ST. MARY'S UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF MARKETING MANAGEMENT

THE EFFECT OF PERCEIVED QUALITY OF MOBILE APPLICATIONS ON CUSTOMER SATISFACTION IN THE CASE OF RIDE SERVICE PROVIDERS IN ADDIS ABABA

BY

HAMDIA NEGMU

MAY 2021

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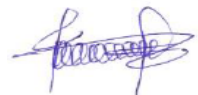
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DECLARATION

I, the undersigned, declare that this thesis proposal "THE EFFECT OF PERCEIVED QUALITY OF MOBILE APPLICATIONS ON CUSTOMER SATISFACTION IN THE CASE OF RIDE SERVICE PROVIDERS IN ADDIS ABABA" is my original work, prepared under the guidance of HAILEMARIYAM KEBEDE (Ph.D.). All sources of materials used for this proposal have been duly acknowledged. I further confirm that the thesis has not been submitted either in part or full to any other higher learning institution for the purpose of earning any degree.

HamidaNegmu

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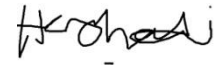
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CERTIFICATE

This is to certify that this proposal entitled "THE EFFECT OF PERCEIVED QUALITY OF MOBILE APPLICATIONS ON CUSTOMER SATISFACTION IN THE CASE OF RIDE SERVICE PROVIDERS IN ADDIS ABABA" was undertaken by HamdiaNegmu for the partial fulfillment of masters of marketing management at St. Mary's University, is an original work and not submitted earlier for any degree either at this university or any other university.

Hailemariam Kebede (PhD)

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ABBREVATION AND ACRONYMS

ANOVA	Analysis of Variances
APPS	Applications
ASP	Application Service Providers
DEA	Data Envelopment Analysis
DOI	Diffusion of Innovation
ECSA	Ethiopian Central Statistical Agency
ECT	Expectation-Confirmation Theory
E-**hailing**	Electronic Hailing
GPS	Global Positioning System
HTML	Hotmail
IS	Information System
MBS	Mobile Banking Systems
M-commerce	Mobile Commerce
OS	Operating Structure
PDAs	Personal Digital Assistances
SINT	Social Affect Community Theory
SUMI	Smartphone Usability Measurement Index
TAM	Technology Acceptance Model
TAS	Technology Acceptance Model
UTAUT	Unified Theory of Acceptance and Use of Technology
VPT	Value-Percept Theory

ABSTARCT

The aim of this study was to conduct the effect of mobile apps quality on user satisfaction in the case of Ethiopian e-hailing taxi service industry. Software usability measurement inventory (SUMI) model is applied to design the survey questionnaire; and collected 307 valid responses out of a total of 372 sample respondents. Statistical package for social sciences (SPSS) were collected from ride e-hailing taxis such as Sheger, Pick-Pick, Taxiye, Ride, Polo-Trip and Zay-Ride users via respective apps loaded on their Smartphone's. The results of the study revealed that all the five attributes of mobile apps quality namely Efficiency, Affection, Controllability, Learnability and Helpfulness had positive and significant relationship with user satisfaction. These predictors are accounted for 64.1% variation of the construct. Efficiency ($\beta = .212$) has relatively highest effect followed by Controllability ($\beta = .205$) and Learnability ($\beta = .192$). However, Helpfulness and Affection had relatively lowest significance on user satisfaction. It can be concluded that the degree to which a software/ app enables the user to complete a given task, the rate at which the apps respond in consistent manner as well as their straight forwardness to use have been given due consideration by the respondents. Emotional feelings and provision of auxiliary information didn't make a difference. Usability of ride mobile apps with respect to different mobile brands could be used as a spring-board for further research.

Key Words: Mobile application, Ride Taxi Service, User Satisfaction, SUMI Model

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Advent of Smartphone technology and recent development of mobile application (app) smoothen day to day lives of users as efficient services are available all the time. Ever increasing improvement in mobile technology has brought a widespread of applications to be developed and the global market of smart phones has become increasingly diverse due to development of such sophisticated apps (Harrison, 2013). The apps are pieces of software developed by people, governmental agencies, military, educational or business organizations with the aim of exceeding users' specific needs. They are installed onto personal phones to attain real time information or services. Advent of such useful technologies have played their substantial roles for the advancement of different industries worldwide. Transportation sector is not far from these facts.

Perpetual growths of population in big cities create substantial demands of rental transportation as mobility is an essential need for an individual. It becomes outstandingly convenient to depend on public or rented transport due to frustrating urban traffic congestion, inadequate public transport infrastructure or high cost of affording own cars (Sacha, 2012). The situations force people to take benefit of comfortable ride hail service rather than using personal vehicles. In metropolitan cities, like Addis Ababa, due to the presence of low level of public transport services, people prefer private or rental vehicles. To cope these issues, mobile app based online and on-call basis taxi services namely Ride, Zay-Ride, Taxiye, Polo-Trip, Feres, Seregela and other metered hail service providers have emerged in Ethiopian taxi market.

The apps are making ride service much easier for users to avail the service with various choices. Once a ride is secured through a mobile app, the detail of car information is displayed on customers' mobile screen to track through global positioning system (GPS). A few providers of the service continuously update their technology to match their customer needs and to stay rival in the competitive marketplace. Passengers' perception towards the usability of such mobile apps determines the quality of the ride service in reference to their legitimate expectation.

Recently, taking the credit of financial institutions being pioneer for the commencement mobile-commerce (m-commerce) in Ethiopia, the potential for using mobile apps has led many organizations to expend substantial resources on these technologies. Providing value added, location-based and interactive mobile services to users seems to be progressively important in

gaining a competitive advantage by initiating, maintaining and strengthening relationships with key customers (Lin, 2006). As the ride service in Ethiopian taxi market becomes increasingly growing, the competition for acquiring new customers and retaining existing ones becomes more intense. In this arena, user satisfaction is a decisive factor for mobile app-based service providers to improve or maintain their profitability and market share at large. However, the effect of currently utilized mobile apps perceived quality on user's satisfaction needs to be assessed so as to determine to what extent the service providers accomplish the emotional, psychological and business needs of their potential customer (Pairot, 2008).

This study, thus, intends to assess the effects of mobile-apps perceived quality on user's satisfaction taking the app-based ride service providers in Addis Ababa as a case study. Software Usability Measurement Inventory (SUMI) model be used to evaluate satisfaction level based on Efficiency, Affect, Helpfulness, Controllability and learnability attributes (O'Maley, 2014). The output of this study helps to improve the existing or develop better apps in Ethiopian users' context regarding the perceived quality of apps that influence users' satisfaction significantly. There are a lot of freely downloadable mobile applications in the market, or in which users will pay some price to get them, but at the end of the day, no satisfaction is derived by the user. This is due to lack of giving due consideration for users' perception towards the quality of the apps even though substantial efforts have been done to exceed technical quality standards in the course of Smartphone application development life-cycle. The primary motive of this research is, thus, to show that the effects of mobile-based apps' perceived quality on users' satisfaction taking e-hailing ride services as a case study in Ethiopian context. This may have substantial importance for enhancing the existing apps or creating new ones capable of exceeding their respective user's expectation.

1.2 Statement of the Problem

Ethiopians are usually very motivated about using mobile technology, as revealed by the growing numbers in the implementation of wireless technologies (Zelalem, 2015). As reported by Ethio-Telecom in 2018 annual report, smart phones are expected to increase their share in Ethiopian's mobile market, expanding from 35% in 2016 to 48% by 2018. But, even though the usage of smart phones is relatively high, mobile commerce is still quite new compared to Sub-Saharan countries such as Nigeria, Egypt, Sudan and Kenya. Nonetheless, the advent of mobile banking and ride hail services enhanced the demand of installing suitable apps of widely utilized services in the country.

Mobile apps based online e-hailing taxi services providers continuously update their technology to match their customer needs and to stay rival in the competitive marketplace. Understanding their requirements and the ability to respond to them in near real-time is becoming increasingly competitive. With more satisfied customers, their businesses can expand their sales volumes and profit margins along with improving their market opportunities. Ride Mobile apps namely Ride, Seregela, Polo-Trip, Taxiye, Zay-Ride and feres are actively implemented by metered e-hailing ride service providers in Addis Ababa carries no rating even though considerable number of users are registered in their respective databases. Besides, users complain about many issues, like unexpected malfunction of an app, availability of the required information in a given context, unintended interruption by other events, accessibility of personal information by hackers, computability or consistence of apps for various mobile phones and dependence of smart phones on wireless internet connections. It is obvious that almost all ride apps utilized in Ethiopian taxi service industry had been designed and developed by outsourced foreign software designers of different companies. It suffers with lack of incorporating improvements regarding cognitive and behavioral aspects of the local end users of the apps. Negligence of considering local user's perception may inhibit developers to identify the factors which influence customer's satisfaction in order to fulfill users' requirements and to rectify deficiencies and restrictions of the apps.

Surveys of user opinion need to be conducted very frequently and to offer accuracy in the measurement results must be able to predict revisions in user perception. Although internal software (hard) metrics could point out hints about software quality, rigorous measurements of user opinion is needed to conduct at any level of software production. The internal metrics could be ineffectively used without conducting customer perceived quality measures (external metrics) simultaneously. Therefore, mobile app-based e-hailing taxi service providers need to conduct continuous assessment of external metrics and their effects on user's satisfaction is mandatory to manage their competitive advantages sustainably for a while.

Many researchers have undertaken significant studies related to user satisfaction as well as customer loyalty in electronic-commerce (Choi, 2008; Yun, 2011; Wang, 2013). Although mobile-commerce has become a part of everyday life, customer satisfaction in m-commerce (mobile-satisfaction) has rarely been considered, because it has only been in existence for a relatively short period of time since its advent (Choi, 2008). In fact, only a few researches have been conducted which have focused on predicting the issues that play a role in the development of mobile app user satisfaction and these operational strategies are not enough for the operators specialized in mobile-commerce.

This study is, thus, intended to determine the effects of perceived quality of Ride mobile apps on customer satisfaction in Ethiopian metered taxi service industry's context. The result, gaining more knowledge about mobile satisfaction determinants, is believed to lead to the better understanding of successful applications in the mobile commerce area. This can be achieved through addressing the following research questions:

1- How does efficiency of Mobile apps affect the customer satisfaction?
2- What is the effect of user's affection towards mobile apps on customer satisfaction?
3- To what extent controllability of mobile apps affect customer satisfaction?
4- What is the effect of mobile apps' learn ability on customer satisfaction?
5- How do offering of helpful communication by mobile apps influence user satisfaction?

1.3 Objectives of The Study

1.3.1 General Objective

The general objective of this study is to determine the effect of perceived quality of Mobile Applications on customer satisfaction in the case of Ride service providers in Addis Ababa.

1.3.2 Specific Objectives

The general objective can be achieved by addressing the following specific objectives:

i- To determine the effect of Efficiency of Mobile apps on customer satisfaction

ii- To examine the level of user's affection to mobile apps on customer satisfaction

iii- To investigate the effect of controllability of mobile apps on customer satisfaction

iv- To test the effect of mobile apps learnability on customer satisfaction

v- To determine the effect of mobile apps helpfulness on customer satisfaction

1.4 Significance of the Study

Proliferations of wireless technologies provoke usersto increasingly interfacing and interacting with mobile app-based services. It is thus important to enhance the existing software or develop new ones, which are specifically targeted for Ride services in a given country's context. In addition, mobile apps' perceived quality is commonly acknowledged as one of the useful proxy measures of user satisfaction towards system success (Wang, 2013).

This study addressed the issue of what constitutes effective mobile applications by evaluating and measuring the construct of antecedents of user satisfaction in m-commerce. Based on the case study chosen, this study validates the construct (customer satisfaction) and its underlying dimensionality (perceived quality of Ride mobile apps). It may also be helpful for those involved

in the design, management and implementation of the foundations of mobile app-based services, especially for Ride app providers.

It is considered that this validated instrument would be useful to future researchers in developing and testing theories on mobile-commerce systems, as well as to the Taxi service industry, especially Ride app providers in developing mobile services that are more widely accepted.

