significant ($X^2 = 1570.914$, $p = 0.000$ with $df = 105$). The factor analysis process yielded five components as indicated in Table 4.22 with Eigen values being above 1.0.

Table 4.19 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.516
Bartlett's Test of Sphericity	Approx. Chi-Square	2987.672
	Df	253
	Sig.	.000

Source: Research Data (2020)

Table 4.20 Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.260	14.172	14.172	3.260	14.172	14.172	2.233	9.708	9.708
2	2.875	12.502	26.674	2.875	12.502	26.674	2.044	8.885	18.592
3	2.131	9.265	35.940	2.131	9.265	35.940	2.033	8.840	27.433
4	2.106	9.157	45.096	2.106	9.157	45.096	1.993	8.667	36.100
5	1.622	7.054	52.150	1.622	7.054	52.150	1.931	8.396	44.496
6	1.363	5.925	58.075	1.363	5.925	58.075	1.854	8.063	52.559
7	1.233	5.363	63.438	1.233	5.363	63.438	1.835	7.976	60.535
8	1.127	4.900	68.338	1.127	4.900	68.338	1.492	6.487	67.022
9	1.112	4.833	73.170	1.112	4.833	73.170	1.414	6.148	73.170
10	.882	3.836	77.007						
11	.829	3.605	80.611						
12	.718	3.121	83.733						
13	.625	2.717	86.450						
14	.535	2.327	88.777						
15	.472	2.052	90.829						
16	.443	1.927	92.756						
17	.399	1.734	94.490						
18	.306	1.329	95.819						
19	.276	1.199	97.018						
20	.194	.843	97.861						
21	.179	.777	98.638						
22	.163	.707	99.345						
23	.151	.655	100.000						

Source: Research Data (2020)

Table 4.21 Rotated Component Matrix^a

	Component								
	1	2	3	4	5	6	7	8	9
PQOC1	.810								
PQOC2	.766								
PQOC3						.855			
PQOC4						.741		.521	
PQOC5								.851	
SCOC1		.719							
SCOC2		.784							
SCOC3	.506								
SCOC4					.809				
SCOC5					.882				
UTR1									
UTR2									.790
UTR3				.781					
UTR4				.693					
UTR5		-.658							
UTR6									
ITL1							.866		
ITL2							.795		
ITL3									
CK1									
CK2			.611						
CK3			.688						
CK4			.779						

Source: Research Data (2020)

4.7.2 Factor Analysis with items deleted

According to Hair, Black, Anderson, and Tatham, (2006) all items loading below 0.50 were deleted and those with more than 0.50 loading factor retained (Daud, 2004). The items were well loaded into their various underlying variable structures of dimensions.

Factor analysis was carried out on the five variables of the study with twenty-two (22) items measuring the variables examined by principal components extraction with varimax rotation. The KMO measure of sample adequacy was 0.561 above the recommended 0.5. The findings show Bartlett's test for Sphericity was significant ($X^2 = 1570.914$, $p = 0.000$ with $df = 105$). The factor analysis process yielded five components as indicated in Table 4.22 with Eigen values above 1.0. The analysis yielded five factors explaining a total of 64.657% of the variance for the entire set of

variables. The KMO of 0.561 and a significant Chi-square provided evidence for the suitability of factor analysis.

Factor 1 had an Eigen value of 2.845 explaining a total variance of 18.96%. The variable was labeled 'Consumer knowledge' with three (3) items loading on it. However, two (2) of its items CK1 and CK5 did not load, hence were removed from the study. Component two (2) had three items measuring Urgency to replace loading on it. One (1) of its items UTR2 was excluded as it failed to load. This factor had an Eigen value of 2.399 which explained 15.99% of the variance. 'Perceived Product quality' with three out of the five items loaded on it. Results shows that items, PPQ1 and PPQ2 did not load, hence excluded from the study. This factor had an Eigen value of 1.861 and findings show that it explained 12.40% of the variance. The fourth factor derived from the analysis was 'Intentions to Leapfrog' with only two (2) items loading as one (1). Item 'ITL3' was excluded from the study as it loaded on component one (1). This factor had an Eigen value of 1.395 which explained 9.298% of the total variance. Finally, 'Perceived Switching Cost' loaded as the fifth factor with only three items loading. Two items (PSC1, and PSC2) were removed because they did not meet the criteria, thus removed. This factor had an Eigen value of 1.199 with the factor explaining 7.99% of the total variance.

Table 4.22: Factor analysis for the study variables

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.561	
Bartlett's Test of Sphericity Chi-Square		1570.914	
df		105	
Significance		.000	
Items of study variables	Eigen Values	% Variance	Total %
1. Consumer Knowledge	2.845	18.965	18.965
2. Urgency to Replace	2.399	15.994	34.959
3. Perceived Product Quality	1.861	12.403	47.363
4. Intention to Leapfrog	1.395	9.298	56.661
5. Perceived Switching Cost	1.199	7.997	64.657
Items and their Factor Loadings	1	2	3
PPQOC3			.616
PPQOC4			.888
PPQOC5			.808
PSCOC3			
PSCOC4			.625
PSCOC5			.709
UTR1		.623	
UTR3		.679	
UTR4		.815	
ITL1			.796
ITL2			.800
ITL3	.514		
CK2	.547		
CK3	.735		
CK 4	.799		

Source: Research Data (2020)

4.8 Data Transformation

Data transformation is moving away from the several questions to form one variable that measures the said construct. After factor analysis was done to identify the number of items that measured each variable, all the items that loaded below 0.50 were deleted and those that were above .50 were used to transform data. To get the construct intention to leapfrog, all the three items were used and divided by 3. For Perceived product quality, the items that loaded were 3 (PPQ3, PPQ4, PPQ5) and this was divided by 3. Perceived Switching cost had 5 items but only 3 items (PSC3, PSC4, SC5) loaded and this was divided by three to form the construct switching cost. For Urgency to replace, three out of four items loaded (UTR1, UTR3, UTR4) and this

was divided by 3 to form the construct “urgency to replace”. Finally, for “consumer knowledge”, (CK2, CK3, CK4) loaded and was divided by 3 to form the construct “consumer knowledge”.

4.9 Assumptions of Regression Model

4.9.1 Normality

Most analysis assumes that the data is normally distributed. According to (Tabachnick & Fidell, 2007) data is normal if the data distribution in each item and in all linear combination of items are normally distributed. Normal distribution assumes the symmetrical bell-shaped curve which is defined by mean $\mu = 0$ and variance $\sigma = 1$. Graphically, a histogram is used to show the normal distribution of a variable as shown in Figure 4.1 This indicates that the perceived ease of use if assuming a normal distribution as shown by the bell-shaped curve.

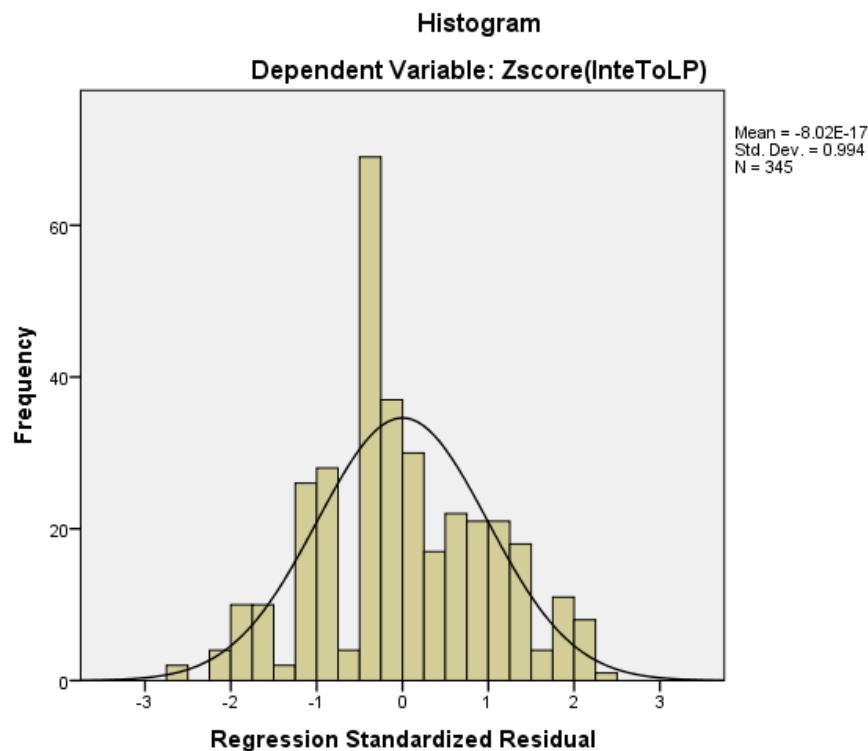


Figure 4. 1: Normal Distribution Curve

Source: Research Data, (2020).

From the histogram as shown in Figure 4.1 above, the symmetry of the distribution is known as the Skewness. A positively skewed distribution will depict scores that are clustered to the left, with the tail extending to the right while a negatively skewed distribution will have scores clustered to the right and the tail extending to the left. In this study, all the variables were within the normal range of skewness of $+3$ or -3 standard in table 4.23 (Hair, *et al.*, 2006). The rule of the thumb is that any skewness statistics that is outside this range should be examined. From the data, the values ranged from $-1.16 < X < 0.79$ and according to Pallant (2007) negative or positive skewness does not represent any problem unless they are outside the normal range.

The “peakedness” of the distribution is known as the Kurtosis. Positive kurtosis values indicate a peak distribution while negative kurtosis values indicate a flat distribution with ranges from $-1.206 < X < 0.973$. Based on our data, the kurtosis ranges were $-0.183 < X < 0.970$ implying that the variables were within the range as shown in table 4.23 and according to Pallant (2007) negative or positive skewness does not represent any problem until and unless they are within normal range.

Table 4.23: Descriptive Statistics

	N	Mean	Std Deviation	Skewness	Kurtosis
InteToLP	349	4.5217	1.23142	-.496	-.325
ProdQuality	349	5.3649	1.18845	-.657	-.490
SwitCost	349	3.9541	1.32924	-.124	-.854
UrgentRepl	349	5.3824	1.23925	-1.001	.303
ConsuKnowledg	349	4.9822	1.14989	-.456	-.136
Valid N (listwise)	349	4.5217	1.23142	-.496	-.325

Source: Research Data (2020)

4.9.2 Linearity

A relationship between independent and dependent variable is said to be linear if there is a consistent change in the slope (gradient). In most cases, this relationship can be visualized using a scatter plot of residues between the two variables. This can also be checked using the correlation coefficient value in the table 4.26.

