FACTORS AFFECTING CUSTOMER VALUE, SATISFACTION, AND LOYALTY OF DIGITAL SELF-SERVICE MOBILE APPLICATIONS

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DECLARATION

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Dr. Kutila Gunasekera

(Research Supervisor)

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ABSTRACT

Most of the people in society use different kinds of mobile applications and tend to use digital self-service mobile applications to help their day-today lifestyle. Digital self-service mobile applications which allow users to take the service or do a transaction without having the help of customer representatives play a major role in this century. This research found what are the factors that affect customer value, satisfaction, and customer loyalty on digital self-service mobile applications. Having proper knowledge about these factors will help mobile application service providers to retain their customers. According to the findings of the present study, customer loyalty is impacted by customer value, satisfaction, and perceived value. Customer satisfaction is impacted by customer value, utilitarian benefits, and perceived value. Furthermore, incentive affects the customer value of digital self-service mobile applications. Therefore, digital self-service mobile application providers, marketing teams, and development teams of the digital self-service mobile application need to pay more attention to above mentioned factors.

Keywords: *Customer Loyalty, Customer Value, Customer satisfaction, Digital Self-Service mobile applications, Perceived value, Utilitarian benefits, Hedonic benefits, Incentives*

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1. INTRODUCTION

1.1. Chapter overview

There are 2.7 billion smartphone users all over the world. Also, there are 2.56 billion apps available in the Google Play Store and 1.847 billion mobile apps available in the Apple App Store. If we look at app downloads per year, in 2019, there are more than 205 billion downloads. These downloads are gradually increasing each year. There are so many apps available that provide the same facility. For example, there are so many mobile messaging applications available in the play store.

However, consumer loyalty towards these mobile applications changes rapidly. It is essential to understand the customer value of these mobile applications, because different customers attach different customer values based on the benefits they get.

In any market, getting new users is more expensive than keeping old ones. It applies to mobile apps as well. Therefore, it is important for mobile application providers to know about customer values, satisfaction, and loyalty to enhance their business in the mobile app industry.

1.2. Background - Motivation

M-commerce refers to purchasing and selling goods and services via wireless handheld devices (“App Stores List (2020),” Business of Apps, May 12, 2017.). Most businesses decided to provide mobile service applications while providing web services as well as some businesses providing their products and services only via mobile applications. Customers may tend to use mobile applications to get these products and services. This is due to reasons such as easy access, restricted but frequently used features, valuing the customers time, twenty-four-hour service, increased intelligent Chabot use, anytime at your fingertips, personalized discounts and other personalized facilities, reaching the customer at the right time, access to the global market and many more.

A digital self-service mobile application could be defined as a mobile application that allows a user to obtain information or complete a business function/transaction without requiring the help of a customer representative.

In this m-commerce world, digital self-service mobile applications play a major role. For example, Network Service Providers (NSP) facilitate their service through digital self-service mobile applications. Especially when it comes to digital self-service web portals in Sri Lanka, some NSPs do not facilitate activation, deactivation, and upgrade of packages via the web portal. However, they facilitate these kinds of services via their digital self-service mobile application.

If we go through the previous literature which relates to customer satisfaction, value, and loyalty, such as (Chang, 2015), (Xu, Peak, and Prybutok 2015), etc., they are more generalized to mobile applications and do not discuss digital self-service mobile applications. Therefore, this research further investigates that area that has not been paid sufficient attention in previous literature.