1.5 Scope of the Study

Smartphone based e-hailing taxi services in Ethiopia is geographically limited in the capital city as all the service providers are located in Addis Ababa. Two options have been granted to access the system, either "On-call" demand or "mobile app" based service provision. So as to catch the taxi, the user should have Smartphone, the ride app and internet connection. Thus, the area of the study is geographically limited to Addis Ababa. Since Ride mobile apps are becoming popular with Ethiopians, data used to test the influence of user satisfaction based on their perception towards apps' quality. SUMI model is applied to measure. SUMI is a reliable and approved standard for measuring satisfaction. It uses a questionnaire which states responses in form of 5-point Linkert agreement scale.

The relevant data were collected within a period of two-month time frame, from Feb - Mar, 2021. The output of this research refersonly the data collected within the given specific period and has a lack of holistic perception of the users since the commencement of the e-hailing mobile apps is limited in Addis Ababa only.

1.6 Limitations of the Study

The study sought to investigate the effect of e-hailing Smartphone-based ride apps usability on customer satisfaction. The survey considered only the perception of taxi users. Participation of other stakeholders namely drivers and service providers were also necessary to evaluate the impact of app usability on user's satisfaction. Besides, other marketing approaches like service charge, driver's discipline, availability of other transport options, etc. are the factors that could affect user's satisfaction. However, failure not to include these factors might affect the holistic view of the study. Furthermore, if it includes the aforementioned variables, it cannot produce exactly the same results.This study mainly confined to Smartphone-based ride apps only, its results couldn't be generalized with some service providers which are undergoing similar changes in the service sector. Therefore, to precisely assess customers' needs and requirements, it is desirable that some more in-depth studies might be conducted in other apps installed on different mobile brands. Larger sample size selected randomly be used to avoid any bias and assessed more perfectly general satisfaction of users.

1.7 Definitions of Key Terms

Mobile phone: A wireless handheld telephone device with access to a cellular radio system which could be used over a wide area, without a physical connection to a network (Maksudur, 2019)

Smartphone: A mobile phone that carries out many of a computer's functions, has internet access, with operating system capable of running downloaded applications and accompanied by typical touch-screen interface (Maksudur, 2019).

Mobile Application: A type of software designed to run on a mobile device such as a Smartphone and tablet computer (Wang, 2013).

User Satisfaction: Satisfaction is a feeling of fulfillment of desires and expectations about an entity (Tsiros,2007).

Perceived Quality: The processes involved in how users judge whether they are satisfied or unsatisfied as they relate to mental requirements for using an app and their intention to continue to use it because of the benefits they have derived (Tsiros,2007).

Ride e-hailing taxi service: Ride-hailing service that use online-enabled platforms to connect between passengers and local drivers using their personal vehicles. In most cases, they are comfortable method for door-to-door transport (Wang, 2013).

1.8 Organization of the Study

The study comprises five chapters. The first chapter refers the introduction part of the study along with statement of the problem, objectives, significance, limitation of the study, scope of the study and definition of key terms. The second chapter is all about the revision of related literature in regards to theoretical framework and, empirical review and the intended research framework and research hypothesis. The third one describes the overall methodological approach applied to generate useful information for making analysis. The fourth chapter is dedicated for data analysis and their interpretation. The last discusses summary of major findings, conclusions based on the findings, and recommendation.

CHAPTER TWO

REVIEW OF THE RELATED LITERATURE

This chapter comprises the theoretical reviews of customer satisfaction, perceived quality of mobile applications and proposed models for measuring customer satisfaction. Empirical reviews and conceptual framework are also presented.

2.1 Theoretical review

2.1.1 Basic concepts and terminologies

Contextually, user satisfaction can be considered as feeling of pleasure results from amassing all the benefits that a person hopes to receive from interaction with information system (Seddon, 19917). The integration of these two concepts, marketing and information system, accounted for determining the relationship between end user's total experience or perception and satisfaction (Khalifa and Liu 2002). Extant researchers have been exerted unlimited efforts to investigate predictability of user satisfaction through perceived quality of mobile apps usability. The adoption of expectation-confirmation model is one of efforts, widely applied in the marketing literature (Staples, Wong, and Seddon 2002; Susarla, Barua, and Whinston 2003). Wide acceptance of this model in IS researches is its ability to examine the attributes affecting satisfaction and the underlying satisfaction formation process (Khalifa and Liu 2005). Moreover, other theories such as Performance Expectancy; Value-Percept Theory; Attribution Theory and Cognitive Dissonance are discussed briefly to show their relevancy. Based on this notion, the literature review focuses on three basic areas such as theories related to user satisfaction, description of mobile apps, and the relationship between mobile app's usability on user satisfaction.

2.1.2 Theories of customer satisfaction

Expectancy-Confirmation Theory

User satisfaction can be determined by the variation between cognitive standards and perceived actual performance alike the difference between expectations and desires (Oliver 1980; Oliver and Swan 1989). The theory assets higher perceived performance with and/or lower expectation drive to a superior confirmation which in turn positively influence user satisfaction results incontinuance behavioral intention. The reverse it true for relationship results in dissatisfaction, disconfirmation and discontinuance intention. Augmented with perceived performance, it theorizes that expectation leads to post-purchase satisfaction which would be mediated through

either negative or positive disconfirmation between performance outcome and expectations. According to Churchill and Suprenant (1982), the model encompasses for basic constructs – performance, expectation, disconfirmation and satisfaction that can be taken as a predictor which indicate expected product attributes at some point in the future. Amongst them, expectation serves as comparison platform or standard to evaluate performance and form a disconfirmation judgment (Halstead, 1999). Disconfirmation is, to the contrary, the difference between expectation and perceived performance where positive disconfirmation leads to satisfaction while negative disconfirmation so does to dissatisfaction.

Expectancy-disconfirmation model is viewed as one of the prominent frameworks for evaluating satisfaction formulated by Oliver (1977) which states that customers/ end users acquire products (goods and services)augmented with pre-purchase expectations regarding the product's attributes or features. The extent of expectation serves as a point of reference against which the product would be judged, i.e., when product is acquired/used or disposed, it should be compared against what is expected from it and if there is a miss/match between user's expectation and its outcome, disconfirmation happens. Disconfirmation happens when the difference between outcome and expectation is wide, thus, a given user is either dissatisfied depending on the negative/positive difference resulted from comparison made (Yuksel, 1977). This is the focal point for major debates within marketing literature concerning the effect of disconfirmation nature on user satisfaction. The evil lies within how predictive expectation is defined/ set as the comparison standard for perceived outcome as confirmation of negative expectations is not likely to lead to satisfaction (Santos, 2003).

To mitigate this problem, researchers proposed other different comparison standards such as desires, ideals, equity, or brand and past product experience (Woodruff, 1983, Tse and Wilton, 1988; Spreng, 1996).In mobile applications, users' expectation can be usefulness and enjoyment, fast loading, fast access to internet, etc. Degree of confirmation must relate positively with these expectations and if this is not the case, disconfirmation occurs and user feels unsatisfied. As this theory is, however, based on expectation as the major standard for determining user's satisfaction, it has some drawbacks in that it assumes and believes that everybody has some expectations about a particular product. This signifies that without any expectation, comparison can't be made and satisfaction may not be determined. Having expectations may not happen all the time as consumersarepeople who may not have any expectation about a product until they see and feel it.

Although Expectation-Confirmation Theory (ECT) was originally developed and tested in the marketing context, the adoption of the theory in studying emerging information system satisfaction represents a good step towards the development of an IS user satisfaction theory. Then after, a number of IS studies applied it with customization and further development by adding unique contextual factors. Susarla, Barua, and Whinston (2003), for example, investigated the respective roles of expectation disconfirmation and norm-based disconfirmation as determinants of satisfaction with application service providers (ASP). Zahedi (2002) proposed a measurement tool for online customer satisfaction by integrating the expectation-disconfirmation model and IS success model. Bhattacherjee (2001) also designed the IS continuance model to examine the IS users' intention to keep on the utilization of a particular technology based on expectation-confirmation theory. In the model, user satisfaction is one of the critical determinants of continued adoption of online banking services, and satisfaction is predicted by users' confirmation on expectation and perceived usefulness.

Value-Percept Theory

According to the Value-Percept Theory (VPT) proposed by Westbrook and Reilly (1983), customer satisfaction is defined as the pleasurable affectionate state results from the evaluation of service that satisfies customers' values. VPT claims post-purchase cognitive-affective processes' causal sequence. A cognitive evaluation process, in which the product perception is compared against one's values, triggers an affective satisfaction. Although, the VPT hasn't received much attention, its theoretical framework guided the scalars to extend the understanding of user's behavior in regards to two critical concepts namely affective satisfaction and values as well as their interrelationships (Chen, 2008; Gooding 1995; Taylor & Baker, 1994; Westbrook & Oliver, 1991). According to Locke (1969), the theory states that satisfaction is an emotional reaction activated by a cognitive-evaluative process against which the comparison is made between the beliefs or perceptions about a given product and his/her values. The higher the difference between the perception and user's values, the lesser the evaluation as well as formation of positive affect related to satisfaction and vice versa. Thus, the it utterly depends on product user's values, perception and cognizantjudgment.

Taking adoption of this theory in mobile apps, user's personal values can be fast execution speed, wide versatility, appealing interfaces, bright colors, etc. If the consumer doesn'tperceive the specific app to have these features, then hard toform positive affect results in user's dissatisfaction. But it is so clear that this theory pays no attention to how these expected personal values are formed before they relate them to products (Westbrook & Oliver, 1991). Likewise,

some direct evaluations may be against customers' or user's value, the theory has no attention to this. In mobile apps, some apps may not have specific' users as they are developed for the masses, it is difficult to have a picture of each user's personal values before comparing them to the values of services provided by applications as each individual has his own distinct personal values (Chen, 2008).

Attribution Theory and Cognitive Dissonance

Attribution theory is concerned with how normal or ordinary people describe the causes of behavioral intention, behavior and events. It dealt with how users perceive things to reach at causal-explanations for events. It examines what and how information is gathered and combined to form a causal-judgment. According to Weiner (1985), it states that individuals involve in spontaneous thinking about the cause of product success/ failure in order to get a better understanding of the success/ failure and to have control over their environment (Oluwande, 2018).

The Attribution theories have been used as a tool to analyze causal attributions made by consumers and its effectiveness in marketing for the fact that there are attributions about the cause of both positive and negative situations in goods and services. Negative attributions may be caused by failure, but recovery decreases the effect' of negative attributions and produce positive results like satisfaction. Thus, satisfaction differs depending on the type of attributions made by a user ofthe apps. If a mobile application fails its user in a specific' functionality, users may make negative attributions for the reasons of such failure to get the causes of failures. This reduces satisfaction. They have communicative and direct effects on judgment of satisfaction (Tsiros, 2007). The theory can be viewed as a way of extending the ECT since attribution in mobile apps is caused by negative disconfirmation of what users are expecting from apps. It's been criticized as being mechanistic and reductionist for assuming that humans are rational, logical, and systematic thinkers. The fundamental attribution blunders, but, demonstrates that they may be cognitive misers and inspired tactician. It additionally fails to deal with the social, cultural, and historical elements that shape attributions of purpose. This been addressed extensively through discourse evaluation, a branch of psychology that prefers to use qualitative techniques with language usage to recognize psychological phenomena.

Regarding mobile apps, many different functional designs are used. Cognitive dissonance, in terms of discomfort faced by an individual having two or more convicting ideas or beliefs, occurs among users as there are two or more valuable offer contest and users have the feeling of misfit

between various features of the design (Festinger, 1962). The presence of non-fitting relationship among cognitive elements leads to a dissonance, negative attitude to mobile apps and reduction in satisfaction. As it has been seen that cognitive dissonance has indicated that there may be misfits between different features of a product which lead to negative attitude; it has not fully and directly explained how people get dissatisfied. Though there may be some features in mobile apps that can lead to dissonance, for example, there can be two or three different attractive user-interface elements. People have different ways of viewing application features as the way people think are different. What will create likeness in an individual may cause hatred and irritation for another person because there are some people who will love to see a lot of ashy interface elements, while others will not. Therefore, the theory has not specifically stated what arouses dissatisfaction in people (Sharma, 2014).