4.9.3 Multicollinearity

It is expected that two independent variables should show correlations, but, when correlations are high ($r > \pm.90$), the problem is referred to as multicollinearity (Hair *et al.*, 2006; Tabachnick & Fidell, 2007). Multicollinearity poses a real problem for the researchers because it severely limits the size of proportion of variance which can be accounted for by the regression or extraction (R^2). This is because the predictors are going after much of the same variance on dependent variable (Field, 2005). Secondly, it makes determination of the importance of a given predictor difficult because the effects of the predictors are confounded due to the correlation among them. Thirdly, it increases the variances of the regression coefficients - the greater the variances, the more unstable the prediction equation will be. To check for multicollinearity, the variance inflation factors (VIF) was checked. The VIF of a predictor should indicate whether there is a strong linear association between it and all the remaining predictors. The second thing to check was the tolerance values, this refers to the degree to which one predictor can by itself be predicted by the other predictors in the model (Pallant, 2007). Using the rule of the thumb, VIF < 4 indicates no problem, VIF > 5 indicates a likely problem while VIF > 10 indicates a significant problem (Pallant, 2007; Tabachnick & Fidell, 2007). In this study, the VIF ranged from $1.063 < X < 1.321$ as shown in Table. **4.24** Also on the same note, if the tolerance values tend to 1, there is a chance of multicollinearity. In our study the

tolerance values were $0.757 < X < 0.941$ as shown in Table 4.24 indicating that the data did not exhibit multicollinearity

Table 4.24: Checking for Multicollinearity

	Coefficients			Collinearity statistics			
	Ustd B	Std Error	Std t	Beta	sig	Tolerance	VIF
Zscore(P.ProdQuality)	.363	.046	.363	7.843	.000	.757	1.321
Zscore(P.SwitCost)	.107	.042	.107	2.554	.011	.916	1.092
Zscore(UrgentRepl)	.026	.041	.026	.633	.527	.941	1.063
Zscore(ConsuKnowledg)	.374	.046	.374	8.201	.000	.779	1.284

a. Dependent Variable: Zscore(InteToLP)

Source: Research Data (2020).

In order to test for multicollinearity among the predictor variables, variance inflation factor (VIF) and tolerance were applied. The multicollinearity statistics showed that the tolerance indicator for all the variables is all greater than 0.1 and their VIF values are less than 10. The results indicate that no multicollinearity problem occurred (Ott and Longnecker 2001)

4.9.4 Test for autocorrelation

Linear regression analysis requires that there is little or no autocorrelation in the data. Autocorrelation occurs when the residuals are not independent from each other. This study used Durbin-Watson test to check for autocorrelation. Results from table 4.25 shows Durbin-Watson of 1.575 which is within the acceptable range of 1.5 – 2.5.

Table 4.25: Model Summary autocorrelation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.666	.444	.437	.75021068	1.575

a. Predictors: (Constant), Zscore(ConsuKnowledg), Zscore(P.SwitCost), Zscore(P.ProdQuality), Zscore(UrgentRepl)

b. Dependent Variable: Zscore (InteToLP)

Source: Research Data, (2020).

4.9.5 Homoscedasticity

This refers to the assumption that dependent variable exhibits similar amounts of variance across the range of values for independent variable around the regression line, meaning they have equal spread.

As evidence from residual scatter plot there is no clear relationship between the residuals and the predicted value of the dependent variable, indicating that linearity between them. Furthermore, the variance of residuals is considered to be equal or same for all predicted value of dependent variable which provided support of homoscedasticity. Therefore, the assumptions of linearity and homoscedasticity in the multivariate analyses have been fulfilled.

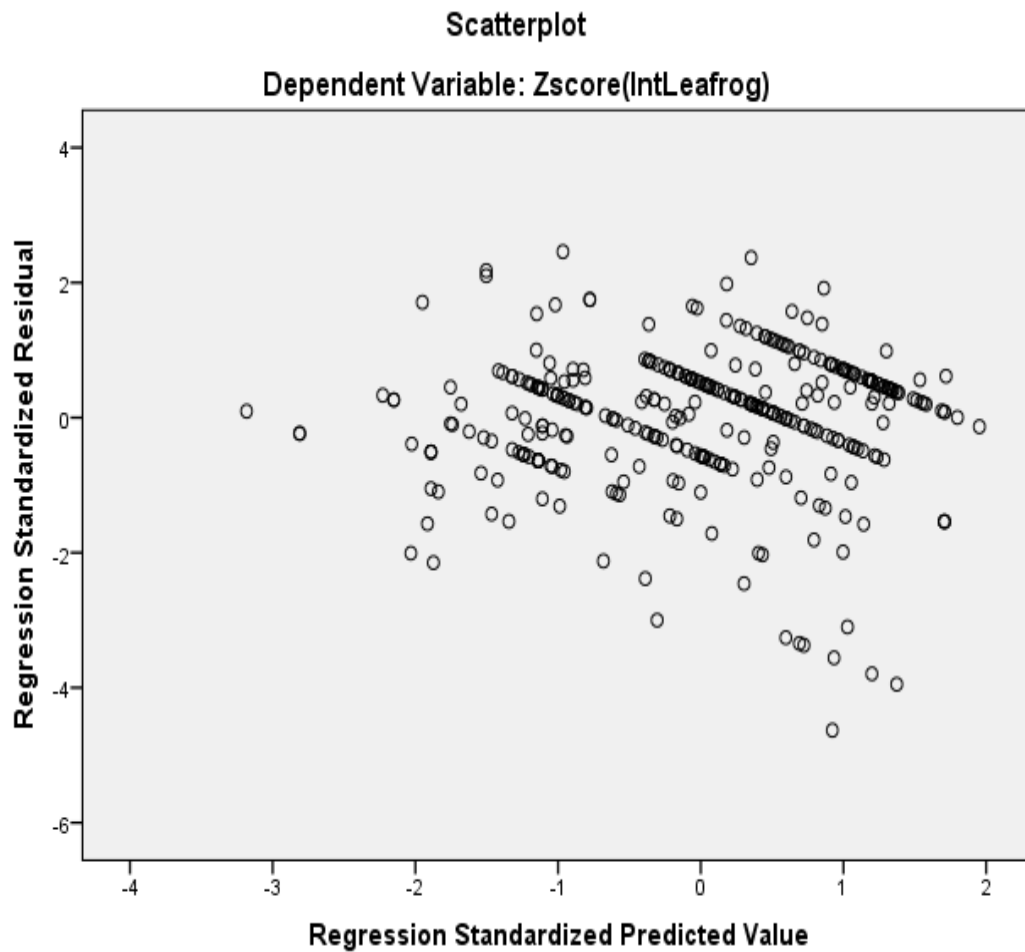


Figure 4. 2: Scatter Plot

Source: Research Data (2020).

4.10 Correlation Statistics

Since one construct in the questionnaire was measured by multiple items the average score of items for a construct was computed and used in further analysis such as correlation analysis and multiple regressions. (Wang and Benbasat 2007). Pearson correlation analysis was conducted to examine the relationship between variables (Wong and Heiw 2005). As cited in Wong Heiw (2005) the correlation coefficient value (r) ranging from 0.10 to 0.20 is considered weak, from 0.30 to 0.49 is considered medium and from 0.50 to 1 is considered strong. However, according to

Field (2005) correlation coefficient should not go beyond 0.8 to avoid multicollinearity.

Having described the study variables using descriptive statistics the study sought to establish the moderating effect of consumer knowledge on the relationship between determinants of leapfrogging and the intention to leapfrog in the mobile phone industry in selected counties Kenya. The study sought to establish the effect of perceived product quality, perceived switching cost, urgency to replace and consumer knowledge. To evaluate the strength of the relationship, a bivariate correlation analysis was used.

The Pearson correlation was performed to determine variables relationship and the intention to leapfrog as shown in table 4.26 All the variables were found to be positively correlated with intention to leapfrog at 1% level of significance and 2 tailed. From the results we can deduce that all the factors affect the intention to leapfrog.

The correlation coefficient between perceived product quality and intention to leapfrog was 0.563. This positive sign of correlation indicated that the two variables tend to move together in the same direction that is they tend to increase or decrease together.

The correlation coefficient between perceived switching cost and intention to leapfrog was 0.246. This positive sign of correlation indicated that the two variables tend to move together in the same direction that is they tend to increase or decrease together.

The correlation coefficient between urgency to replace and intention to leapfrog was 0.152. This positive sign of correlation indicated that the two variables tend to move together in the same direction that is they tend to increase or decrease together.

The correlation coefficient between intention to leapfrog and the moderator consumer knowledge was 0.560. This positive sign of correlation indicated that the two variables tend to move together in the same direction that is they tend to increase or decrease together.

Perceived product quality had the highest level of relationship with the dependent variable with a correlation coefficient value of 0.563 followed by consumer knowledge which was 0.560 then perceived switching cost which was 0.246 and Urgency to replace the lowest was which was 0.152.

The hypothesized relationships developed (perceived product quality $r = 0.563$, consumer knowledge $r = 0.560$, perceived switching cost $r = 0.246$ and Urgency to replace $r = 0.152$.) were found to be statistically significant and positively correlated to intention to leapfrog.

Table 4.26: Correlation Statistics

Variable	1	2	3	4	5
1. IT L	1				
2.P. PQ	.563**	1			
3.P. S C	.246**	.228**	1		
4. U T R	.152**	.133*	.207**	1	
5. C K	.560**	.462**	.134*	.147**	1

Source: Research Data, (2020). Dependent variable: Intentions to Leapfrog:

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

Footnote

P.PQ- Perceived Product quality

P.SC- Perceived Switching Cost

UTR -Urgency to Replace,

CK- Consumer Knowledge

Before running the regression analysis, the researcher ran the correlation matrix in order to check whether there was a relationship between variables. Pearson product-moment correlation coefficient (r) was used to aid in establishing a correlation between the study variables of interest. The correlation coefficient shows the magnitude and direction of the relationship between the study variables.

4.11 Hypotheses testing

This study formulated and tested seven (7) hypotheses using Hierarchical regression model which provides an addition value to the model by every additional variable. The study has four (4) direct effects and three (3) moderating effect hypotheses.

4.11.1 Effect of control variables on the dependent variable

Results from Table 4.27, Model 1 show the effect of the control variable on the Dependent variable (Intentions to Leapfrog). Findings indicate that Age ($\beta = -0.385$, $p = 0.000$) and income ($\beta = 0.144$, $p = 0.028$) were both found to have a significant effect on intentions to Leapfrog. However, individual's gender and education were insignificant. This model explains 7.5% of the total variance in intentions to Leapfrog as shown by $R^2 0.075$ which has a significant $F = 6.923$, $p = .000$.