1.3. Problem statement

There are billions of mobile applications available in app stores. As per Riley Panko (2018), 51% of users delete mobile apps within one week. Out of these users, 32% of them delete the app as it was never used and 26% of them delete the app because that app did not fulfill their needs. The same behaviour is observed even for digital self-service mobile applications, where customer value, satisfaction, and loyalty change rapidly. Hence, understanding and enhancing those aspects is important for digital self-service mobile application providers and their marketing teams. While related work discusses many aspects of customer value, satisfaction, and loyalty in mobile commerce, there seems to be no attention on these aspects in the context of digital self-service mobile applications. If we investigate literature related to value, satisfaction, and loyalty, they focus on typical paid and free mobile applications, and do not cover specialized mobile applications like digital self-service mobile applications. Further, factors mentioned in the literature such as “enjoyment' '(Xu, Peak, and Prybutok 2015) may not affect the digital self-service mobile applications as it is external to the mobile app. Even though the literature identifies “incentives” as important, its impact has not been measured (Malik, Suresh, and Sharma 2017). Incentives are important as promotional offers and discount coupons are known to affect customer value, satisfaction, and loyalty on digital self-service mobile applications (DSSMA). Therefore, in this project, I plan to fill this research gap by identifying the factors that specifically affect the customer value, satisfaction, and loyalty on digital self-service mobile applications.

1.4. Research Question

What are the factors affecting the customer value, satisfaction, and loyalty of digital self-service mobile applications?

1.5. Research Objective

The current study is expected to identify factors affecting customer value, satisfaction, and loyalty on digital self-service mobile applications. To solve the above research question, this study aims to achieve the following objectives.

There are three major objectives of this research.

- To identify the key factors affecting customer value, satisfaction, and customer loyalty of mobile applications
- To identify how different factors, influence customer value, satisfaction, and customer loyalty of digital self-service mobile applications
- To provide recommendations on how to maintain and improve customer value, satisfaction, and customer loyalty on digital self-service mobile applications by reducing the impact of affected factors.

1.6. Research Design

This research focuses on the factors affecting customer value, satisfaction, and customer loyalty of Digital Self-Service mobile applications. The target population is users of the digital self-service mobile applications in Sri Lanka.

As the first step of this study, a literature review is conducted to identify the factors that affect customer value, satisfaction, and customer loyalty of mobile applications. Then a methodology is developed based on the identified factors to address the problem of the research.

The quantitative methodology has been used. To capture the identified factors, hypotheses are developed, and a questionnaire developed to capture the variables. The *Convenience Sampling* method used to distribute the questionnaire. Finally, based on the survey responses, the factors

affecting the customer value, satisfaction, and loyalty on digital self-service mobile applications in Sri Lanka will be identified and recommendations are given on how to improve the same.

1.7. Importance of the study

- Help the digital self-service mobile application providers to identify the factors that affect customer value, satisfaction, and customer loyalty.
- Digital self-service mobile application providers and their marketing teams will be able to reduce affecting factors and enhance customer value, satisfaction, and customer loyalty.
- Development teams of the digital self-service mobile applications will be able to pay more attention to enhance customer satisfaction when they develop the application.
- The marketing team will be able to plan promotional campaigns to enhance customer value, satisfaction and customer loyalty towards their application and their product/ service.

1.8. Structure of the thesis

This thesis is divided into five chapters, each of which is briefly described below.

Chapter 1 includes the background of the study, research question, and objectives.

Chapter 2 includes the literature review of the customer value, satisfaction and customer loyalty towards mobile applications and identifies the factors that affect them.

Chapter 3 provides the methodology of the present study, and detailed explanation of the framework, variables defined, hypothesis, questionnaire instrument.

Chapter 4 consists of the statistical analysis of the collected data and the results.

Chapter 5 contains the observations and recommendations based on the analytical results. And the limitations of the present study and further steps for future research are also mentioned.

2. LITERATURE REVIEW

2.1. Chapter overview

This chapter consists of the literature review of the current study. The main objective of this chapter is to identify the factors affecting customer value, satisfaction, and customer loyalty of mobile applications.

2.2. Customer Satisfaction

Customer satisfaction is an important factor and correlated with expectations and repeat purchasing. The expectation is correlated with either disconfirmation or performance (Szymanski and Henard 2001). Furthermore, Szymanski and Henard (2001) found that "differentiation of product-service is important when attempting to assess the correlation between affect and satisfaction and satisfaction and repeat purchasing." The research observed that satisfaction and outcomes are different when the processing mode is intangible versus tangible. Customer satisfaction on digital self-service mobile applications comes under the intangible processing mode. According to the research findings of Szymanski and Henard (2001), intangible feelings of satisfaction encourage buying intangibles (i.e., service) again and again. This means, satisfaction on digital self-service mobile applications plays a stronger role to use the application again and again.