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Performance Expectancy

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The emergence of technology facilitates and enhances user or consumer performances to a substantial level. The extent of an individual's beliefs that the adoption of technology helps in facilitating task performances which is referred to as performance expectancy (Rogers, 1995).Performance expectancy in IS implies that users do not forget the mobile app to be beneficial as it permits them to perform their intention-orientated tasks (Venkatesh, 2003). In this regard, many researchers have reached in conclusion that users are willing to pay for mobile apps as they found downloaded apps valuable and innovative (Arya, 2011). Davis (1986) also related it to predictors like perceived usefulness and their relative advantage. The former relates to continual use of a product caused by derived benefits. In terms of mobile apps, a user may have some beliefs that using an application can give him/her better job performance. After having adapted an app, if it happens, the user's level of satisfaction increases, but if not, user's satisfaction level diminishes. A specific mobile application may not be generic in nature and is usually developed for different functionality or purposes. Thus, it has an implication that its performance will be different with respect to the difference in context in which it is used. Some users may have off-beam performance expectations for mobile apps as they may not fit into their context of use. When this happens, no satisfaction will be derived.

2.1.3 Theories of service quality and customer satisfaction
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Mobile Application Usability

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Mobile apps can be defined as self-contained software designed for a mobile device and performing specific tasks for mobile users (Bryan, 2013). Although the primary mobile programs appeared approximately more than one a long time ago, their diffusion escalated exponentially

with several App store platforms. those distribution systems, which offer app software to mobile gadgets, these structures consist of each third-celebration systems offered with the aid of business groups consisting of Amazon, preferred software program, and others and apps marketplaces which can be native to the primary mobile operating structures (OS) which include BlackBerry OS, Android, Palm internet OS, Symbian OS, and so forth. The fulfillment of these app marketplaces in which cellular customers can without problems down load or browse escalates the boom of app demands.

Besides, due to the emerging fashion of using remote/cellular apps in and between enterprise/ commercial settings, the demand initiatives to boom even an increasing number of. cell apps sincerely provide a method for having access to apps from remote places for sharing files and collaborating with co-workers across the globe for improved and remotely to be had productivity gear (Wang, 2013). There are predominant varieties of cell packages: ones that have to be set up at the device (either pre-installed or downloaded from marketplaces) and cellular web programs. The former can be similarly labeled into apps written for a particular type of handset (e.g., iPhone programs, which ought to be focused for iPhone) and programs that could run on many handsets, normally written in Java. In evaluation, internet applications are living on a server and customers get admission to the application over the internet via an internet browser deployed at the cellular tool. in this component, those programs do now not fluctuate very an awful lot from traditional net applications evolved for desktop pc, and typically use the same technologies, like HTML, CSS, and Java (Bryan, 2013).

Based totally on offering a information-based totally provider, cellular apps will also be categorized based totally on their software architecture (Momenico, 2013). This type distinguishes amongst: patron-handiest applications – apps need to be set up at the device and do now not have any server-facet counterpart inside the community; client-Server packages - apps rely on complementary client and server components that talk with request-response sequences; content applications – apps are a specific sort of consumer-Server apps where the patron implements all important business logic however fetches content material from a server; and packages the usage of native API - can be taken into consideration a shape of customer-handiest apps that invoke other local packages like video players, alarm schedules, touch lists, messaging APIs, and so on. to carry out obligations.

Regardless of their sorts, most cellular apps are usually simple and advanced by a small team accounted for thought, design, and development (Domenico, Anna, Porfirio and Bryan, 2013). because of under the stress of quick time-to-marketplace, the team often execute on strict

timelines. They utilize powerful frameworks and development equipment but rarely undertake formal development technique. This approach may also fit small- or medium-sized applications. however, as mobile packages grow to be more complicated and business-vital, use of well-defined software engineering strategies becomes crucial. Specifically, to assure the required pleasant of those apps, testing sports call for more effort and devotion. Acknowledging the recognition of apps, now a day, extant studies and business projects have aimed to outline effective and green testing standards, techniques, and gear for mobile apps usability. The App-shops' popularity solidifies the significance of assuring the reliability of cell apps that allows you to assuring reliability with the intention to serve as a strategic thing in the sustainability and expansion achievement.

As with all cellular apps specific constraints of handheld gadgets have an effect on the development and checking out techniques for Android apps. For instance, constraints like heterogeneity of cellular device software and hardware configurations, the constrained nature of underlying hardware sources, and the scarceness of mechanisms provided with the aid of the use of the structures for stopping security assaults all have an effect on the layout and execution of testing activities. On top of such technical fine manage, the want for checking out their capabilities primarily based totally on person's perception aka perceived quality.

Originally mobile apps were intended to offer for productivity and informational purposes such as calculator, calendar, email, contacts and weather information (Oluwande, 2018). With the rapid advancement in the technology and users' prospects, the software developers' implementation expanded into other categories like mobile games, video chats, social media, banking, ticket purchases, global positioning system (GPS), factory automation, location-based services, fitness apps and recently mobile medical apps. Few disadvantages of the recognition of mobile apps has perpetuated to elevate, as their use has become additional and more prevailing across itinerant users. There are many articles that have captured the statistics of mobile apps in terms of:

- The number of developers growing every year,
- The quantity of apps increasing each year,
- Revenues generated from apps,
- The number of apps that are appearing on totally different platforms and
- Most popularly used apps on different platforms.

Not many websites/articles verbalize concerning the number of apps being deleted, the number of users deleting apps, the number of excellent apps vs unhealthy apples, factors that tempt users to delete apps, the weather that cause bad apps.

Usability in Mobile Applications

Usability in mobile applications is quite different from the usability in desktop applications because mobile applications are constrained by limited bandwidth, limited memory, small screen size, different screen resolutions, battery life, changing mobile context, etc. (Choi, 2008). Most people think that usability relates to the appearance of an interface, but in reality, usability relates to how a software application interacts with users. Even though there is confusion about the meaning of usability, its importance is widely acknowledged.

Usability can be viewed in two dimensions, the product oriented and the broader human-centered dimension (Bevan, 1996). Viewed usability from the product-oriented approach as the level to which a product is used with ease. It fits well with normal software engineering practice. However, the major contention about this approach is that a particular product can be usable by allowing some actions to be performed; it doesn't mean that it is useful because the actions performed may not be what the user wanted. Therefore, it will be regarded as not useful by people. Also, people have different perspectives about how a product should function when actually used it as they have different needs.

The broader approach defines usability as the capability to use a good or service for the purpose in which it was designed for. Many times, usability is often considered as the rate at which the user interface is easy to use, this often restricts the work done on usability as it is seen as self-determining input to quality of software. By putting human factors in mind, this broader approach is synonymous to quality in use which is of the opinion that a product can be used in a real-world environment. However, while viewing usability in these two approaches, it is observed that a common goal is to be achieved, which is ensuring that users can effectively apply a product, either from the product perspective or the environment in which it is utilized. Usability perceived quality includes the following attributes: **Effectiveness in use:** is the extent at which specified goals are reached by users in a particular context of use; **Efficiency in use:** is the rate at which users make use of suitable and minimal amounts of resources in a particular usage context; **Freedom from risk:** is the rate at which possible risks are mitigated to save human life, health and his environment. Risk refers to the possibility of occurrence of bad events. A good system/app should have provision for this; **Context coverage:** is the rate at which a system is can be used effectively, efficiently and with freedom from risk in a specific context. It refers to

any information that describes a situation in which a user finds him/herself; and **Satisfaction in use:** refers to the level at which users are glad and satisfied about a product in a defined context. It is further divided into likeability, pleasure, comfort and trust. Many of these usability metrics have been developed for desktop apps and they may not fit into mobile applications due to changing mobility. However, for the aim of this study, the focus made on satisfaction attribute of usability quality.

For mobile apps, usage in normal context is maintained by usability testing through gathering data (usage and user feedback) in the field. A number of remote usability testing approaches count on accompanying observers or special hardware (Sá,2008) but others rely on logging activity of the mobile device data usage in the field. This may range from simple logging to more sophisticated methods such as audio-visual recording or capturing of usage paths (Liang,2011;Ma,2013). The former approaches are less cost-intensive rather imply other weaknesses like difficult interpretation of high data volumes and simple log files.

Now a day, smart phones are provided with audio and video recording capabilities which can be can be replayed and then analyzed later. Despite the hardware performance, video data can even be analyzed on spot. Contemporary approaches adopt mobile front camera for eye tracking (Lissoboi,2012). It becomes a standard technique for evaluating usability in the laboratory (Bulling,2010). Whereas automated evaluation of field test usage data is mostly confined to simple conclusions. The derivation of cause-effect relationships in complex situations has to be supported by post-processing tools. These aggregate a potentially large amount of data to information suitable for human examination. Questionnaires as part of the mobile usage acquisition process can be automatically evaluated and provide usually more relevant data than simple logging methods (Ryu,2005;Väätäjä,2010). Nevertheless, this should be taken into consideration that the incorporation of questionnaires into the mobile evaluation process raises the level of intrusiveness.

Measurement of Satisfaction

An approach was used by Ching and Lai (2011), for measuring satisfaction in mobile phones. It is called Data Envelopment Analysis (DEA). It is based on linear programming model and used for assessing the performance of many types of objects in different contexts. It measures object attributes by using a scale between 0 to 1 or 0 to 100. For mobile phones, it takes various factors of satisfaction like perceived usefulness, ease of use, values and others as inputs and generates user satisfaction and loyalty as output. Since it is a quantitative measurement for satisfaction, it can be adapted to mobile applications as well.

Despite the fact that DEA takes various attributes as inputs to generate an output, it poses serious problems especially when interpreting each variable independently. For example, different individuals will have different perception of ease of use and usefulness, objective determination of satisfaction may be quite difficult. Also, O'Malley (2014) proposed an approach for measuring user satisfaction. It called SUMI, abbreviated for Software Usability Measurement Inventory. User satisfaction is further split into five factors which are:

- **Efficiency -** The level to which a software/application enables a user to complete a task.

- **Affect - T**he extent of user's emotional feelings to a software/app

- **Learnability -** The degree to which a software/app is straightforward to use.

- **Helpfulness - U**ser's perception about how the software offers helpful communication

- **Controllability:** Rate at which the app responds to user's input in a consistent manner

This approach has been seen to be efficient as it closely relates specifically to mobile applications. It was used to measure the satisfaction of an obesity app called Reactive app. SUMI is a consistent and approved standard for measuring satisfaction. It uses a questionnaire which states responses in form of 5-point Likert agreement scale with options "Strongly agreed", "agree", "undecided", "disagree" and "Strongly disagreed".

2.2 Empirical review

Under this subtitle, considerable related researches which had been conducted in this area are reviewed to point out the practicability or relationship between usability of mobile apps and their effect on user satisfaction.

Kim (2014) developed a theoretical model to investigate antecedents which could affect app usage amongst Smartphone users. It included four significant factors namely perceived entertaining and informative usefulness, ease of use and user review. The study also includes the cost-effectiveness as a key variable. It found that the cost effectiveness did not have influence on app usage.

Zarmpou (2012) argued that the success of mobile services adoption depends on its ability to cover user needs and attract consumer interest. Authors claimed that the extant of literature focused only on understanding the factors that might affect consumers' actual adoption of such services through their effect on behavioral intention. Most studies were conducted on behavioral intention a theory, which includes Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) and Unified Theory of Acceptance and Use of Technology (UTAUT). The

authors claim that they proposed a new theoretical construct by extending TAM with variables such as trust, innovativeness, relationship drivers, and functionality. Drivers relationship, added in a marketing angle in the direction of the original models of era adaption via constructing emotional connections among the users and cell services. it is in brief concluded that behavioral purpose is immediately laid low with perceived usefulness, innovativeness and courting drivers.