4.11.2 Effect of Perceived Product Quality, Perceived Switching Cost and Urgency to Replace on Intentions to Leapfrog

Table 4.27 Model 2 reveals the results of hypotheses H_{01} , H_{02} , and H_{03} while holding constant for gender, age, income and education. Results indicate that age ($\beta = -0.214$, $p < .05$) was found to be significant as gender, income and education remain insignificant in this model. H_{01} stated that Perceived Product quality has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya. The findings indicated a value of Perceived product quality ($\beta = 0.511$, $p = 0.000$), which

was positive and significant and thus the null hypothesis was rejected. In conclusion product quality has a significant effect on intention to leapfrog. The second hypothesis **H₀₂** was that Perceived switching cost has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya. The findings indicated a value of Perceived switching cost ($\beta = 0.099$, $p = 0.030$) which was significant and thus the null hypothesis was rejected. In conclusion Perceived switching cost has a significant effect on intention to leapfrog. The third hypothesis **H₀₃** states that urgency to replace has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya. The findings indicated Urgency to replace ($\beta = 0.073$, $p = 0.109$) has no significant effect on Intentions to Leapfrog. In conclusion Urgency to replace has an insignificant effect on intention to leapfrog and hence the null hypothesis was not rejected.

This model explains 36.1% variance in intentions to Leapfrog (R^2 0.361), with $F=51.038$, $p = .000$ and a change in R^2 of $^{0.287}$ implying that holding the control variables constant, the independent variables (Perceived product quality, Perceived switching cost and urgency to replace) explains 28.7% of the total variance in Intentions to Leapfrog.

4.11.3 Effect of Consumers Knowledge on Intentions to Leapfrog (H₀₄)

Model 3 of the same Table 4.27 indicates the inclusion of the moderator in the model. Findings show that age ($\beta = -0.119$, $p = 0.000$) significantly affects intentions to leapfrog as education, gender and income were insignificant. Furthermore, the study reveals that Perceived product quality ($\beta = 0.363$, $p = 0.000$), Perceived switching cost ($\beta = 0.099$, $p = 0.018$), have a significant effect on intentions to leapfrog in this model

but urgency to replace ($\beta = 0.045$, $p = 0.281$) has no significant effect on intentions to leapfrog in this model.

Additionally, results indicate that the moderator (consumer knowledge) as a variable has a positive and significant effect on intentions to leapfrog as indicated by $\beta = 0.378$, $p = 0.000$. Thus, H_{04} is also rejected. The results indicate R^2 of 0.465 with change in $R^2 = 0.104$ and a significant $F = 65.904$ $p = 0.000$. This implies that consumer' knowledge accounts for 10.4% of the total variance in intentions to leapfrog.

In conclusion by incorporating consumer knowledge, this study has proposed and empirically tested and extended the model of leapfrogging to understand consumer behavioral intention buy and use mobile phones. Consumer knowledge which has a positive and significant beta coefficient in relation to intention to leapfrog, provides another more potential important way to explain other factors that influence consumers' adoption and use with technologies with uncertainty.

4.11.4 The moderating effect of Consumers Knowledge on the Relationship Between Perceived Product Quality and Intentions to Leapfrog (H_{05a})

Model 4 of Table 4.27 shows the results of the first interactions of Consumer knowledge on the relationship between Perceived product quality and intentions to leapfrog. This Model indicates an improved R^2 of 0.477 and change in R^2 of 0.012, with $F = 8.052$, $p = 0.005$ which implies that the first interaction explains 1.2% of the variance in intentions to leapfrog.

The findings regarding the controls in this model indicate that age ($\beta = -.133$, $p = 0.026$) was found to be significant but gender ($\beta = 0.139$ $p = 0.102$) income ($\beta = 0.074$,

$p = 0.141$) and education ($\beta = 0.078$, $p = 0.242$) were insignificant. Additionally, the study results show that Perceived product quality ($\beta = 0.601$, $p = 0.000$), Perceived switching cost ($\beta = 0.108$, $p = 0.009$), and consumer knowledge ($\beta = 0.653$, $p = 0.000$) were all found to be significant in the model. Urgency to replace ($\beta = 0.051$, $p = 0.213$) is not significant. Finally, the interaction results indicate a $\beta = -0.047$, $p = 0.005$. Since the p-value of the moderation is less than 0.05, hypothesis H_{05a} is also rejected by the study and conclusion made that consumer's knowledge moderates the relationship between Perceived product quality and intentions to leapfrog.

These results are further illustrated by Figure 4.3 which reveals that at low levels of perceived product quality, intentions to leapfrog is high with customers who have high consumer knowledge compared to those with low levels of consumer knowledge. However, as Perceived product quality increases, intentions to leapfrog increases with both groups of consumers, but the increases is high with those who have low levels of consumer knowledge.

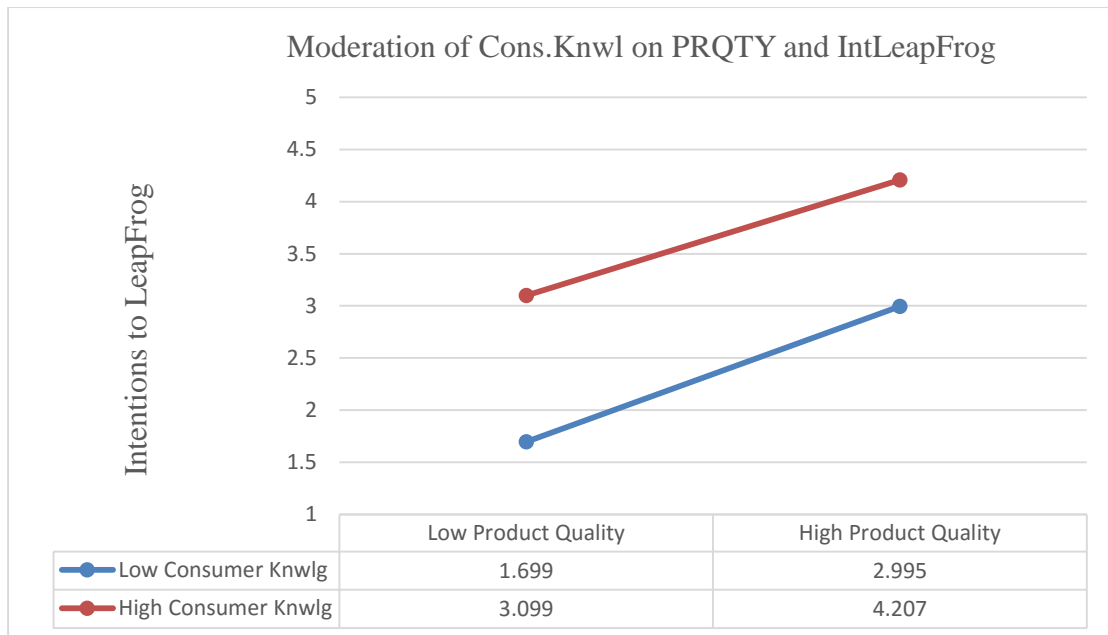


Figure 4. 3: Moderating effect of Consumer knowledge on Perceived Product Quality and Intention to Leapfrog

Source: Research Data (2020)

The above relationship indicates an enhanced moderation since the results from model 2 which shows the direct effect of the independent variables, product quality on the dependent variable, intention to leapfrog have increased in model 4 when the moderator is introduced. The enhanced moderation is from $\beta = 0.201$, $p = 0.000$ in model 2 to $\beta = 0.741$, $p = 0.002$ in model 4 which are both significant.

4.11.5 The moderating effect of Consumers Knowledge on Perceived Switching cost and Intentions to Leapfrog (H_{05b})

Model 5 of Table 4.27 shows the results of H_{05b}. Results of this model shows that age $\beta = -0.141$, $p = 0.017$ was found to be significant while gender income and education were insignificant in this model. Results further shows that Perceived product quality $\beta = 0.638$, $p = 0.000$, and consumer knowledge, $\beta = 0.535$, $p = 0.000$ were all found to be significant while switching cost, $\beta = -0.129$, $p = 0.210$, and urgency to replace, $\beta = 0.049$, $p = 0.233$ were found to be insignificant in this model. Additionally, the results

reveal that this model indicated an improved R^2 of 0.484 and ΔR^2 0.010 with a significant F- statistics of 6.361, $p = 0.012$. The ΔR^2 0.010 implies that this model accounts for 1% of the total variance in intentions to leapfrog. Finally, the findings of the interaction show a $\beta = 0.039$, $p = 0.012$ which gives evidence that consumer knowledge moderates the relationship between Perceived switching cost and intentions to leapfrog; hence H_{05b} is rejected by the study.

This finding is further explained by Figure 4.4 which shows that at low levels of switching cost, intentions to leapfrog is high with those consumers with high levels of the product knowledge than with those having low levels. However, as Perceived switching cost increases, intentions to leapfrog reduces with both groups' customers, but the decrease is more with customers having low levels of consumer knowledge about the product.

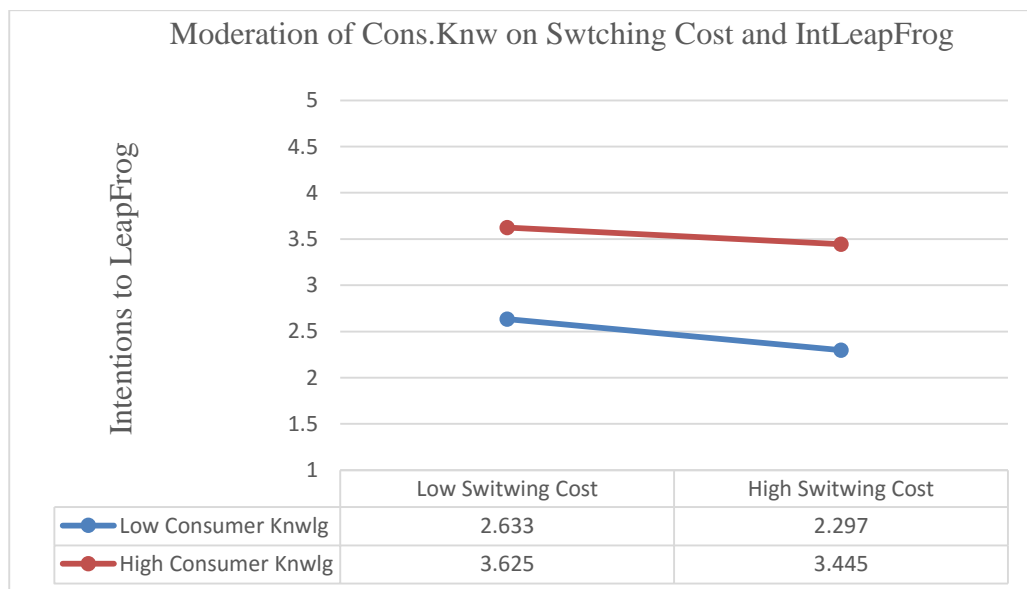


Figure 4. 4: Moderating effect of Consumer knowledge on Perceived Switching cost and intentions to leapfrog

Source: Research Data (2020)

The above relationship also indicates an antagonistic moderation where increasing the moderator would reverse the effect of the predictor on the outcome. Results from model 2 which shows the direct effect of the independent variables, perceived switching cost on the dependent variable, intention to leapfrog have decreased in model 5 when the moderator is introduced. The reverse moderation is from $\beta = 0.099$, $p = 0.000$ in model 2 to $\beta = -.129$, $p = 0.210$ in model 4 which is insignificant.