They further paid attention to implications for managers and stated that "Growing declaration of the negative effects of unhappy customers may explain why a growing number of businesses have senior executives responsible customer satisfaction."

Peterson and Wilson (1992) stated that satisfying customers is a fundamentally sound principle. Their research demonstrated that customer satisfaction can be evaluated relative to a standard and norms. And it is not possible to measure true satisfaction, and more effort is required to measure customer satisfaction. Peterson and Wilson (1992) discussed that measuring customer satisfaction unexpectedly increases satisfaction, regardless of measuring the products or services. As research discussed that customer satisfaction ratings cannot be viewed as absolute measurements, therefore,

we need to state the satisfaction ratings needed to compare with the prior ratings of the same brand and company's brand over competitor's brand.

2.3. Customer Loyalty

Customer loyalty is the user's desire to continue their relationship with a particular product or service for a long time (Malik, Suresh, and Sharma 2017). Customer loyalty denotes an intention to behave in a certain way in relation to a service or a business (Andreassen and Lindestad n.d.). Drexel University and Gefen (2002) found that in order to create customer loyalty on mobile applications, it is necessary to increase trust through service quality. This research concluded the importance of service quality and trust of digital self-service applications. Drexel University and Gefen (2002) indicate that customer loyalty is created by high-quality service, which makes the vendor more efficient. (Andreassen and Lindestad n.d.). They concluded that customer's trust directly increases their loyalty to mobile applications.

2.4. Customer Value

Customer value refers to the emotional connection that develops between a customer and a producer after the customer has used the product or service and discovered additional benefits (Butz and Goodstein 1996). According to this research, such emotional bonds lead consumers to repeatedly buy their products/services and to recommend them to others. Moreover, consumer satisfaction is determined by someone's attitude, while customer value is determined by one's behaviour. Butz and Goodstein (1996) discussed the three levels of customer value which were introduced by Noriaka Kano.

- Expected Value

This is the basic level of the customer value. In this stage suppliers supply products and services which consumers expect to have.

- Desired Value

This level adds some value to the customers which they do not expect due to industry standards. In this stage it is very important to give some additional value by meeting the customer's true expectations.

- Unanticipated Value

The ultimate level of customer value is an unexpected level. In this level organizations find a way to give additional value that exceeds the customer expectations. This includes anything which exceeds the customer expectations such as additional service at no extra cost.

Moreover, this literature (Butz and Goodstein 1996) discussed two important kinds of information; "what are the consumer's present needs and how well we meet them and what are the consumer's emerging needs and how we position ourselves to meet them".

Keeping in mind these levels are important for customer value on digital self-service mobile applications.

2.5. VSL

According to Xu, Peak, and Prybutok (2015), "customer value as a whole is considered as cognition, satisfaction is considered as affect and loyalty represents behaviour or behavioural intent". They divided loyalty behaviour into two types such as, customer retention and customer attraction. In the consumer context, cognition and affects play different roles in these two loyalty behaviours. This literature found that the effects of satisfaction on mobile apps facilitate continuance intention and intention to recommend. This depicts that there is a relationship between VSL (Value, Satisfaction and Loyalty), and understanding of VSL is important to discuss VSL on digital self-service mobile applications.

2.6. Hedonic benefits and customer satisfaction

Hedonic benefits have been described as non-functional benefits provided by the mobile app's performance. This talks about the process of obtaining fun and self-satisfaction by using the mobile application (Xu, Peak, and Prybutok 2015). According to literature, hedonic benefits identified as enjoyment and app aesthetic (Xu n.d.), (Chang, 2015)

2.6.1. Enjoyment

(Chen, Meservy, and Gillenson 2012) found that when customers use utilitarian applications providing timely information, they experience enjoyment. However, using the digital self-service applications may not be fun or allow users to kill time when they do not have anything else to do. Therefore, it is necessary to investigate how enjoyment affects the satisfaction of the Digital Self-service Mobile application users.