Chen (2013) studied the diffusion of Mobile Banking Systems (MBS) incorporating the top issues of risk perception, brand awareness, brand image and their relationships to attitudes and intention. This study considered usage frequency of the users as sub groups and analyzed the difference among frequent user group, infrequent MBS users and users who seldom or never used the technology. The author quotes Khalifa& Cheng (2002) because of the significant mobile-phone market penetration and optimally designed marketing tactics of MBS providers, exposure to mobile technology will likely facilitate the adoption of related services. The author recommends that future research should examine exactly how financial services providers disseminate information about new services, and how they allocate resources to train sales personnel or to advertising campaigns affect customer segments (i.e. frequent users) differently.

Motional and epistemic values, among the consumption values, have stronger relation with repurchase intention and word-of-mouth (behavioral) intention. Moreover, conditional value influences mobile app user's behavioral intention through the mediation of other factors such as emotional, social, functional and epistemic. Ferreira (2013) researched on the adaption and adoption of educational application in smart phone among teacher/student. There are many teaching apps focused on diverse higher education topics, from physics and calculus to anatomy and law.

Nickerson (2014) made as diffusion of Innovations Analysis on the mobile technology and smart phone apps. They argued that even though the technologies are intended for the public, some users are specific to a particular domain. Thus, there is a need for understanding the diffusion within specific domains. Chou (2013) argued that escalating emergence of information technology and the wireless communication has expanded the use of mobile devices and the mobile based services using apps. Grace, Zhou, Jiang and Sadeghi (2012), also mentioned the app marketplace. They mentioned that for the beyond couple of years, telephone income has grown explosively. according to Gartner, smart phones outsold private computer systems for the primary time in records. naturally, clients embraced smart phones due to their comfort and energy, because customers can down load plenty of 0.33-celebration apps that offer additional

useful features. furthermore, Google and Apple as platform vendors also offer centralized app markets wherein customers can actually browse, seek, purchase, download, and installation apps.

Doidge (2011) pronounced that marketplace for cell apps might be very aggressive, especially for the mixing of innovative apps and platform layer technology. In 2012, stop-users had been predicted to spend $15.9 billion on cell apps, which could force supplementary hardware income, advertising and marketing spending, and similarly technological innovation. the author additionally reported that Gartner expected brand groups to more and more shift their advertising and marketing budget to the mobile channel, and experiment with apps to seize advertising and income possibilities. Ten (10) patron mobile apps had been diagnosed within the watchable listing with the aid of Gartner, which were region-based totally offerings, social networking, mobile seek, M-commerce, M-payments, context-aware services, object popularity, cellular instantaneous messaging, cellular e mail, and mobile video. Smartphone devices and apps are effective equipment that businesses can harness to have interaction customers, serve companions, and empower employees. Despite the fact that smart phones are smaller, quicker, and cheaper gadgets walking tiny web or display-scraped apps, smart phones deliver a much greater holistic and a long way-reaching exchange to customers' lives. Apps are within the consumer's pocket.

ComScore (2012) presented its annual file examining the mobile and related device landscape over 8 markets: United States, Japan, Uk, Canada, Spain, France, Italy, and Germany. The record explored some of the key developments using telephone adoption boom and discovered that apps have been one of the critical additives of adoption. Telephone owners rated the selection of apps and music/video skills as considerably essential components of their buying selection. The record defined that the strong growth inside the utilization of apps might reach parity with the cell browsers. In December 2011, 47.6 percent of the full mobile audience within the America used apps with an increase of thirteen.3% at the same time as forty-seven.5 percent used mobile browsers.

It's far believed that once consumers make a ramification decision on smart phone devices and apps, choices of the peer are influential. Social affect community theory (SINT) is a combination of social community idea and social diffusion idea. Consistent with Johnsen and Friedkin (2006), social diffusion is a technique via which precise thoughts (attitudes, critiques, or ideals), emotions (emotions, sentiments, or moods), or behaviors (selections, movements, or practices) are unfolded amongst members of a social community. This principle indicates that for consumers' adoption of cell phone gadgets and apps, they may be more likely to pick out the telephone and apps which are most famous in the specific social community. But it's predicted

that this causal relation will decrease as the consumer develops affection with numerous platforms and consequently is capable of severely compare core competencies of the tool based on user's requirements being impartial of the social network. ultimately, it is predicted that this causal relation will lessen as the user's age increases.

2.3 Conceptual framework of the study

Although there are alternative models have been proposed for the measurement of user's satisfaction based on perceived quality of mobile apps, SUMI model is found to be more effective and has been widely used by researchers and practitioners to measure satisfaction (O'Malley, 2014). Here the independent variables are efficiency, affect, helpfulness, controllability and learn ability of Ride mobile apps while customer satisfaction is the dependent variable that the study measure with the independent variables. Therefore, this model applied as a reference point for this study to develop hypothesis test.
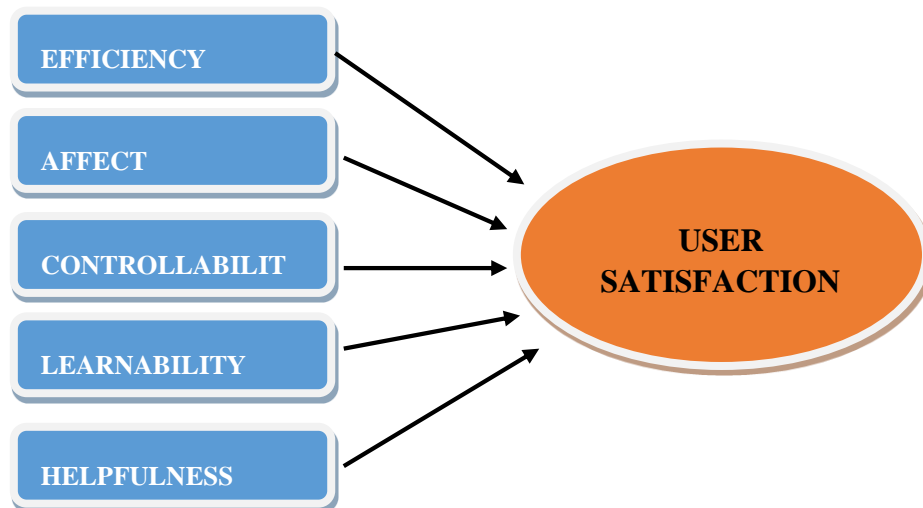
[Source: O'Malley, 2014]

Figure - 1 Software Usability Measuring Index (SUMI) Model

2.4 hypothesis

H_1 - Efficiency of Ride Mobile apps has significant positive effect on customer satisfaction

H_2 - Affection to Ride mobile apps has significant positive effect on customer satisfaction

H_3 - Controllability of Ride mobile apps have significant positive effect on customer satisfaction

H_4 - learn ability of Ride mobile apps have significant positive effect on customer satisfaction

H_5 - Helpfulness of Ride mobile apps have significant positive effect on customer satisfaction

CHAPTER THREE

METHODOLOGY

This chapter presents a detail discussion about the research methodology to be employed in the study. Topics related to research approach, research design, population, sampling techniques, sample size, data source, data collection method, data analysis techniques and ethical consideration are also part of this chapter.

3.1 Research Approach

Research approach is a method employed for collecting data to address the research questions of interest. One of the most prominent ways to classify research approach is to make a distinction between quantitative and qualitative research. The approach applied in this study is quantitative, related to objective measurement and statistical analysis of numeric data to explain phenomena.

3.2 Research Design

This study tried to identify or explain the effect of Ride mobile apps' perceived quality on customer satisfaction in Ethiopian Metered Taxi service industry. Therefore, to achieve the basic research objective, this research used explanatory research design that tried to clarify how and why two or more facets of a situationis related (Saunder, 2005). It is believed to be a suitable design to explain and describe the aforementioned apps' influence on users' satisfaction.

3.3 Population

The populations in Addis Ababa are currently estimated over six million dwellers (ECSA, 2018) of which about 59% are mobile cellular subscribers. The target population of this study, thus, comprised all mobile cellular subscribers and users of metered taxi hail service in Addis Ababa via Ride app loaded on their smart phones. These targeted active e-hailing service provider apps include Ride, Zay-Ride, Polo-Trip, Taxiye, Feres and Seregela. Mobile app based metered taxi service providers are targeted for the reason that they have developed and implemented usable and active mobile software apps in addition to accessing their services on-call basis by contacting their respective call centers in the city.

3.4 Sampling Technique

The target population for this research is metered taxi hail service users of the aforementioned service providers via Ride mobile apps. Since the targeted study population is substantially large in number, geographically dispersed in different sub-cities and hard to get their lists, it would be impractical to select sample based on random selection. Thus, convenience non-probabilistic sampling method is applied for its appropriateness.

3.5 Sample Size

Determining sample size is very important issue because samples that are too large are uneconomical while too small samples may lead to inaccurate results. When the size of population is unknown but the variability of an estimate over all possible samples is anticipated as **p = 0.59** and **q = 0.41,** thus the calculated sample size is favorable for the case (Cochran, 1963). Since the exact total population is unknown, sample size determination formula is used to estimate the sample size. The formula is:

$$n = \frac{Z^2 * P * Q}{e^2} = \frac{(1.96^2)(0.59)(0.41)}{0.05^2} = 372$$

Where: n = required sample size

Z = Degree of confidence (i.e. 1.96^2)

P = Probability of success (0.59)

Q = Probability of failure (0.41)

E = Tolerable error (0.05^2)

3.6 Data Source

Both primary and secondary sources are used in this research but basically primary data is used for analysis and were gathered through standardized questionnaire. Secondary sources are referred from different marketing journals, company publication, annual reports, sector research articles and governmental agencies to articulate the companies' background and the related literature review.

3.7 Data Collection Instrument

The primary instrument for data collection in this research are self-administered semi-structured questionnaire, which contained a mixture of closed ended and open-ended questions by approaching respondents at different international branded hotels. These hotels are targeted for the fact that they are the place where majority of metered taxi users are picked or destined mostly. The intended questionnaire had three parts such as the first part refers about personal detail which includes Sex, Age, origin, preferred Ride app and reason for using the service. The second one is related to the determinants or predictor variables of mobile apps' perceived quality (Efficiency, Affect, Helpfulness, Controllability and Learnability); and the dependent variable (construct) – user's satisfaction. 5-point Likert scale is applied for measurement of user's perception.

3.8 Validity and Reliability Analysis

3.8.1 Validity

Validity defined as the degree to which data collection methods accurately measure what they were intended to measure (Saunders, 2009). It evaluates whether the measurement scale truly measures which is intended to measure or how truthful the research outputs are. To ensure face validity of measurement procedure, pilot study was conducted to examine the face validity of questionnaire items and to make sure the instructions in the questionnaire would be adequate. The content validity is verified by the advisor of this research, who looks into the appropriateness of questions and the scales of measurement.

3.8.2 Reliability

Reliability can be defined as the extent to which measurement scales are free from errors and, therefore, yield consistent results. Operationally, reliability is defined as the consistency of a scale, which assesses the degree to which the items are homogeneous. This study uses Cronbach's alpha to assess the internal consistency of variables in the research instrument. Cronbach's alpha is a coefficient of reliability used to measure the internal consistency of the scale. According to Zikmund (2010), scale with coefficient alpha between 0.6 and 0.7 indicate fair reliability so for this study a Cronbach's alpha score of 0.70 or higher is consider adequate to determine reliability.

3.9 Methods of Data Analysis and Presentation

To process the collected data, SPSS software is used. Descriptive statistics such as mean, percentage, correlation and multi-regression analysis applied in analyzing the quantitative data and explanatory approach to analyze respondent's perception. Further, a regression model is applied to analyze the quantitative data, check the association of variables and predict the dependent variable.