4.11.6 The moderating effect of Consumers Knowledge on Urgency to Replace and Intentions to Leapfrog (H_{05c})

Finally, H_{05c} was tested in Model 6 of Table 4.27. The findings indicate that age $\beta = -0.143$, $p = 0.016$, was found to be significant but gender, education and income remained insignificant. Additionally, results of product quality $\beta = 0.632$, $p = 0.000$, and consumer knowledge $\beta = 0.583$, $p = 0.000$ were all found to be significant but switching cost $\beta = -0.130$, $p = 0.204$, urgency to replace $\beta = 0.105$, $p = 0.338$ were found to be insignificant in this model. The results further reveal that this model has an improved R^2 0.488 and ΔR^2 .000 with an insignificant $F = 0.305$, $p = 0.581$. The ΔR^2 .000 means that this model explains 0 % of the total variance in intentions to leapfrog. Lastly, the study results indicate that the interaction of consumer knowledge on the relationship between urgency to replace and intentions to leapfrog was insignificant with $\beta = 0.010$, $p = 0.581$. Based on these findings we fail to reject H_{05c} .

These results are further illustrated by Figure 4.5 which indicates two parallel lines with same or minimal change in the slope of the gradients.

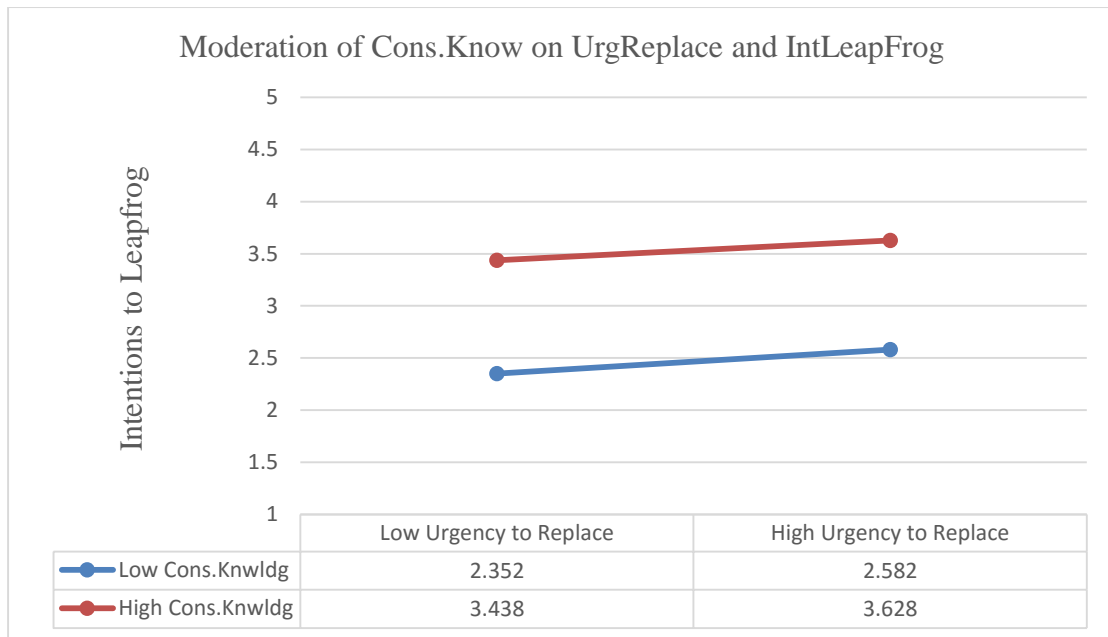


Figure 4. 5: Moderating effect of Consumer knowledge on Urgency to replace and intentions to leapfrog.

Source: Research Data (2020)

Table 4.27: Summary of Hierarchical regression analysis results

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Gender	-.060	.054	.121	.139	.156	.154
Age	-	-.214**	-.119*	-.133*	-.141*	-.143*
	.385***					
Income	.144*	.086	.075	.074	.059	.060
Education	-.131	.022	.078	.082	.087	.085
Perceived Prod Qlty		.511***	.363***	.601***	.638***	.632***
Perceived Swit Cost		.099*	.099*	.108**	-.129	-.130
Urgency to Replace		.073	.045	.051	.049	.105
Consumer Knowledge			.378***	.653***	.535***	.583***
PQT × ConsKnw				-.047**	-.054**	-.053**
PSwitCost×ConsKnw					.039*	.039*
UrgRep × ConsKnw						-.010
R ²	.075	.361	.465	.477	.487	.488
ΔR ²	.075	.287	.104	.012	.010	.000
F	6.923***	51.038***	65.904***	8.052**	6.361*	.305

Source: Research Data, (2020). Dependent variable: Intentions to Leapfrog:

Note: * $p < .05$; ** $p < .01$; *** $p < .001$.

Footnotes

PQT- Perceived Product quality

PSwitCost- Perceived Switching Cost

UrgRepl -Urgency to Replace,

ConsKnw- Consumer Knowledge

PQT × ConsKnw -1st interaction,

PSwitCost × ConsKnw -2nd interaction,

UrgRep × ConsKnw- 3th interactio

4.12 Summary of Hypothesis testing

	Hypotheses	Results	Decision
H ₀₁	Perceived Product quality has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.	$\beta = 511$ $p = 0.000$	Rejected
H ₀₂	Perceived Switching cost has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.	$\beta = 0.099$ $p = 0.030$	Rejected
H ₀₃	Urgency to replace has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.	$\beta = 0.073$ $p = 0.109$	Fail to Reject.
H ₀₄	Consumer knowledge has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya.	$\beta = 0.378$ $p = 0.000$	Rejected
H _{05a}	Consumer knowledge has no significant moderating effect on the relationship between Perceived product quality and intention to leapfrog in the mobile phone industry in Kenya.	$\beta = -0.047$ $p = 0.005$ $\Delta R^2 0.012$	Rejected
H _{05b}	Consumer knowledge has no significant moderating effect on the relationship between Perceived switching cost and intention to leapfrog in the mobile phone industry in Kenya.	$\beta = 0.039$ $p = 0.012$ $\Delta R^2 0.010$	Rejected
H _{05c}	Consumer knowledge has no significant moderating effect on the relationship between Urgency to replace and intention to leapfrog in the mobile phone industry in Kenya.	$\beta = -0.010$ $p = 0.581$ $\Delta R^2 0.000$	Fail to Reject

Source: Research Data, (2020).

4.13 Discussion of the Research Findings

4.13.1 Effect of Perceived Product Quality on Intentions to Leapfrog

The first objective of the study was to establish the effect of perceived product quality on the intention to leapfrog in the mobile phone industry in Kenya. This was achieved by asking the respondent to indicate the extent of their level of agreement on several statements describing product quality. The findings showed that all the statements representing Perceived product quality had a mean score of above 5.30, indicating that the respondents highly rated the variable since they enjoyed using their phones because they liked the features of their phones indicating that consumers were keen on the quality of their phones. The scores for Perceived product quality and intention to leapfrog were subjected to a correlation test and the results yielded a positive and moderate relationship between Perceived product quality and intention to leapfrog and that was statistically significant. The hypothesis that stated that Perceived Product quality has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya was therefore rejected. These results are in line with existing literature which links Perceived Product quality and intention to leapfrog.

4.13.2 Effect of Perceived Switching Cost on Intentions to Leapfrog

The second objective was to determine the effect of perceived switching cost on the intention to leapfrog in the mobile phone industry in Kenya. This was achieved by testing the hypothesis using regression analysis. The results showed a value of Perceived switching cost ($\beta = 0.099$, $p = 0.030$) which was significant and thus the null hypothesis was rejected. In conclusion Perceived switching cost has a significant effect on intention to leapfrog.

These findings seemed to agree with existing theoretical and empirical literature. Consumers will consider more than just the price of the newer product when making the product adoption decision. Given that many consumer goods markets are saturated, the decision to adopt a new product frequently involves a replacement, rather than a first-time purchase (Chanda & Bardhan, 2008), thus consumers must also consider costs associated with switching product generations. Since the old product has often not reached the end of its life cycle at the time of replacement, the consumer assumes the role of buyer of the newer product (either P1 or P2), as well as the seller of the older product (P0). Thus, costs involved in purchasing one of the newer products can be offset from proceeds of selling the older product (depending upon the residual value of the old product; Cripps & Meyer, 1994)

4.13.3 Effect of Urgency to Replace on Intentions to Leapfrog

The third objective of the study was to examine the effect of urgency to replace on the intention to leapfrog in the mobile phone industry in Kenya. On the basis of this objective, the study hypothesized that urgency to replace has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya. On the assessment of urgency to replace, respondents were provided with a set of statements on urgency to replace their mobile phones. Overall, there was agreement on urgency to replace decisions with a grand mean of 4.65 and the indication was that respondents in the counties were keen on their decisions on the urgency it would take to replace their mobile phones. The findings indicated Urgency to replace ($\beta = 0.073$, $p = 0.109$) has no significant effect on Intentions to Leapfrog. In conclusion Urgency to replace has an insignificant effect on intention to leapfrog and hence the null hypothesis was not rejected.

It is expected that consumers' who own a product will vary in the perceived urgency to replace the existing item and that this urgency will be driven by a variety of factors. The quality of the old product is an obviously important consideration when deciding to forego the new product (P1) and instead wait for the future one (P2). Indeed, the urgency to purchase the new product is ultimately determined by the consumer who is impacted by the functionality of the existing item (Rogers, 1995; Weiss & John, 1989).