2.6.2. App aesthetics

Aesthetics are defined as the visual appearance of the application. (Xu, Peak, and Prybutok 2015) found that the user interface of the mobile application is affecting user's satisfaction especially when the user does not have proper knowledge of the app. Moreover, the user interface brings positive experiences to users, and it allows the user to decide whether he is going to use it or not. Since digital self-service applications do not provide any human interaction, it is necessary to maintain a user-friendly interface.

According to the research findings of Xu, Peak, and Prybutok (2015), hedonic benefits positively affect customer satisfaction on mobile applications. Therefore, hedonic benefits may affect the customer satisfaction of digital self-service mobile applications.

2.7. Utilitarian benefits and satisfaction

Research stated that utilitarian benefits are considered into two parts: App utility and app quality (Xu, Peak, and Prybutok 2015), (Chen, Meservy, and Gillenson 2012). Mobile application quality refers to the integration, responsiveness, and reliability of the application. The utilitarian benefit is achieving the expected performance of the mobile application. Chen, Meservy, and Gillenson (2012) stated that there is a concern whether the "application provides utility in a trustworthy manner and quickly responds to the users."

Ekizler (2019) found that utilitarian benefits have a significant effect on mobile application customer's satisfaction. Also, Xu et al. (2015) found that utilitarian benefits directly affect customer satisfaction and obtain a stronger intention to continue to use the app.

2.8. Perceived value on customer loyalty and satisfaction

Chang (2015) defined perceived value as; some customers get value from all that was given and returned to them. Not only that but also, in the literature the author stated that perceived value is positively related to customer loyalty on mobile applications. According to Chang's findings, high levels of perceived value for m-commerce influences customer satisfaction and loyalty. Furthermore, emotional value and social value highly impact perceived values in the mobile context. That means users who use mobile applications highly consider the emotional value and the social value of mobile applications when they are using it.

According to (Chang 2015), in order to enhance the performance quality of mobile applications, service providers need to introduce automated creation of personalized, rich portable contexts. (Chang 2015) discussed in his research that in order to encourage emotional value and social value, marketers need to establish hedonic perception in using the setting of mobile applications.

(Chang 2015) discussed the moderating relationship between satisfaction, customer loyalty and perceived value. This discussion depicted that there is a relationship between satisfaction, customer loyalty and perceived value. Therefore, I expect this relationship to be useful for digital self-service mobile applications as well.

2.9. Incentives and customer value

Malik, Suresh, and Sharma (2017) stated that incentives are promotional offers or any financial benefit which customers expect to receive. According to the feedback received from their focus group members, financial benefits motivated them to download the application as well. But this has not been measured well. In the current research this needs to be filled by aligning into the digital self-service mobile applications.

This chapter identified the factors which affect customer value, satisfaction and customer loyalty on mobile applications and identified what are the factors which we can inherit for digital self-service mobile applications.

3. METHODOLOGY

3.1. Chapter overview

The aim of this study is to identify the factors affecting customer value, satisfaction and loyalty towards digital self-service mobile applications and provide recommendations on how to retain and improve the same by reducing the impact of affected factors. This chapter consists of the conceptual framework, hypothesis development, data collection methodology and population and sampling methods.

Figure 3.1 below describes the research methodology.