The model used for measuring user's satisfaction is SUMI model by O'Malley (2014). Since it is customizable to this study, the researcher utilizes it with modifications of variables and indicators. The regression is conducted to identify the relationship and to determine the most dominant variables that influenced user's satisfaction. Thus, the multi-regression analysis for testing the formulated hypotheses is depicted as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + e$$

Where:

Dependent Variable

Y = Overall user's satisfaction

Independent Variable –

X1 = Efficiency; X2 = Affect; X3 = Helpfulness; X4 = Controllability; X5 = Learnability

e = error term,

β_0 = constant, term

$\beta_{1, 2, 3, 4 \text{ and } 5}$ = coefficient terms of Efficiency, Affect, Helpfulness, Controllability and Learnability

3.10 Ethical Considerations

It is important to consider ethical principles when conducting a business research. Ethical issues are categorized into four different types: harm to participants, lack of informed consent, invasion of privacy and deception (Bryman, 2011). In this study, there are descriptive questions about the respondent's' age and gender but this information is not enough to identify the person. The second ethical principle to consider is the lack of informed consent. The third ethical principle concerns the invasion of privacy. In this study the respondent has the opportunity to skip a question if it is judged sensitive. Furthermore, this study is not of a sensitive nature which enhances the respondents' willingness to answer. The fourth ethical principle refers to deception which occurs if respondents are led to believe that a research is about something else than what it is. After taking these ethical principles into considerations and fully live up to the requirements, it can be classified as ethical.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION

This chapter encompasses the data analysis and discussion of the research findings. The Statistical Products and Social Solutions (SPSS version 22.0) was used for process data gathered via questionnaires. It used descriptive analysis for respondent's profile, and correlation analysis to determine the significance level of relationship between independent and dependent variables. As well a linear regression analysis to identify which factor the most influence on customer satisfaction of ride mobile applications. As well conducting reliability and validity test through Cronbach alpha value. In following section, it is discussed about those data analyses aforementioned and finally, the proposed hypotheses are tested accordingly.

4.1 Results

4.1.1 Response Rate

The survey questionnaires had been distributed at five international hotels in Addis Ababa, the place where most ride service users are situated. Sheraton Addis, Radisson Blu, Intercontinental Addis, Ramada and Hayat Regency hotels. A total of 372 targeted sample respondents at the selected hotels were contacted to manage the self-administered questionnaires to be filled. Among them, only 319 filled questionnaires were returned which accounted for 85.8% response rate. In order to make the collected data suitable for the analysis, all questionnaires were screened to be complete, coded and put on SPSS for analysis. During data editing, the collected questionnaires were checked for errors and found 12 incompletes and then discarded. Thus, out of the 319 collected questionnaires, 307 was found to be valid and used for the final analysis.

4.1.2 Validity and Reliability

Survey instruments should be checked for both external (Validity) and internal (Reliability) consistency to assure the accuracy and relevancy of the instrument to rely on the data gathered (Hair, 1985). Validity is the extent to which a scale accurately represents what it is supposed to. It is concerned with how well the concept is defined by the measure(s) and can be defined as the assessment of the correspondence between the individual items and concept. Reliability of the study shows the degree to which the researcher can confidently rely on data obtained through the use of instrument adopted to gather, for the research work. It actually shows the extent to which the researcher can confidently rely on the information gather through the use of research instrument (questionnaire) adopted to gather data for the research work.

The study addressed the content validity through the review of related literatures and adapting instruments used in previous research carried out to assess the effect of perceived quality of mobile apps on users' satisfaction (O'Malley, 2014). Besides, to assure whether the measure adequately represented the underlying supposed to measure, theoretical assessment of validity was undertaken. Accordingly, the items were partially adopted from previous studies and partially based on the definition given by different researchers. Appropriate research procedures were also applied to find the answers to the basic question.

A reliability test has been carried out on the questionnaire using the Cronbach's alpha test. It is a coefficient of reliability used to measure its consistency of the scale; it represents as a number between 0 and 1. According to Zikmund (2010) scales with coefficient alpha between 0.6 and 0.7 or higher are considered adequate to determine reliability. Thus, the alpha coefficient was calculated for all factors, almost all constructs were between 0.708 and 0.874. As a result, all constructs were accepted as being reliable for the research. The alpha coefficient of the five mobile app quality attributes and customer satisfaction are shown on Table 4.1 below

Table 4.1 Reliability Analysis of the Variables

Variables	Cranach's alphas	No. of Items
EFF - Efficiency	0.874	5
AFF - Affection	0.708	4
CON - Controllability	0.728	5
LRN - Learnability	0.726	4
HLP - Helpfulness	0.824	5
US - Overall Customer Satisfaction	0.794	5

Source: Own Survey (2021)

4.2 Descriptive Analysis

To provide a clear picture regarding the study participants' demographic characteristics and their responses for the given questionnaires, descriptive analyses of respondents' profile and their respective perceptions on mobile app quality have been described below.

4.2.1 Demographic Characteristics

The results on Table 4.2 refers the demographic analysis of sex, age, employment, reason for being in Addis Ababa, type of smart phone brand owned, ride app used, and the rate at which the ride service used. These variables help to identify the background of the respondents.

The analysis of the data collected revealed that 171 (55.7%) of respondents were female and the rest 136 (44.3%) accounted for male counterparts. This implies that female respondents were relatively higher than men. Regarding their age, 127(41.4%) was found within the range of 20 – 30 years followed by 84(27.4%) from 31 – 40 years. While those in the range of 41 – 50 years and 51 – 60 years accounted for 70(22.8%) and 26(8.5%) respectively but no elder was found above 60 years. Their employment status shows that 99(32.2%) employed in different organizations and 139(45.3%) was self-employed while the rest 69(22.5%) unemployed.

Table 4.2 Demographic Profiles of Respondents

Description			Frequency	Percentage
Sex	Male		136	44.3%
	Female		171	55.7%
		Total	307	100.0%
Age	20 - 30 years		127	41.4%
	31 - 40 years		84	27.4%
	41 - 50 years		70	22.8%
	51 - 60 years		26	8.5%
	> 60 years		0	0.0%
		Total	307	100.0%
Employment	Employed		99	32.2%
	Self-Employed		139	45.3%
	Unemployed		69	22.5%
		Total	307	100.0%

Source: Own Survey (2021)
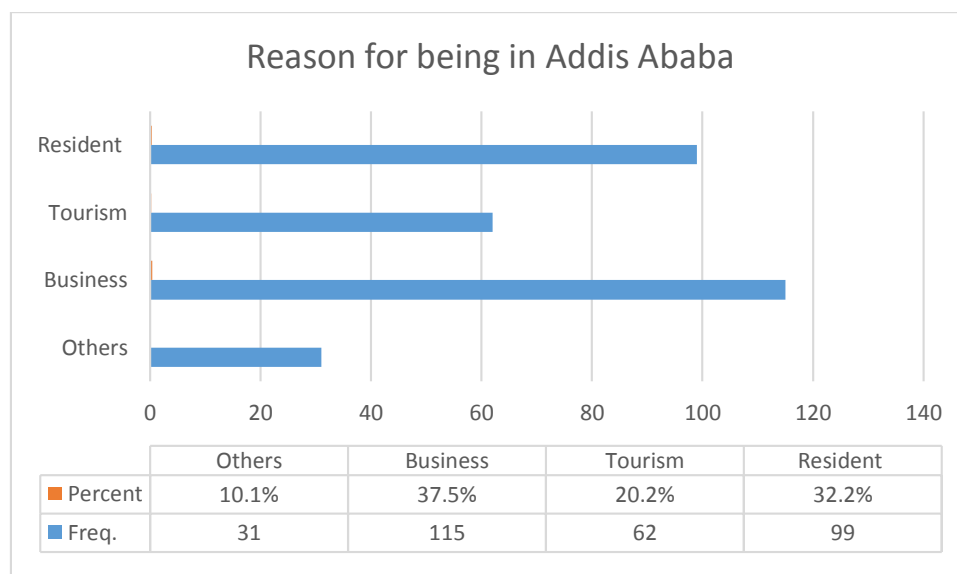
Figure -2. Reason for being in Addis Ababa

As far as the reason why respondents are in Addis Ababa, Figure-2, Ethiopia, those who were in Addis Ababa for business took the highest percentage 115(37.8%) followed by residents 99(32.2%) while the rest 62(20.2%) and 31(10.1%) were tourism and being here for different reasons respectively. It has the implication that the respondents contacted at international hotels came for business.

	Ride	I-phone	Techno	Huawei	Others
Percent	36.5%	30.0%	18.2%	11.7%	3.6%
Freq.	112	92	56	36	11
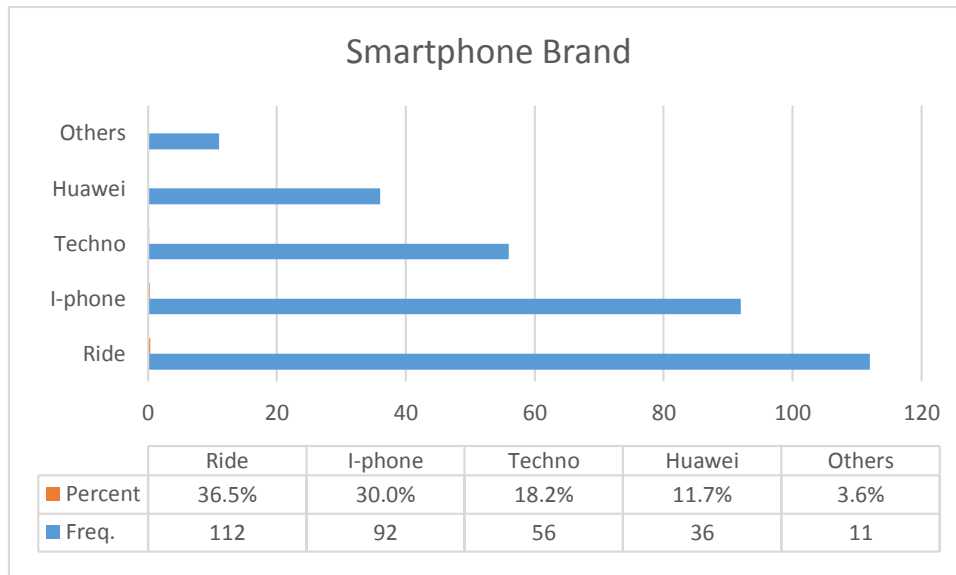
Figure-3. Smartphone Brand Preference

Figure-3., concerning the brand of the smart phone they owned, 112(36.5%) Samsung, 92(30.0%) I-phone, 56(18.2%) Techno, 36(11.7%) Huawei and 11(3.6%) other brands. It indicates that majority of the respondents who belonged to Samsung and I-phone took the highest share (66.9%).

	Ride	Feres	Taxiye	Seregela	Polo-Trip	Zay-Ride
Percent	39.7%	28.7%	6.5%	19.2%	3.9%	2.0%
Freq.	122	88	20	59	12	6

Figure -4. Application Preference

The e-hailing smart phone-based app, Figure-4., downloaded and used for taxi service by the respondents, Ride took the share of 122(39.7%), Feres 88(28.7%), Taxiye 20(6.5%), Seregela 59(19.2%), Polo-Trip 12(3.9%) and Zay-Ride 6(2.0%). The two apps, Ride and Feres, were found to be famous and most preferred mobile apps by the respondents.

	Day	Week	Month	As Demanded
■ Percent	10.4%	19.9%	28.7%	41.0%
■ Freq.	32	61	88	126
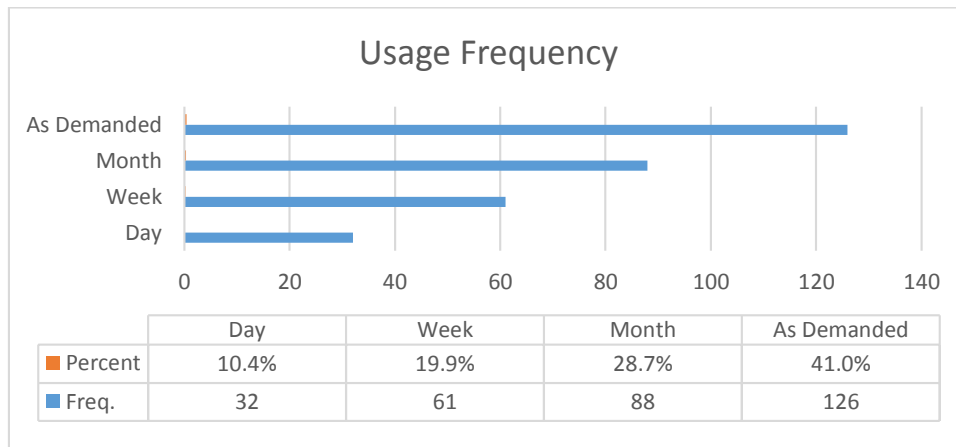
Figure-5. Usage Frequency

In terms of usage frequency, those respondents who use the preferred ride app "As demanded" took the share of 126(41.0%) followed by 88(28.7%) users of "At least once in a month". The rest 61(19.9%) and 32(10.4%) utilized the service "At least once in a week" and "At least once in a day" respectively. This implies that majority of the respondents preferred to use the ride taxi service when the need arises rather than using the service regularly.