As time progresses, the functionality of any item is adversely affected by wear and tear and with increasing age, one can expect increased breakdowns of most products. In support of this view, Bayus and Gupta (1992) demonstrate that the perceived condition of the currently owned item impacts intentions to replace the item (Labay & Kinnear, 1981).

4.13.4 Effect of Consumers Knowledge on Intentions to Leapfrog

The fourth objective of the study was to examine the effect of consumer knowledge on the intention to leapfrog in the mobile phone industry in Kenya. On the basis of this objective, the study hypothesized that consumer knowledge has no significant effect on the intention to leapfrog in the mobile phone industry in Kenya. On the assessment statements used to explain consumer knowledge had a mean score above 3.76 indicating that respondents agreed on Consumer Knowledge measures. This shows that the majority of the respondents agreed with the statements that were used to measure Consumer Knowledge. Additionally, results indicate that the moderator (consumer knowledge) as a variable has a positive and significant effect on intentions to leapfrog and thus, H₀₄ was rejected. The results indicate R² of 0.465 with change in

$R^2 = 0.104$ and a significant $F = 65.904$ $p = 0.000$. This implies that consumer knowledge accounts for 10.4% of the total variance in intentions to leapfrog.

In conclusion by incorporating consumer knowledge, this study has proposed and empirically tested and extended the model of leapfrogging to understand consumer behavioral intention to buy and use mobile phones. Consumer knowledge which has a positive and significant beta coefficient in relation to intention to leapfrog, provides an additional potential and important way to explain other factors that influence consumers' adoption and use with technologies with uncertainty.

4.13.5 The moderating effect of Consumers Knowledge on the Relationship Between Perceived Product Quality and Intentions to Leapfrog

The fifth objective sought to establish the moderating effect of consumer knowledge on the relationship between perceived product quality and intention to leapfrog in the mobile phone industry in Kenya. The results yielded a significant interaction between perceived product quality, consumer knowledge and intention to leapfrog. The hypothesis that Consumer knowledge has no significant moderating effect on the relationship between perceived product quality and intention to leapfrog in the mobile phone industry in Kenya was rejected by the study and conclusion made that consumer's knowledge moderates the relationship between Perceived product quality and intentions to leapfrog.

These results further reveal that at low levels of perceived product quality, intentions to leapfrog is high with customers having high consumer knowledge compared to those with low levels of consumer knowledge. However, as Perceived product quality increases, intentions to leapfrog increases with both groups of consumers, but the increase is high with those having low levels of consumer knowledge.

4.13.6 The moderating effect of Consumers Knowledge on Perceived Switching cost and Intentions to Leapfrog

The other objective of the study was to explore the moderating effect of consumer knowledge on the relationship between perceived switching cost and intention to leapfrog in the mobile phone industry in Kenya. The findings of the interaction shows a $\beta = 0.039$, $p = 0.012$ which gives evidence that consumer knowledge moderates the relationship between switching cost and intentions to leapfrog, hence H_{05b} is rejected by the study. This finding further show that at low levels of switching cost, intentions to leapfrog are high for consumers with high levels of the product knowledge than with those having low levels. However, as perceived switching cost increases, intentions to leapfrog reduces with both groups' customers, but the decrease is more with customers having low levels of consumer knowledge about the product.

4.13.7 The moderating effect of Consumers Knowledge on Urgency to Replace and Intentions to Leapfrog

The last objective of the study was to determine the moderating effect of consumer knowledge on the relationship between urgency to replace and intention to leapfrog in the mobile phone industry in Kenya. The results yielded an insignificant interaction between urgency to replace and intentions to leapfrog and consumer knowledge.

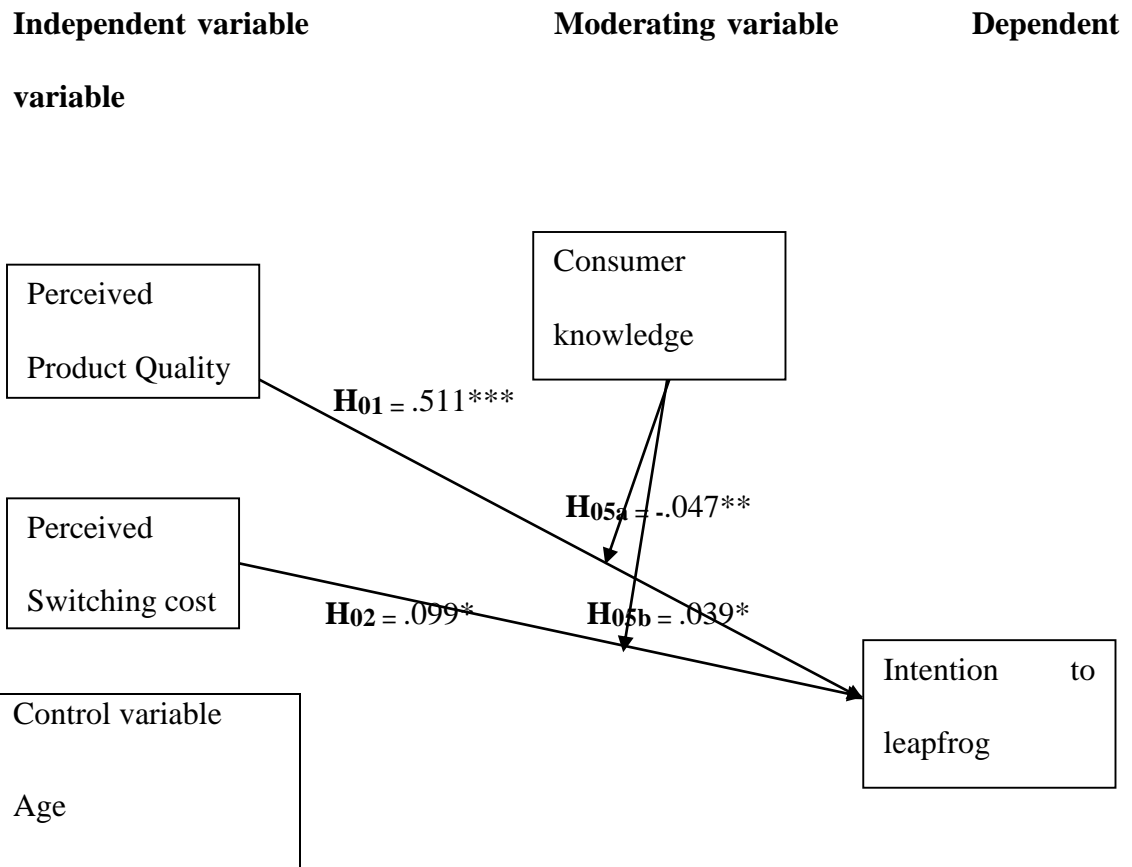


Figure 4.6: Conceptual Framework relationship

Source: Research Data, (2020).

The above conceptual framework is a model of presentation where the researcher conceptualized the relationship between independent and dependent variables in a study and showed the relationship diagrammatically. The purpose of the conceptual framework is to help the reader to quickly see the proposed relationships. Figure 4.6 above shows the moderating effect of consumer knowledge on the relationship between determinants of leapfrogging and the intention to leapfrog. It is evident that consumer knowledge moderates the relationship between perceived product quality and perceived switching cost and intention to leapfrog.

CHAPTER FIVE

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

This chapter presents a summary of the study findings, as guided by the specific objectives, and the conclusion of the study. Recommendations as well as direction for future research as per the findings are also presented.

5.1 Summary of Findings

The demographic response showed β for Age was -0.385 with $p = 0.000$, while β for Income = 0.144 with $p = 0.028$. Both were found to have a significant effect on intentions to Leapfrog. However, individual's gender and education were insignificant. On the determinants of leapfrogging, the findings showed that Perceived product quality ($\beta = 0.511$, $p = 0.000$), Perceived Switching cost ($\beta = 0.099$, $p = 0.030$), and consumer knowledge ($\beta = 0.378$, $p = 0.000$) positively and significantly affect the intention to leapfrog.

Further, Consumers Knowledge moderates the relationship between Perceived product quality, Perceived switching cost and Intentions to Leapfrog in the mobile industry in Kenya. This means that consumers are more likely to leapfrog if the future mobile phone is superior to the one currently available in the market. If a consumer perceives the costs of switching to be high, the predisposition to purchase what is in the market will be lower and thus intention to wait for the future phone will be high. Also, the findings show that it does not matter if there is an urgency to replace, the customer will not wait for the future product; and this makes sense, the urgency to replace should make the customer buy whatever is available in the market and have not to wait for the future phone.

5.1.1 Perceived Product quality and the intention to leapfrog in the mobile phone industry in Kenya.

The first hypothesis shows that Perceived product quality ($\beta = 0.511$, $p = 0.000$) positively and significantly affects the intention to leapfrog. This means that consumers are more likely to leapfrog if the future product is superior to the one currently existing in the market.

Product quality is a key factor in assessing purchase intention. In real sense, it is the endless process of improvement that leads to the continual changes that increase product performance and consequently the satisfaction of customers' needs. As it is often said, quality should be improved every moment (Tariq *et al.*, 2013). Moreover, Zeeshan (2013) indicated that quality is a crucial tool for creating competitive advantage.

Chi *et al.*, (2008) stated that buying intention of consumers depends on the merchandise quality which has a big impact thereon. Furthermore, Madahi and Sukati (2012) stated that acquisition intentions have become complicated and significant in recent era whereby quality of product plays significant role in considering purchase intention. Desai (2014) observed that consumers are more quality conscious when purchasing cosmetic products because they patiently await the brand during non-availability.

Alhedhaif (2016) also observed that if a product fulfills the customer's expectations, the customer will be pleased and believe that the merchandise is of acceptable or maybe top quality. If his or her expectations aren't fulfilled, then the customer will believe that the merchandise is of inferiority. This suggests that the standard of a product could also be defined as "its ability to satisfy the customer's

needs and expectations”. Accordingly, Russell and Taylor (2006) explained that product quality encompasses the features and characteristics of a product or service that bears on its ability to satisfy stated or implied needs.

Quality is split into two categories which are product quality and service quality. Product quality is defined as “fitness for use” or “conformance to requirement” (Khraim, 2011). Anute, Deshmukh and Khandagale (2015) used nine variables to review consumer purchasing behavior of cosmetic products. The variables include price, packaging, celebrity, fashion, availability, brand, quality, promotion, peer/family influence. The results showed that the majority of the people take product quality as the most important factor in purchasing a cosmetic product and packaging is the least important factor in purchasing a cosmetic product. Based on these studies the hypothesis on perceived quality in the current study has not been supported.