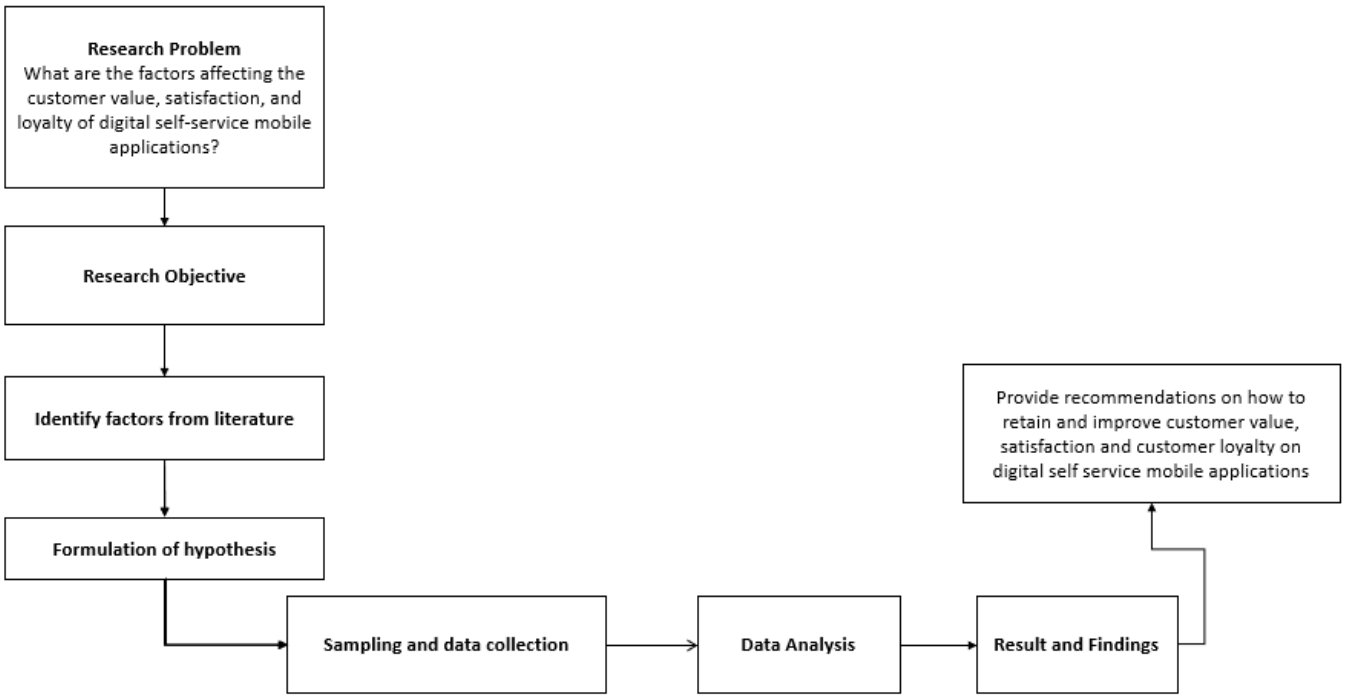

Figure 3-1Research Methodology

A Conceptual framework was built based on literature findings to explain the relationship between the concepts under consideration. This is presented next.

3.2. Conceptual Framework

The interrelationships among the variables that are considered relevant to the situation are discussed in the conceptual framework.

In order to develop the conceptual framework, I identified relevant factors through the literature review. Incentives, perceived value, Utilitarian benefits, and Hedonic benefits have been identified as factors affecting customer value, satisfaction, and loyalty. And according to the literature review there is a relationship between perceived value and customer loyalty. Moreover, users who get more customer value will be satisfied and be more loyal to the mobile application service.

The below figure illustrates the conceptual framework developed for the current study.