4.2.2 Dimensions of Mobile Applications Perceived Quality

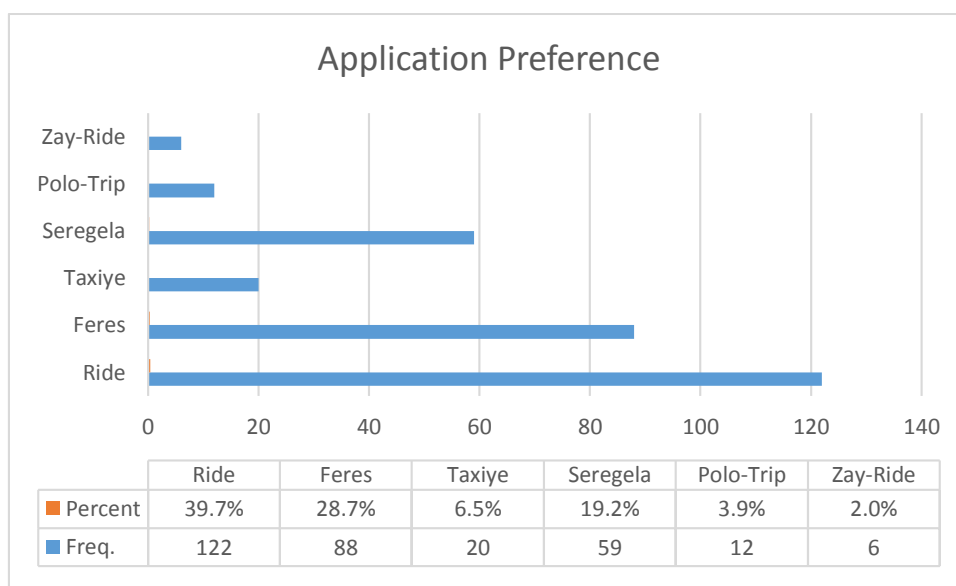Mobile app is an application software program designed for the execution of specific tasks through interaction of users. User satisfaction for using the apps is influenced by five related factors such as Efficiency, Affection, Helpfulness, Learnability and Controllability. Likert scale was used to measure the contribution of perceived quality of mobile apps dimensions for user satisfaction. On a five-point scale, respondents were asked to choose the number that best represented their point of view. The degree of agreement towards each attribute was set from 1 to 5 (where 5 is the highest/ strong agreement, and 1- is the highest/ strong disagreement). Accordingly, the translation of level ranking is analyzed based on the following criteria of customer satisfaction (Best, 1977). The mean scored value within the range of 1.00 – 1.80 is considered as the lowest satisfaction, 1.81 – 2.61 low satisfaction, 2.62 – 3.41 average satisfaction, 3.42 – 4.21 good (high) satisfaction, and 4.22 – 5.00 mean very good (highest) satisfaction. The results of the analyses presented as follows.

4.2.2.1 Efficiency

Table 4.3 Efficiency of Mobile Apps

Descriptive Statistics

	N	Mean	Std. Dev
Using ride app is suitable for performing the service effectively	307	2.96	1.530
The app provides accurate real-time information to complete the task	307	3.66	1.738
I know what to do next as the app has few steps (options)	307	2.72	1.145
I made a number of mistakes while using the app for the first time	307	2.71	1.516
The app has done the work properly as I expected in general	307	3.76	1.455
Grand Mean	307	3.1622	1.21510
Valid N (list wise)	307		

Source: Own Survey (2021)

Referring Table 4.3, the respondents strongly believed that the app provides accurate real-time information to complete the task (mean 3.66) and it has done the work properly as expected (mean 3.76). They neither agreed nor disagreed on that using the app is suitable for performing the service effectively (mean 2.96). However, they denied that they made a number of mistakes when they used the app for the first time (mean 2.71) and know what to do next as the app has few steps (options) with mean scored value of (mean 2.72).

4.2.2.2 Affection

Table 4.4 Affection of Mobile Apps

Descriptive Statistics

	N	Mean	Std. Deviation
The app Icon is appealing (eye-catching) elements	307	2.57	1.848
It really excites me using the app for ride taxi services	307	3.41	1.805
Menu organization or option lists are set logical	307	3.43	1.644
I feel comfortable while using the app	307	3.44	1.748
Grand Mean	307	3.2134	1.28675
Valid N (list wise)	307		

Source: Own Survey (2021)

The results in Table 4.4 show that majority of respondents agreed on the app really exciting to use the app for taxi services (mean 3.41), menu organization or option lists are set logical (mean 3.43), and also makes comfortable while using the app (mean 3.44) but the Icon is appealing

(eye-catching) elements (mean 2.57), It implies that the apps are not designed to be appealing for users. Aesthetic quality of app design has the potential to tempt users to download it even if they are not intending to use it.

4.2.2.3 Controllability

The results revealed that the respondents agreed that it is easier to use the app to get the metered taxi services with mean scored value of 3.97. They also confessed that sometimes the app stops suddenly (mean 3.42). They thought that all things are under their control (mean 3.43). but respondents disagreed on theapp's execution speed (mean 2.60) and the correct order (mean 2.56). It has an implication of they weren't sure about following order.

Table 4.5Controllability of Mobile Apps

Descriptive Statistics

	N	Mean	Std. Dev.
It is easier to use the app to get the metered taxi services	307	3.97	1.242
The apps execution speed (response) is fast	307	2.60	1.752
Sometimes I am not sure about using the correct order	307	2.56	1.813
Sometimes the apps stop suddenly	307	3.42	1.583
When I am using the apps, I think that all things are under my control	307	3.43	1.602
Grand Mean	307	3.1954	1.11442
Valid N (list wise)	307		

Source: Own Survey (2021)

4.2.2.4 Learn ability

The result, Table 4.6, shows that the respondents disagreed on the idea that the primary learning is not as such difficult with the apps, with mean scored value of 2.73. The respondent agreed on doesn't need long time to learn how to use the app fully with mean value of 4.06. But they were indifferent regarding the app has clear (understandable) method of displaying information with mean scored value of 3.36 and ease of learning all features of the app relatively within a short period with mean value of 3.50, this implies that majority of the respondents have negative perception to the learn ability of the apps for the fact that they didn't incorporate or have local language option in their versions.

Table 4.6 Learn ability of Mobile Apps

Descriptive Statistics

	N	Mean	Std. Deviation
Primary learning is difficult with the apps	307	2.73	1.684
It is easy to learn all features of the app relatively within a short period	307	3.50	1.819
The app has clear (understandable) method of displaying information	307	3.36	1.821
It needs long time to learn how to use the app	307	4.06	1.684
Grand Mean	307	3.4121	1.29904
Valid N (list wise)	307		

Source: Own Survey (2021)

4.2.2.5 Helpfulness

Table 4.7 Helpfulness of Mobile Apps

Descriptive Statistics

	N	Mean	Std. Deviation
There is not enough information on the screen when necessary	307	3.14	1.929
Auxiliary info presented by the apps are enough for better guidance	307	2.74	1.981
The apps provide voice assistance for disabled persons (visually impaired)	307	2.49	1.860
When I use these apps, sometimes I need someone's assistance to operate	307	3.72	1.771
I think that sometime using theses apps put me in trouble	307	3.94	1.742
Grand Mean	307	3.2065	1.42451
Valid N (list wise)	307		

Source: Own Survey (2021)

Table 4.7 revealed that the respondents expressed their disagreement on the auxiliary information presented by the apps are enough for better guidance and provided voice assistance for disabled persons (for instance visually impaired users) with mean scored value of 2.74 and 2.49 respectively. On top of that they were also indifferent regarding the presence of enough information on the screen when necessary (mean 3.14). The respondents agreed on didn't need assistant (mean 3.72) and sometime using theses apps didn't put them in trouble (mean 3.94). It has the implication that majority of the respondents (mean 3.20) claimed the lack of sufficient

information provided by the respective mobile apps. So that, it can be concluded that helpfulness of the apps is in question.

4.2.2.6 Overall User Satisfaction

The overall user satisfaction, Table 4.8, shows that majority of the respondents were strongly satisfied with the apps for the fact that it made the service much easier for them (mean 3.95); satisfied with the apps that as it doesn't require a lot of mental effort (3.43); and their overall experience of the apps use were found to be very contented (mean 3.49). But they neither agree nor disagree on they intended to keep on using the apps rather than taking taxi in conventional way (mean 3.13). However, they had doubt on the helpfulness of the apps (mean 2.55). It can be concluded that the overall user satisfaction was found to be slightly satisfactory implying that the existing apps in use requires improvement or software updates accordingly.

Table 4.8 Overall User Satisfaction

Descriptive Statistics

	N	Mean	Std. Deviation
I'm satisfied with the app as it was found to be helpful	307	2.55	1.433
I'm delighted to use the app as it made the service much easier for me	307	3.95	1.374
I intend to keep on using the app rather than taking taxi in conventional way	307	3.13	1.024
I'm pleased as interacting with the app doesn't require a lot of mental effort	307	3.43	1.429
My overall experience of the app use was very contented	307	3.49	1.030
Grand Mean	307	3.3094	.94226
Valid N (list wise)	307		

Source: Own Survey (2021)

4.3 Inferential Analysis

4.3.1 Relationship Between Mobile Apps and User Satisfaction

To explore the relationship between mobile app quality dimensions and user satisfaction, Pearson correlation was first investigated. The five dimensions of smart phone based mobile apps perceived quality were taken as independent variables and user satisfaction as a dependent variable in this study.

Table 4.9 below shows the correlation between the five dimensions of promotional mix and consumer preference. The results of the relation test show that there is a strong and positive and significant relationship with user satisfaction. Effectiveness (r = 0.592), Controllability (r = 0.582), Learn ability (r = 0.550) but Helpfulness (r = 0. 488) and Affection (r = 0.427) exhibited positive and moderate relationship.

Table 4.9 Correlation Analysis of Variables

Correlations

		EFF	AFC	CON	LRN	HLP	SAT
EFF	Pearson Correlation	1					
	Sig. (2-tailed)						
	N	307					
AFC	Pearson Correlation	.161**	1				
	Sig. (2-tailed)	.005					
	N	307	307				
CON	Pearson Correlation	.572**	.202**	1			
	Sig. (2-tailed)	.000	.000				
	N	307	307	307			
LRN	Pearson Correlation	.241**	.412**	.455**	1		
	Sig. (2-tailed)	.000	.000	.000			
	N	307	307	307	307		
HLP	Pearson Correlation	.344**	.307**	.125*	.186**	1	
	Sig. (2-tailed)	.000	.000	.029	.001		
	N	307	307	307	307	307	
SAT	Pearson Correlation	.592**	.427**	.582**	.550**	.488**	1
	Sig. (2-tailed)	.000	.000	.000	.000	.000	
	N	307	307	307	307	307	307

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

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

Source: Own Survey (2021)

4.3.2 Assumption Test for Regression Analysis

The regression analysis is the final step to disclose the information about the unique contribution of each app perceived quality dimensions and its' effects on user satisfaction. The dependent variable is a variable which is dependent on independent variables (Pallant, 2005). The regression includes a dependent variable (user satisfaction) and five independent variables (Effectiveness, Affection, Controllability, Learnability and Helpfulness).