5.1.2 Perceived Switching cost and the intention to leapfrog in the mobile phone industry in Kenya.

Perceived Switching cost was found to positively and significantly affect the intention to leapfrog ($\beta = 0.099$, $p = 0.030$). This means that if consumers expect the cost of switching to the currently available mobile phone to be high, the predisposition to purchase what is currently available will be lower and the intention to wait for the future phone will be higher.

Switching costs represent an impediment to exploring new suppliers (Wathne *et al.*, 2001). To the extent that individuals perceive costs or barriers to exit, they will tend to maintain their supplier (Burnham *et al.*, 2003; Lee *et al.*, 2001). If switching costs are low, dissatisfaction with the service quality, price or firm will motivate the

intention to switch suppliers. In contrast, if they are high, many dissatisfied consumers are likely to manifest a “false loyalty”. Numerous studies have shown that switching costs act as a moderating variable that negatively affects the relation between satisfaction and intention to maintain the relationship (Burnham *et al.*, 2003; Jones *et al.*, 2000; Oliva *et al.*, 1992; Sharma and Patterson, 2000). As the costs rise, the influence of satisfaction on the intention to maintain the relationship declines, and vice versa.

Kim *et al.*, (2004) examined switching costs in the mobile phone service context, considering it as the combination of loss cost, adaptation cost and move-in cost. According to the authors, loss cost refers to the consumers’ perception of losing social status, relationship and performance when switching the existing service provider, whereas adaptation cost refers to the problems related to adopting a new service provider after switching the existing one (search cost and learning cost). Move-in cost indicates the “perception of economic cost involved in switching to a new carrier”, such as the purchase of a new device and subscriber fee. Due to the suitability and similarity of context, the current study considers Burnham *et al.*, (2003) and Kim *et al.*, (2004) conceptualization of switching costs and defined it in the mobile phone service usage context as the one-time costs that mobile phone service users are associated with in the process of switching from one provider to another, and which is the combination of loss cost, adaptation cost and move-in cost.

According to the cost models in consumer behaviour, before terminating any existing relationship, consumers consider the change in net utility (Lee, 2005). While switching to another service provider, if the switching costs are found to be larger than an increase in utility, consumers prefer not to switch. Past studies reveal that

switching costs significantly contribute to predicting customer retention and/or switching behaviour (Kim *et al.*, 2004).

As mentioned earlier, it incorporates all possible costs that a consumer bears as a penalty for showing disloyalty towards the current relationship by switching to a different service provider (Chen and Hitt, 2002). Therefore, switching costs create barriers to switch.

5.1.3 Urgency to replace and intention to leapfrog in the mobile phone industry in Kenya.

Urgency to replace ($\beta = 0.073$, $p = 0.109$) insignificantly affects the intention to leapfrog. This is in line with the fact that consumers would be inclined to buy the current mobile phone available in the market when there is an urgency to replace and thus the results show that consumers would not wait for the future phone to be made available when they have an urgency to replace their mobile phones.

This finding is in line with previous studies by Bayus and Gupta (1992), who state that as time progresses, the functionality of any item is adversely affected by wear and tear, and with increasing age, one can expect increased breakdowns of most products. Also, consumers' desire for variety and change also influences the urgency to replace the current product by the next generation product. Such stimulation of wants by a new product has proved a central determinant in buying behaviour (Wang *et al.*, 2008) and so the study fails to reject the hypothesis since it was not significant. Consumers don't wait when there is an urgency to replace.

5.1.4 Consumer knowledge and the intention to leapfrog in the mobile phone industry in Kenya.

The results on hypothesis number 4 (H4) shows that Consumer knowledge significantly affects the intention to leapfrog. This means that if a consumer has knowledge of a newer or future model of a phone, the consumer would rather wait for it and thus have an intension to leapfrog.

The level of a consumer's product knowledge may affect his/her information and decision-making behavior (Brucks, 1985; Park, Mothersbaugh, & Feick, 1994). Two knowledge constructs have been proposed (Brucks, 1985; Park et al., 1994). The primary construct is an objective knowledge: accurate information about the merchandise class stored within the future memory. The second construct is subjective knowledge: people's perceptions of what or how much they realize a product class

As discussed in the previous section, one component of perceived behavioral control within the theory of planned behavior reflects a person's self-confidence within the ability to conduct the behavior. If an individual has strong subjective product knowledge, s/he will have higher confidence within the ability to hold on a consumption behavior. His/her attitude toward the act already shows this confidence. The attitude toward the behavior can overshadow the effect of perceived behavioral control. Therefore, the effect of perceived behavioral control on behavioral intention is going to be weaker when consumers have high subjective product Knowledge.

5.1.5 Moderating effect of Consumer knowledge on the relationship between Perceived product quality and intention to leapfrog in the mobile phone industry in Kenya.

The results of the first interactions of Consumer knowledge on the relationship between Perceived product quality and intentions to leapfrog indicates an enhanced moderation from $\beta = 0.511$, $p = 0.000$ in model 2 to $\beta = 0.601$, $p = 0.000$ in model 4 and are both significant. The results further indicate an improved R^2 of 0.464 and change in R^2 of 0.012, with $F = 8.052$, $p = 0.005$, which implies that the first interaction explains 1.2% of the variance in intentions to leapfrog. The findings of the study show that consumer knowledge moderates the relationship between Perceived product quality and intention to leapfrog. These results show that when consumers perceive low levels of product quality, intentions to leapfrog is high with customers who have high consumer knowledge compared to those with low levels of consumer knowledge. However, as Perceived product quality increases, those having low levels of consumer knowledge, their intentions to leapfrog increases as compared with those with high levels of consumer knowledge. This could be explained in that a consumer who has knowledge on product quality of the future model of the mobile phone knows that it is a better alternative and are therefore inclined to leave what is in the market now because they perceived that its quality is unsatisfactory. Those with less knowledge are more inhibited to change and thus their intentions to leapfrog increases even if the product quality is good.

Furthermore, when the quality of the product a consumer has is good, then the consumer would want to retain it and thus not be in a hurry to buy a new product. Hence, there is minimal change in the intention to leapfrog with high levels of consumer knowledge and high level of product quality.

Advertisements play significant role in shaping the behavior of consumers. Advertisements are the source of information thus leading to consumer knowledge and building trust which forces them to buy a particular product (Bleier & Eisenbeiss, 2015; Islam, *et al.*, 2018). This implies that the consumer is induced if s/he is looking for the quality, if they have knowledge of advertise products.

5.1.6 Moderating effect of Consumer knowledge on the relationship between Perceived switching cost and intention to leapfrog in the mobile phone industry in Kenya.

The results of the second interactions of Consumer knowledge on the relationship between Perceived switching cost and intentions to leapfrog indicates an enhanced moderation from $\beta = 0.099$, $p = 0.030$ in model 2 to $\beta = 0.108$, $p = 0.009$ in model 4 which are both significant. The results for model 4 produced an improved R^2 of 0.487 and ΔR^2 0.010 with a significant F- statistics of 6.361, $p = 0.012$. The ΔR^2 0.010 implies that this model accounts for 1% of the total variance in intentions to leapfrog. The findings of the study show that consumer knowledge moderates the relationship between Perceived switching cost and intention to leapfrog.

The finding further shows that at low levels of Perceived switching cost, intention to leapfrog is high with those consumers with high levels of the product knowledge than with those having low levels. The results further show that as switching cost increases, intentions to leapfrog increases with both groups of consumers but the increase is high with those having low levels of product knowledge compared to those having high product knowledge.

If switching cost is low and one is aware of it, it means that one may not lose much if one waits for a better version of the model. But if the cost of switching is high and

one is not aware of it, or has little knowledge, then one's intention to leapfrog is high compared to those who are aware of the fact that the switching cost is high. They would rather retain what they have and therefore have no intention to leapfrog. In conclusion, the moderating role of consumer knowledge on the relationship between product quality and switching cost on the intention to leapfrog contributes to consumer behavior knowledge.

5.1.7 Moderating effect of Consumer knowledge on the relationship between urgency to replace and intention to leapfrog in the mobile phone industry in Kenya.

The results indicate that the interaction of consumer knowledge on the relationship between urgency to replace and intentions to leapfrog was insignificant with $\beta = -0.010$, $p = 0.581$. The results show that consumer knowledge does not moderate the relationship between urgency to replace and intention to leapfrog. Urgency to replace was not moderated by the consumer knowledge since urgency to replace measures consumers' limited freedom to delay buying decision. Also, when a customer has an urgency to replace, they will buy whatever is available to meet their needs regardless of whether they have knowledge of the product, brand or not because they have an urgent need to meet.

5.2 Conclusion

5.2.1 Perceived Product Quality

The customer's perception of general quality or superiority of product or service in light of expected goal in comparison to other alternatives is usually based on key dimensions that consist of product specification. It is a key factor in assessing intention to leapfrog. This is supported by the β value of 0.511 which shows a

significant and positive effect on the intention to leapfrog in the mobile industry in Kenya.

In Conclusion, the better the customer perceives the new product as a functional improvement over the older one, the need to have an intention to leapfrog. Manufacturers of Mobile Phones should produce phones that reflect the latest technology, and it should have better features that are better, quicker, simpler and enjoyable to use.

5.2.2 Perceived Switching cost

Whether a firm should encourage or prevent the intension to leapfrog among its customers not only depends on monetary investments but also on non-financial considerations. Switching cost plays a role in opting for a newer or better phone as indicated by a positive and significance β Value of 0.099.

In conclusion, the non-monetary investment such as time and effort spent to learn how the new mobile phone operates should be considered while creating awareness of the future phones. These could influence customers to have an intension to leapfrog.

5.2.3 Urgency to replace.

The study shows that intention to leapfrog is not influenced by the urgency to replace since it is insignificant. One would expect that the urgency to replace would have a negative effect on intention to leapfrog. As the results from the study show, consumers will not wait for the future phones despite there being an urgency to replace a phone.

In conclusion, Manufacturers should ensure that consumers are satisfied with their current or old phone so that they do not have the urgency to replace since whatever they have is of good value in which case they will have no intention to leapfrog.

5.2.4 Consumer Knowledge.

Since consumer knowledge moderates the relationship between the perceived product quality and switching cost with significant β values, manufacturers should always provide adequate information on expected product/ brand quality and on the switching, cost involved in purchasing or leapfrogging for the newer version of mobile phones.