A multiple regression analysis explores the inter-relationship between several variables and provides information about what variable that best predict a specific outcome. For example, the

test uncovers information about the unique contribution of each variable that the theoretical SUMI model consists of. In this study a standard multiple regression analysis is conducted. This means that one dependent variable and all the independent variables are entered in to the regression equation at once instead of entering them step by step. The results of this regression are also generalizable (repeatable), due to the calculated sample size of 307 respondents, which increases the reliability of the study. Meeting the assumptions of regression analysis is necessary to confirm that the obtained data truly represented the sample and that researcher has obtained the best results (Hair, 1998). A number of assumptions such as normality, homoscedasticity, multi-collinearity and linearity for regression analysis used in this study is discussed for the individual variables. In the following paragraphs, each assumption is explained.

4.3.2.1 Multi-Collinearity Test

For the independent variables to be accepted, the correlation between the variables must not exceed a '*r*' -value of 0.7. One of the methods to inspect if the predictor variables are relevant to include in the multiple linear regression model is to look at the correlation values. If the correlation is too high, the independent variables must be modified (Pallant, 2005). The initial inspection of thePearson Correlation Matrix (Table 4.9) for the regression models revealed that the correlations between the independent variables did not exceed 0.80. While checking, the independent variables showed significant relation with the outcome variable (above (*r*) 0.3 preferably). Also, the researcher checked that the correlation between each of independent variables is not too high. As it can be observed from the results, no correlation between the predictor variable which is above 0.7. Thus, all variables are retained. this could be taken as a confirmation that there was no multi-co linearity problem to proceed for regression analysis.

Table 4.1: Collinearity Diagnosis

Coefficients[a]			
Model		Collinearity Statistics	
		Tolerance	VIF
1	Efficiency	0.294	3.401
	Affection	0.261	3.831
	Controllability	0.185	5.405
	Learnability	0.472	2.119
	Helpfulness	0.595	1.681
[a.] Dependent Variable: Purchase Intention			

Source: Own Survey, 2021

4.3.2.2 Normality Test

According to Bagozzi and Yi (1998), one of the major things that should be done in the evaluation of regression analysis is assessment of the adequacy of input data and statistical assumption underlying any estimation methods used in analysis. The estimation of multi-regression model requires continuous data with normal distribution. A common rule-of-thumb test for normality is to run descriptive statistics to get skewness and kurtosis. Both Skew and Kurtosis should be within the +2 to -2 range when the data are normally distributed (Hair, 1998). Normality test was conducted with SPSS and all the six variables found within the range.

Table 4.2: Normality of Distribution

	Descriptive Statistics				
	N	Skewness		Kurtosis	
	Statistic	Statistic	Std. Error	Statistic	Std. Error
Efficiency	302	-.589	.135	-.184	.270
Affection	302	-.527	.135	-.044	.270
Controllability	302	-.447	.135	-.424	.270
Learnability	302	-.580	.135	.166	.270
Helpfulness	302	-.623	.135	-.105	.270
User Satisfaction	302				

Source: Own Survey, 2021

4.3.2.3 Linearity

The linearity of the relation between the outcome and explanatory variable represented the extent to which the change in the outcome variable is associated with the predictor variable (Hair, 1998). Conventional regression analysis will underestimate the relationship when nonlinear relationships are present, i.e., R^2 underestimates the variance explained overall and the betas underestimate the individual importance of the explanatory variables involved in the non-linear relationship. Substantial violation of linearity implies that regression results may be more or less unusable (Malhotra, 2007).
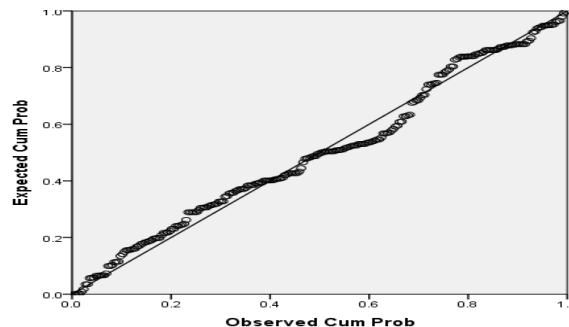

Figure -6. Scatter Plot for Linearity Test

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4.3.2.4 Homoscedasticity

Hair (1998) identifies homoscedasticity as homogeneity of variance. This assumption is referred to as the description of data in which the variance of the error terms (e) appears constant over the range of values of an independent variable. The assumption of equal or uniform variance of the population is critical to the proper application of linear regression. When the error terms have increasing or modulating variance, the data are considered as heteroscedastic. In general, heteroscedasticity is the result of non-normality of one of the variables, and the correction of the non-normality remedies the unequal dispersion of variance. The errors were expected to have equal variances. In the scattered residual plots, the residuals scattered randomly about the zero line and didn't exhibit a triangular-shaped pattern, thus providing sufficient evidence to satisfy the assumption for homoscedasticity of the error terms.
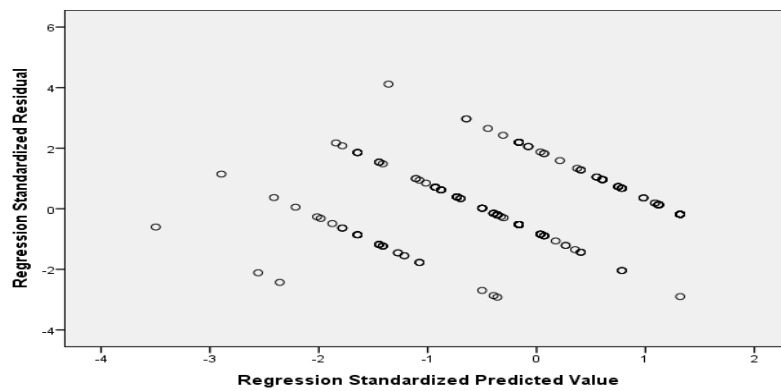

Figure 7: Frequency Distribution of Standardized Residuals

4.3.3 Multi-Regression Analysis

To investigate the impact of smart phone based mobile apps' perceived quality dimensions on overall user satisfaction, User Satisfaction (US) score was regressed against mobile apps quality dimensions. Multi-regression analysis was applied to investigate the relationship aiming to see the degree to which overall user satisfaction is affected by apps' quality. The results have been derived from three major regression analyses such as Model Summary, ANOVA test and coefficient analysis.

4.3.3.1 Model Summary

The regression model presents how much of the variance in the measure of user satisfaction of the respondents is explained by the underlying dimensions of mobile apps' perceived quality model. The model or the predictor variables have accounted for 64.1 % (R^2) of the variation in

consumer satisfaction. However, the remaining percent (35.9%) was explained by other variables not included in this study.

Table 4.12 Regression Model Summary

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.801[a]	.641	.635	.56925

a. Predictors: (Constant), HLP, CON, AFC, LRN, EFF

Source: Own Survey (2021)

4.3.3.2 ANOVA

The ANOVA table shows if the regression model is significant. The significance value of this regression model is 0.000, which equals $p < 0.05$, and 'F' equals 107.482, which means that the model reaches statistical significance (Pallant, 2005) implying that the variation explained by the model is not due to chance.

Table 4.13 ANOVA Table

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	174.145	5	34.829	107.482	.000[b]
	Residual	97.537	301	.324		
	Total	271.683	306			

a. Dependent Variable: SAT

b. Predictors: (Constant), HLP, CON, AFC, LRN, EFF

Source: Own Survey (2021)

4.3.3.3 Coefficients

The unstandardized coefficient refers to the direction of the relationship and the amount of change that the different independent variables contribute to User Satisfaction given that one unit change in the value of the independent variable. Table 4.14 shows that the effect of a unit change in "Effectiveness" attribute, User Satisfaction would increase with 0.719 units, given that all other variables in the model are constant. The results (estimated coefficients) revealed that there is positive and strong relation between mobile apps quality and User Satisfaction except Affection dimension with positive but weak relationship (beta value of .104). Amongst the predictors, Effectiveness took relatively the highest value ($\beta = .212$) followed by Controllability ($\beta = .205$), Learnability ($\beta = .192$) and Helpfulness ($\beta = .179$).

Table 4.14 Coefficients

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.421	.130		3.228	.001
	EFF	.212	.035	.273	6.090	.000
	AFC	.104	.029	.142	3.610	.000
	CON	.205	.039	.242	5.219	.000
	LRN	.192	.030	.265	6.334	.000
	HLP	.179	.026	.271	7.008	.000

a. Dependent Variable: SAT

Source: Own Survey (2021)

Moreover, all predictors (independent) dimensions have statistically significant relationship with the criterion (dependent variable) for the fact that ***p-value*** was found to be less than 0.05. The established regression function is:

SAT = .421 + 0.212 EFF + 0.104 AFC + 0.205 CON + 0.192 LRN + 0.179 HLP

To conclude, among the five underlying determinants, Effectiveness, Controllability and Learnability have the highest significant effect on User Satisfaction while and Helpfulness and Affection get moderate but significant effects. Therefore, based on Table 4.15, the results indicate that a significant relationship between the independent and dependent variables. Since, coefficients of the predictors are statistically significant at less than five percent; alternative hypotheses related to all the five dimensions of mobile apps perceived quality were supported.

Table 4.15 Summary of the Overall Outcomes of the Research Hypotheses

Alternate	Hypothesis	Result
H1	Effectivity has significant effect on User Satisfaction	Supported
H2	Affection has significant effect on User Satisfaction	Supported
H3	Controllability has significant effect on User Satisfaction	Supported
H4	Learnability has significant effect on User Satisfaction	Supported
H5	Helpfulness has significant effect on User Satisfaction	Supported

4.4 Discussion

The basic aim of this study concerned with the attributes of smart phone based mobile apps perceived quality and their influence on user satisfaction taking Ethiopian ride-hailing taxi service providers as a case study. The objectives were set to explain the effects of mobile apps quality on user satisfaction within the industry by analyzing the relationship of the constructs depicted on the conceptual framework. The exceedance of ride taxi mobile app users' expectation is measured based on the Software Usability Measurement Inventory (SUMI) model (O'Malley, 2014). The model attributed the efficiency, affection, controllability, learnability and helpfulness. Based on these attributes, the findings of the study are briefly discussed below.

Efficiency of the e-hailing apps, the degree to which the apps enabled the user to complete the request of the ride taxi service successfully, was found to be relatively the highest influence (β = .212) on user's satisfaction. It reconciles or supported by Kim (2014) for the fact that his study showed that provision of app software aided the government to help cities and public transit agencies improve their operational efficiency resulted in attracting more investments and engagement of better riders as well. The implication is that well developed ride apps are more efficient to carry out a given task successfully with satisfactory perceived usage consequences.

The extent of user's emotional feeling to the ride hailing apps, the affection, exhibited the least effect (β = .104) on exceeding user expectation. Mobile apps, designed for entertainment (mobile commerce, games, music, etc.), are more influential on the continued usage behavior (O'Malley, 2014). Thus, the intention of using the apps more and more in ride-hailing service has less to do with the affection of the users as they may use only the demand of door-to-door taxi service are arising.

On the other hand, the rate at which the ability of the apps to respond to the user's input in consistent manner (controllability with β = .205) and the degree to which the apps are straightforward to use (learnability with β = .192) appeared to have substantial influence in exceeding satisfaction through contributing for the ease of apps usage by ensuring unnecessary interruptions are avoided. Besides, it implies that the visibility of the system based on the action currently performed are believed to be enough for the user to know what an app is doing (Harrison, 2013).

Similarly, the provision of auxiliary information to the intended users (helpfulness with β = .179) exhibited positive and significant but relatively weak relation with user satisfaction. Harrison (2013) in his study, tried to show the situation or environment in which an individual is using a

mobile application. It includes user's location and involvement in other activities while using a mobile application. User's situation or the context they are using their mobile apps to call a taxi determines the mood to read or give attention to the auxiliary information provided by the apps. So as to ensure satisfaction, developers and ride taxi service providers should put this into consideration by determining specific, accurate and precise level of information through the display of only the required information.