Hence this provides empirical support that consumers' knowledge moderates the relationship between determinates of leapfrogging and intentions to leapfrog, more specifically, the relationship between product quality and intentions to leapfrog and the relationships between switching cost and intention to leapfrog.

5.2.5 Control Variables

Finally, since the study was dealing with consumers of mobile phones in Kenya, the study concludes that as manufacturers think of providing new models, they have to incorporate the likes (preferences) of the different ages and income levels, since they were significant in the study.

5.3 Theoretical implications

This study contributes conceptually to developing theoretical links and improving the theoretical rationale for the existing links. More specifically, the study contributes to knowledge with regard to the moderation of consumer knowledge on the relationships between the determinants of leapfrogging and intention to leapfrog. The results show

that consumer knowledge moderates the relationship. Thus, the current study is one of the pioneer studies that link consumer knowledge as a moderator between determinants of leapfrogging and intentions to leapfrog.

More specifically, the current study is one of the pioneer studies that examine the influence of consumer knowledge on the relationship between determinants of consumer leapfrogging and intentions to leapfrog. Consumer behaviour literature defines intention as a person's plan, commitment, or decision to carry out an action or achieve a certain goal (Harland, *et al.*, 1999; Eagly, A.H.; Chaiken, S 1993). It is the direct antecedent of one's behaviour (Harland, *et al.*, 1999; Fishbein, M.; Ajzen, 1980). A consumer's intention to perform a behaviour is regarded as the primary determinant of its future behaviours. Ajzen, in his TPB, clarified that, when behaviour is under one's control, intention can predict behavior with significant accuracy (Fishbein, M.; Ajzen, 1980). Thus, behaviour can be measured if the intention to perform is strong. If an individual is motivated by certain behaviours, then he/she can make a decision, and, ultimately, intention. Consumption intention is one's action toward a certain brand, which occurs due to the decision to act. In turn, this act reveals one's behaviour toward a certain product. This decision can be influenced by various factors, such as product feature, the perception of other consumers, and perception of the manufacturing country (Wang *et al.*, 2012), which frequently originates from quality concerns (Sharma, 2011).

The dependent variable in this study is intention to leapfrog, which can be defined as the willingness of the customer to wait for the next generation of mobile phone purchase (Ajzen, 1991.)

There is dearth of research on the effect of consumer knowledge on the relationship between determinants of consumer leapfrogging and intentions to leapfrog. Hence, this research attempted to fill the gap in existing literature. The output of this study has provided theoretical support for this relationship. It shows that consumer knowledge moderates the relationship between determinants of consumer leapfrogging (product quality and switching cost) and intentions.

The current study has considered the effect of consumer knowledge as a moderator and has given a more meaningful understanding of the role it plays in influencing the intention to leapfrog when switching. More particularly, considering consumer knowledge as having a moderating effect on product quality and switching cost

Finally, leapfrogging has also been used to describe a country's adoption of a novel technology while declining the adoption of an earlier technology in the same sector (Binz *et al.*, 2012; James, 2009). While this idea is distinct in that it focuses on a systemic perspective, the insights of the current study can inform this stream of research by providing a more nuanced perspective of individual actors' determinants of leapfrogging.

Even from a systemic perspective, still individual actors are involved in decisions concerning leapfrogging, which might be formed based on the factors revealed by the current research. It might be interesting to use a multilevel approach by integrating the current results in research with the systemic perspective of this literature stream.

5.4 Managerial Implications

Consumers' desire for change and variety influences their urgency to replace their current mobile phones. Managers need to work on reducing the time associated with

new product development which will result in reduction of product lifecycle thus increasing demand for the introduction of latest models that will meet consumer desires when they wait for the new models.

When customers are satisfied with their current mobile phones, because they are of good value to them, they will not buy what is in the market currently, rather they will wait for a more improved versions and so managers should always strive to make products that satisfy consumers as they use them so that they do not look at competition and be tempted to buy.

As managers develop products like mobile phones, they should not only consider the financial aspect of switching, but also consider the non-financial aspect of switching from one generation of phone to another. For example, managers should take into consideration the time and effort it takes to learn to use a new model and ensure that they are customer friendly. In so doing, customers will have an intention to wait for the future products knowing that it will be easy for them to switch.

As mobile phones continue to enjoy tremendous growth, studies have been designed to investigate mobile phones adoption and usage. Managers should direct their interest in broadening the understanding of the factors that influence technology adoption and the continued use of technology innovations by customers and by extension their intentions to leapfrog.

It is also wise for manufacturers to consider producing handsets that are environmentally friendly so that consumers feel that they are taking part in saving the planet. This may lead them to have an intension to wait for such products and in the end will lead to increased sales.

Managers have to invest in providing consumers with relevant information about the different brands that they have so that they become experts in them. Also, emphasis should be placed on getting consumers the best experience while using the several brands that the company produces. Thus, consumers will have knowledge and on the basis of this, will be better placed to make informed decisions on the intention to leapfrog bearing in mind the product quality and switching cost.

5.5 Limitations of the study and suggestions for further study.

The study is subject to several limitations that, however, provide a fruitful basis for future research. The study used a specific generation of product that is the mobile phone to examine the intention to leapfrogging which naturally limits our implications. It is not unlikely that variations in factors as the length of product life cycle, cost of replacement, value of abandoned product might cause the importance of consumer determinants to vary. For instance, we expect that for product categories as car, which are characterized by longer product life cycles, switching cost of old product might be more important than for mobile phones. To provide a conclusive answer on how to generalize the findings of the study, further research is needed. Ideally, such research would span several product categories that differ from mobile phones in terms of their basic characteristics and uses data that comprise multiple generations of each product category.

It is important that additional exploratory analyses examine whether other consumer characteristics such as income or gender also moderate the relationship between consumers' determinants to leapfrog and intentions to leapfrog. Identifying such variables is of great value for businesses as they can commonly observe consumers'

demographic characteristics and employ distinct strategies for each consumer segment to either enhance or prevent leapfrogging.

The consumer determinants of leapfrogging examined by the study are consumers' marketing-mix variables such as the quality of a product of future products. Combining the current insights with those of prior work on the direct influence of marketing-mix variables on leapfrogging behaviour (Danaher *et al.*, 2001; Druehl *et al.*, 2009; Kornish, 2001; Speece & MacLachlan, 1995) could generate additional insights. Future research may examine to what extent specific marketing-mix measures like communicating the quality of a novel product influences the consumer determinants of leapfrogging that the study revealed (the consumers' product quality).

Prior work found that switching costs is one of the central factors to leapfrogging (Cripps & Meyer, 1994), yet this study found that urgency to replace was a central factor to intention to leapfrog. Future research may examine how businesses can more effectively manage consumers' urgency to replace bearing in mind other underlying factors.

Finally, the current study examined intention to leapfrog behaviour of consumers (B2C). On an organizational level, several additional determinants of leapfrogging as formal elements and structures such as buyer–supplier contracts (B2B), exist and partly may determine whether a business leapfrog or not. Future research may examine whether the proposed determinants of leapfrogging are similarly relevant for B2B relationships and whether they interact with additional factors with additional determinants that are specific to B2B relationships.

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APPENDICES

Appendix I: Introduction Letter

CHEPKOECH MAE,
P. O. BOX 3900,
ELDORET.

Dear Respondent,

My name is Chepkoech Mae a student of Moi University, School of business and Economics undertaking my PHD degree in Business Management. I am undertaking a research on *Determinants of Intention to Leapfrog in the Mobile Phone Industry in Kenya* and your assistance will be highly appreciated. Any information you provide will be kept confidential and will only be used for academic purposes.

Thank you in advance.

CHEPKOECH MAE.

Appendix II: Questionnaire

Dear Respondent,

Kindly fill the below questions to the best of your knowledge for the information you provide will be kept confidential and only be used for academic purpose.

Thank you

SECTION ONE

General Information

- | | | | | |
|--|----------------------------|-----|--------|-----|
| 1) Gender | Male | [] | Female | [] |
| 2) What is your Age? | A) 18 – 28 | [] | | |
| | b) 29-39 | [] | | |
| | c) 40-50 | [] | | |
| | d) 51-61 | [] | | |
| | e) above 61 | [] | | |
| 3) Income | | | | |
| | a) below Ksh 30,000 | [] | | |
| | b) Ksh 40,000 – Ksh 50,000 | [] | | |
| | c) Ksh 60,000 – Ksh 70,000 | [] | | |
| | d) Ksh 80,000 – Ksh 90,000 | [] | | |
| | e) above Ksh 100,000 | [] | | |
| 4) Education | | | | |
| | i. Certificate | [] | | |
| | ii. Diploma | [] | | |
| | iii. Bachelor's degree | [] | | |
| | iv. Masters | [] | | |
| | v. PhD | [] | | |
| 5) What is your Current Position | | | | |

SECTION TWO

You have your phone (PO), a new model of your phone in the market (P1) and a future model of your phone that has been announced but not yet in the market (P2), answer the following statements regarding your intention to leapfrog (Skipping the phone in the market and waiting to buy the future phone).

Please tick where appropriate.

1. Strongly Disagree (SD)
2. Slightly Disagree (SLD)
3. Disagree (D)
4. Neutral
5. Agree (A)
6. Slightly Agree (SLA)
7. Strongly Agree (SA)

Variables will be measured with existing scales and they will be on a 1 to 7 scale

Intention to leapfrog

	Intention to leapfrog	S.A						S.D
No.	To what extent do you agree or disagree with the following statements about your intentions to leapfrog.	1	2	3	4	5	6	7
1.	I will wait until the next Mobile phone generation is available.							
2.	I will wait provided that announcements pertaining to the next generation Mobile phones are already available							
3	I will recommend other customers to wait until a future model is released							

Quality of the product(P0 –P1) Old and current								
No.	To what extend do you agree or disagree with the following statements regarding the features of the current model of mobile phone visor vie the old.	1	2	3	4	5	6	7
1.	My Mobile phone has good security features than what is available currently							
2.	I like the design of my Mobile phone							
3.	I enjoy using my phone							
4.	I like the features in my phone							
5	My mobile phone is environmentally friendly							

Switching cost (P0 - P1) Old and current								
No.	To what extend do you agree or disagree with the following statements in regards to the current phone.	1	2	3	4	5	6	7
1.	It will take a lot of time to learn to use a new mobile phone.							
2.	It will take a lot of effort to learn to use a new mobile phone							
3.	The price of current phone is high							
4	My phone will lose value with the introduction of a new phone							
5	It will be costly to repair my old phone before I switch to the new phone							

Urgency to replace the product								
No.	To what extend do you agree or disagree with the following statements.	1	2	3	4	5	6	7
1.	I like to change things in my life							
2.	I like variety in my life							
3.	I am not satisfied with my old phone							
4.	I like things of good value							
5.	I like things that make my work easy							
6.	When there is a need to replace my phone, I will do a replacement purchase.							

Consumer knowledge								
No.	To what extent do you agree or disagree with the following statements.	1	2	3	4	5	6	7
1	I have knowledge of several other mobile phone brands							
2	I use several different mobile phone brands							
3	I am an expert when it comes to mobile phones							
4	My knowledge on different brands is based on previous experiences of using the brands.							

Appendix III: Correlation Results

		Correlations				
		Zscore(IntLeafrog)	Zscore(PrdQual)	Zscore(SwtCost)	Zscore(UrgReplace)	Zscore(ConsKnl)
Zscore(IntLeafrog)	Pearson Correlation	1	.563**	.246**	.152**	.560**
	Sig. (2-tailed)		.000	.000	.005	.000
	N	349	349	349	349	349
Zscore(PrdQual)	Pearson Correlation	.563**	1	.228**	.133*	.462**
	Sig. (2-tailed)	.000		.000	.013	.000
	N	349	349	349	349	349
Zscore(SwtCost)	Pearson Correlation	.246**	.228**	1	.207**	.134*
	Sig. (2-tailed)	.000	.000		.000	.012
	N	349	349	349	349	349
Zscore(UrgReplace)	Pearson Correlation	.152**	.133*	.207**	1	.147**
	Sig. (2-tailed)	.005	.013	.000		.006
	N	349	349	349	349	349
Zscore(ConsKnl)	Pearson Correlation	.560**	.462**	.134*	.147**	1
	Sig. (2-tailed)	.000	.000	.012	.006	
	N	349	349	349	349	349

** . Correlation is significant at the 0.01 level (2-tailed).

* . Correlation is significant at the 0.05 level (2-tailed).

Appendix IV: Factor Analysis Before Deletion Of Items

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.516
Bartlett's Test of Sphericity	Approx. Chi-Square
	2987.672
	df
	253
	Sig.
	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.260	14.172	14.172	3.260	14.172	14.172	2.233	9.708	9.708
2	2.875	12.502	26.674	2.875	12.502	26.674	2.044	8.885	18.592
3	2.131	9.265	35.940	2.131	9.265	35.940	2.033	8.840	27.433
4	2.106	9.157	45.096	2.106	9.157	45.096	1.993	8.667	36.100
5	1.622	7.054	52.150	1.622	7.054	52.150	1.931	8.396	44.496
6	1.363	5.925	58.075	1.363	5.925	58.075	1.854	8.063	52.559
7	1.233	5.363	63.438	1.233	5.363	63.438	1.835	7.976	60.535
8	1.127	4.900	68.338	1.127	4.900	68.338	1.492	6.487	67.022
9	1.112	4.833	73.170	1.112	4.833	73.170	1.414	6.148	73.170
10	.882	3.836	77.007						
11	.829	3.605	80.611						
12	.718	3.121	83.733						
13	.625	2.717	86.450						
14	.535	2.327	88.777						
15	.472	2.052	90.829						
16	.443	1.927	92.756						
17	.399	1.734	94.490						
18	.306	1.329	95.819						
19	.276	1.199	97.018						
20	.194	.843	97.861						
21	.179	.777	98.638						
22	.163	.707	99.345						
23	.151	.655	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

	Component								
	1	2	3	4	5	6	7	8	9
PQOC1	.810								
PQOC2	.766								
PQOC3						.855			
PQOC4						.741		.521	
PQOC5								.851	
SCOC1		.719							
SCOC2		.784							
SCOC3	.506								
SCOC4					.809				
SCOC5					.882				
UTR1									
UTR2									.790
UTR3				.781					
UTR4				.693					
UTR5		-.658							
UTR6									
ITL1							.866		
ITL2							.795		
ITL3									
CK1									
CK2			.611						
CK3			.688						
CK4			.779						

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 11 iterations.

Appendix V: Factor Analysis after Deletion Of Items

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	.561
Bartlett's Test of Sphericity	Approx. Chi-Square
	1570.914
	df
	105
	Sig.
	.000

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	2.845	18.965	18.965	2.845	18.965	18.965	2.043	13.622	13.622
2	2.399	15.994	34.959	2.399	15.994	34.959	2.018	13.457	27.078
3	1.861	12.403	47.363	1.861	12.403	47.363	1.947	12.980	40.058
4	1.395	9.298	56.661	1.395	9.298	56.661	1.920	12.803	52.861
5	1.199	7.997	64.657	1.199	7.997	64.657	1.769	11.796	64.657
6	.936	6.243	70.900						
7	.903	6.022	76.922						
8	.777	5.182	82.103						
9	.604	4.028	86.132						
10	.534	3.558	89.690						
11	.439	2.928	92.617						
12	.372	2.482	95.100						
13	.312	2.082	97.182						
14	.235	1.569	98.751						
15	.187	1.249	100.000						

Extraction Method: Principal Component Analysis.

Rotated Component Matrix^a

	Component				
	1	2	3	4	5
PQOC3			.616		
PQOC4			.888		
PQOC5			.808		
SCOC3					.625
SCOC4					.709
SCOC5					.809
UTR1		.623			
UTR3		.679			
UTR4		.815			
ITL1				.796	
ITL2				.800	
ITL3	.514				
CK2	.547				
CK3	.735				
CK4	.799				

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.^a

a. Rotation converged in 7 iterations.

Appendix VI: SPSS Regression Results

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.273 ^a	.075	.064	.96760244	.075	6.923	4	344	.000
2	.601 ^b	.361	.348	.80735121	.287	51.038	3	341	.000
3	.682 ^c	.465	.452	.73999379	.104	65.904	1	340	.000
4	.691 ^d	.477	.464	.73243699	.012	8.052	1	339	.005
5	.698 ^e	.487	.472	.72671342	.010	6.361	1	338	.012
6	.698 ^f	.488	.471	.72746127	.000	.305	1	337	.581

a. Predictors: (Constant), Education, Age, Gender, Income

b. Predictors: (Constant), Education, Age, Gender, Income, Zscore(SwtCost), Zscore(UrgReplace), Zscore(PrdQual)

c. Predictors: (Constant), Education, Age, Gender, Income, Zscore(SwtCost), Zscore(UrgReplace), Zscore(PrdQual), Zscore(ConsKnwl)

d. Predictors: (Constant), Education, Age, Gender, Income, Zscore(SwtCost), Zscore(UrgReplace), Zscore(PrdQual), Zscore(ConsKnwl), X1

e. Predictors: (Constant), Education, Age, Gender, Income, Zscore(SwtCost), Zscore(UrgReplace), Zscore(PrdQual), Zscore(ConsKnwl), X1, X2

f. Predictors: (Constant), Education, Age, Gender, Income, Zscore(SwtCost), Zscore(UrgReplace), Zscore(PrdQual), Zscore(ConsKnwl), X1, X2, X3

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.829	.264		3.143	.002
	Gender	-.060	.111	-.030	-.544	.587
	Age	-.385	.074	-.300	-5.167	.000
	Income	.144	.065	.154	2.202	.028
	Education	-.131	.085	-.097	-1.528	.127
2	(Constant)	.105	.228		.462	.644
	Gender	.054	.093	.027	.586	.558
	Age	-.214	.064	-.167	-3.360	.001
	Income	.086	.055	.093	1.570	.117
	Education	.022	.072	.017	.310	.756
	Zscore(PrdQual)	.511	.046	.511	11.083	.000
	Zscore(SwtCost)	.099	.045	.099	2.184	.030
Zscore(UrgReplace)	.073	.045	.073	1.607	.109	
3	(Constant)	-.266	.214		-1.242	.215
	Gender	.121	.086	.059	1.409	.160
	Age	-.119	.060	-.093	-1.994	.047
	Income	.075	.050	.080	1.485	.139
	Education	.078	.067	.058	1.173	.242

	Zscore(PrdQual)	.363	.046	.363	7.905	.000
	Zscore(SwtCost)	.099	.042	.099	2.382	.018
	Zscore(UrgReplace)	.045	.042	.045	1.079	.281
	Zscore(ConsKnwl)	.378	.047	.378	8.118	.000
4	(Constant)	1.028	.503		2.045	.042
	Gender	.139	.085	.068	1.640	.102
	Age	-.133	.059	-.104	-2.241	.026
	Income	.074	.050	.079	1.476	.141
	Education	.082	.066	.061	1.237	.217
	Zscore(PrdQual)	.601	.095	.601	6.305	.000
	Zscore(SwtCost)	.108	.041	.108	2.610	.009
	Zscore(UrgReplace)	.051	.041	.051	1.246	.213
	Zscore(ConsKnwl)	.653	.107	.653	6.082	.000
	X1	-.047	.016	-.457	-2.838	.005
5	(Constant)	.510	.539		.945	.345
	Gender	.156	.085	.077	1.850	.065
	Age	-.141	.059	-.110	-2.390	.017
	Income	.059	.050	.063	1.180	.239
	Education	.087	.066	.065	1.330	.184
	Zscore(PrdQual)	.638	.096	.638	6.666	.000
	Zscore(SwtCost)	-.129	.102	-.129	-1.256	.210
	Zscore(UrgReplace)	.049	.041	.049	1.194	.233
	Zscore(ConsKnwl)	.535	.116	.535	4.598	.000
	X1	-.054	.017	-.532	-3.272	.001
	X2	.039	.015	.322	2.522	.012
6	(Constant)	.747	.690		1.083	.280
	Gender	.154	.085	.076	1.816	.070
	Age	-.143	.059	-.112	-2.425	.016
	Income	.060	.050	.064	1.197	.232
	Education	.085	.066	.063	1.290	.198
	Zscore(PrdQual)	.632	.097	.632	6.546	.000
	Zscore(SwtCost)	-.130	.102	-.130	-1.272	.204
	Zscore(UrgReplace)	.105	.109	.105	.959	.338
	Zscore(ConsKnwl)	.583	.146	.583	4.004	.000
	X1	-.053	.017	-.521	-3.181	.002
	X2	.039	.015	.325	2.541	.011
	X3	-.010	.018	-.088	-.553	.581

a. Dependent Variable: Zscore(IntLeafrog)

Appendix VII: NACOSTI Research Permit


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