It can, thus, be concluded that in mobile apps, satisfaction is determined by what user's perceived about the apps in terms of their efficiency, affection, controllability, learnability and helpfulness. Cognitive (affective) and behavioral (intentional) elements show the processes involved in how users judge whether they are satisfied as they relate to mental requirements for using an app and their intention to continue to use an app because of the benefits they have derived. Ensuring their satisfaction is possible if service providers and software developers understand how users perceive things around them. Along with strictly following development/ technical standards, promoting ease of apps use within the scope of their capability and providing precise auxiliary information.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

This chapter comprises the summary of major findings, conclusions and then suggested recommendation related to the findings and their respective conclusion.

5.1 Summary of Major Findings

The purpose of this research was to determine the effect of smart phone based mobile apps quality on user satisfaction in the case of ride service providers in Addis Ababa, The escalating demand of public transportation is substantially aggravated by growth of population, disproportional urbanization, individual disposable income, and lack of sufficient infrastructure. The stated factors, along with other related issues, have played their own contribution for the emergence of e-hailing taxi services providers in Ethiopian transportation industry. For the last two years, a number of "On-Call" and "Mobile Apps" based e-hailing service providers are actively taking parts in the sector. Amongst them, six private companies namely Ride, zay-ride, Polo-Trip, Taxiye, Seregela and feres launched their own smart phone apps. However, the applications software is designed and developed by outsourced foreign Software Engineering Companies. During the development cycle, one of the major activities is pretesting the quality of the apps based on users' perception. Before their implementation, the apps' Effectivity, Affection, Controllability, Learnability and Helpfulness should have been tested locally in Ethiopian users' context.

Hence, this study tried to identify and fill the gap through detailed investigation of ride mobile apps quality along with which determinant has the highest influence on user satisfaction. SUMI model was applied to address the stated research questions on the basis of underlying theories. It considered five determinants namely Effectivity, Affection, Controllability, Learnability and Helpfulness. A sample size was selected using convenience sampling technique. Based on the theoretical frame work and objectives of the study 28 items were provided in a 5-point Likert scale to the respondents. The gathered data were analyzed by inferential analysis using descriptive and inferential statistics. The analyses had been done based on the primary data collected through self-administered questionnaires from a total of 307 respondents. The major findings revealed how smart phone based mobile apps perceived quality dimensions affect satisfaction e-hailing taxi service users in Addis Ababa.

The relationship between each predictor and the construct was investigated. All the predictors showed positive relationship. This could be taken as a confirmation that there were no multi-co linearity problems to proceed for regression analysis.

On top of that, multiple linear regression analysis was carried out to determine the extent to which the predictor variables contributed for overall User Satisfaction. As it can be inferred from the model summary, mobile apps quality is accounted for 64.1% of User Satisfaction ($R^2 = 0.641$). The variation analysis (ANOVA) analysis confirmed a good fit was established between mobile apps quality and user satisfaction with *P<0.05*. Regarding the comparison of their effect on the construct, beta values were analyzed. The results revealed that all attributes had positive and significant effect on the user satisfaction. Effectiveness had the highest influence ($\beta = .212$) followed by Controllability ($\beta = .205$) followed by Learn ability($\beta = .192$) and Helpfulness ($\beta = .179$) and whereas Affection showed significant but relatively the least effect with value of ($\beta = .104$). It has an implication of respondents' doubt on their contribution in exceeding expectation rather than mere appealing features.

5.2 Conclusions

Now a day social and technological forces have been pushing smart phone apps from the peripheral to the mainstream. Consideration and understanding the role of user perception towards transportation apps in urban and suburban mobility is vital for strategic planning and business enhancement. Mobile app software designers and developers are playing the major role in improving usability of smart phones resulted in assuring user satisfaction. The need for evaluating or assessing the level of user's perception towards the quality of transportation (ride e-hailing taxi services) apps in Ethiopian context emanated from the fact that no efforts had been done to pretest the apps during their respective development cycles. However, assessing the gaps and acting accordingly for the implemented ride apps helps for further update or improvement. Based on this premise, the researcher motivated to conduct the study to determine the effect of smart phone based mobile apps' quality on user satisfaction in the case of ride e-hailing service providers in Addis Ababa.

On the basis of the major findings of this study, it revealed clear links between mobile apps quality and user satisfaction that helps to deeply understand the relationship and interaction between them. The findings support the assumption that apps quality dimensions can enhance the exceedance of customer's expectation for longer period and in turn increase repetitive use of the service. In these regards, the Ride e-hailing mobile apps perceived quality in terms of

efficiency, affection, controllability; learnability and helpfulness have significant and positive effect on User Satisfaction. Efficiency of the apps, the extent to which the apps enable the users to complete the ride service request accounted for relatively highest contribution satisfaction for user. User's controllability, the rate at which the apps respond to their respective input in a consistent manner, is also the related factors that determine user satisfaction. Similarly, the degree to which the apps are straight forward to use also describe their significant perception. But, the provision of helpful communication and the extent of user's emotional feeling to the apps have given less attention.

At the beginning, it was hypothesized that all the five determinants of apps perceived quality have significant and positive effect on user satisfaction. After the analysis was done, the major determinants' contribution, their significant causal relationship and level of effect on user satisfaction were identified in the Ethiopian e-hailing taxi services context. Perceived ease of use determines user's satisfaction as people prefer to use an application that requires minimum mental effort. If cognitive requirement is too high, users will prefer to switch to an application that only requires small cognitive processing. Meanwhile, ensuring real satisfaction, developers made efforts to put the cognitive desires into consideration by determining proper level of context information through the display of only the required information. It ensures that users have total control of the application because if an application malfunctions unexpectedly, the user's perception of control will be weakened. In this regard, the credibility of the analysis findings is supported for the fact that Efficiency, Controllability, Learnability imposed relatively high impact on satisfaction, thus, all the five proposed hypotheses were supported. Since homogeneity of apps quality is inevitable, service providers need to exert more efforts in mitigating the hassles to use them for the intended purpose.

5.3 Recommendation

E-hailing taxi service providers in Ethiopia outsourced apps designed and developed by outsourced companies in abroad. There is no mechanism to understand what user perceive or react while using ride apps. Ensuring their satisfaction has been seen as a good idea as it allows users enjoy an application, makes life easier, decide to reuse the apps again and also prompts them to other people. This research, thus, has explored smart phone mobile apps quality based on user's perception from psychological and behavioral perspectives. Referring the major findings and conclusions, the following recommendations are proposed.

- Ride e-haling service providers in Addis Ababa should update their respective mobile apps to enhance perceived usefulness through minimizing complexity of lengthy procedures to catch the taxi service.

- The app Icon should add appealing or eye-catching elements to make the app more attractive.

- Taking the individual user's demographic and psychographic differences into consideration, the apps should be updated for their ease of learnability, the extent to which the apps are straight forward to use through incorporating local languages.

- The ride apps need to incorporate short, precise and relevant information to promote their respective apps helpfulness.

- More research work is needed to be done in the aspect of evaluating the effect of each app's quality and their compatibility with different mobile brands in terms of screen size, battery life, wireless connectivity and perceived value. This may help mitigation of apps related issues due to lack of standards. More practical work should be carried out to help developers in this aspect.

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Appendices

Appendix I – Survey Questionnaire

ST. MARY'S UNIVERSITY
SCHOOL OF GRADUATE STUDIES
DEPARTMENT OF MARKETING MANAGEMENT

Survey Questionnaire

Dear Respondents,

My name is HamdiaNegmu, a postgraduate student of st, mar's University School of Business and Economics. I am conducting my study entitled "the effect of Smartphone based e-hailing mobile applications on user satisfaction in the case of Ethiopian Ride Taxi services." The purpose of this questionnaire is to gather information regarding the quality of mobile based e-hailing applications based on ride taxi services users' perception. It helps to estimate the level of user's satisfaction on the basis of the perceived quality of the service. Your honest and sincere responses for this questionnaire will play a great role in making the research successful. I assure you that all the responses will be treated confidentially and only be used for academic purpose. Participation is purely voluntary and no need to write your name.

I thank you in advance for offering your golden time and if you have any question, please feel free to contact me by the below contact:

HamdiaNegmu
Phone: +251 912353641
Email: hebe2mare@gmail.com

Part 1: General Information about the Respondents

1. Sex

   ☐ Male
   ☐ Female

2. Age

   ☐ 20 – 30 years
   ☐ 31 – 40 years
   ☐ 41 – 50 years
   ☐ 51 – 60 years
   ☐ Above 60 years

3. Your employment status

   ☐ Employed
   ☐ Self-employed
   ☐ Unemployed
   ☐ Other (please specify) _____

4. The reason you are in Addis Ababa

   ☐ Resident
   ☐ Tourist
   ☐ Business
   ☐ Other (please specify) _____

5. Type (brand) of smart phone owned

   ☐ Samsung
   ☐ IPhone
   ☐ Huawei
   ☐ Techno
   ☐ Other (please specify) _____

6. Which Ride Taxi service apps do you prefer mostly? (choose only the best one)

   ☐ Ride
   ☐ Zay-Ride
   ☐ Polo-Trip
   ☐ Seregela
   ☐ Taxiye
   ☐ feres

7. How often do you use Ride Taxi services in Addis Ababa?

   ☐ At least once in a Day   ☐ At least once in a week
   ☐ At least once in a month   ☐ As demanded

Part 2: Perceived quality of Smartphone based e-hailing applications

This section is aimed to gather data regarding the rating of smartphone-based ride taxi service apps based on users' perception. It helps to evaluate the level of user satisfaction arose from quality of smartphone apps implemented by ride taxi service providers. Each statement relates to your feelings about the service based on your experience. The rating is organized in five Likert scale measurement which facilitates your level of evaluation by ticking (√) under the codes of the five alternatives offered. The score levels are described as:

1- Strongly Disagree; 2- Disagree; 3- Neutral; 4- Agree; 5- Strongly Agree

Code	Description	Likert Scale				
	Efficiency	1	2	3	4	5
EFF1	The apps provide accurate real-time information to complete the task					
EFF2	Using ride apps are not suitable for performing the service effectively					
EFF3	I have made a number of mistakes while using the apps for the first time					
EFF4	Often, I don't know what to do next as the app has many steps (options)					
EFF5	The app has not done the work I expected in general					
	Affection	1	2	3	4	5
AFC1	The app Icon is appealing (eye-catching) elements					
AFC2	It really excites me using the apps for ride taxi services					
AFC3	Menu organization or option lists are set logical					
AFC4	I feel comfortable while using the apps					
	Controllability	1	2	3	4	5
CON1	It is easier to use the app to get the metered taxi services					
CON2	The apps execution speed (response) is fast					
CON3	Sometimes I am not sure about using the correct order					
CON4	Sometimes the apps stop suddenly					
CON5	When t am using the apps, I think that all things are under my control					
	Learnability	1	2	3	4	5
LRN1	Primary learning is difficult with the apps					
LRN2	It is easy to learn all features of the app relatively within a short period					
LRN3	The app has clear (understandable) method of displaying information					
LRN4	It doesn't need long time to learn how to use the app					
	Helpfulness	1	2	3	4	5
HLP1	There is not enough information on the screen when necessary					
HLP2	Auxiliary info presented by the apps are enough for better guidance					

		1	2	3	4	5
HLP3	The apps provide voice assistance for disabled persons (visually impaired)					
HPL4	When I use these apps, sometimes I didn't need someone's assistance to operate					
HLP5	I think that using this apps didn't put me in trouble					
	Overall Satisfaction	1	2	3	4	5
SAT1	I'm satisfied with the app as it was found to be helpful					
SAT2	I'm delighted to use the app as it made the service much easier for me					
SAT3	I intend to keep on using the app rather than taking taxi in conventional way					
SAT4	I'm pleased as interacting with the app doesn't require a lot of mental effort					
SAT5	My overall experience of the app use was very contented					

Thank you for your valued time, response and cooperation!!!