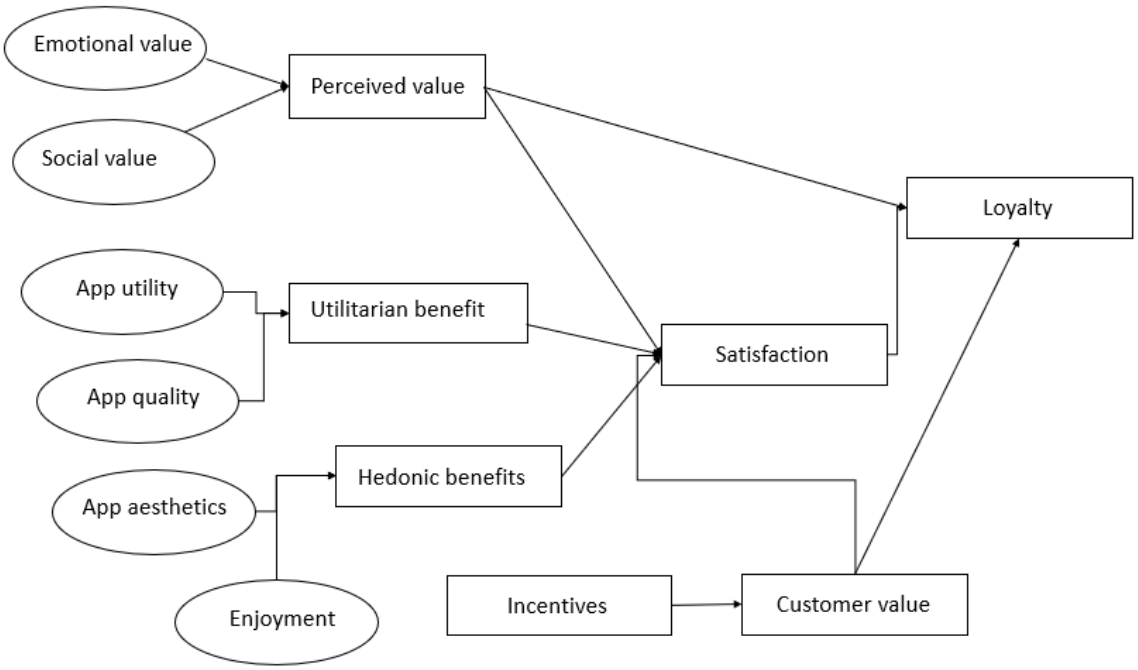

Figure 3-2 Conceptual framework

3.3. Independent and Dependent variables

Customer value, satisfaction, and loyalty are dependent variables. Table 3.1 specifies the definition of the dependent variables and previous research which is associated with these variables.

Table 3.1 - Dependent Variables

Variable	Definition	Associated previous research
Customer value	"Customer value refers to emotional bond established between a customer and a producer after the customer has used a salient product or service produced by that supplier and found the product to provide an added value."	(Butz & Goodstein, 1996)
Customer satisfaction	"The summary psychological state resulting when the emotion surrounding disconfirmed expectations is coupled with the consumer's prior feelings about the consumption experience"	(Oliver, 1981, p. 27)
Customer Loyalty	"Customer loyalty is the user's desire to continue their relationship with a particular product or service for a long time"	(Malik, Suresh, and Sharma 2017)

Customer value, satisfaction, and customer loyalty are explained by four main independent variables. They are; Perceived value, Utilitarian benefit, Hedonic benefits, and Incentives. According to the literature review, Perceived value can be determined by emotional value and social value. The utilitarian benefits have been defined into two types such as; app utility and app

quality. The hedonic benefit is also determined by two ways which are app aesthetics and enjoyment.

Table 3.2 describes the summary of the associated previous research along with the independent variables.

Table 3.2 Independent Variables

Variable	Definition	Associated previous research
Hedonic benefits	"Hedonic benefits have been defined as non-functional benefits delivered by performance of the mobile app"	(Xu, Peak, and Prybutok 2015), (Chen, Meservy, and Gillenson 2012)
Perceived value	Perceived value is defined as, "Consumers' overall evaluation of a product's utility based on their expectations of what is obtained and what is offered."	(Chang 2015)
Utilitarian benefits	"Utilitarian benefit is achieving the expected performance of the mobile application"	(Xu, Peak, and Prybutok 2015), (Chen, Meservy, and Gillenson 2012), (Xu et al. 2015), (Ekizler 2019)

Incentives	"Incentives are promotional offers or any financial benefit which customers expect to receive"	(Malik, Suresh, and Sharma 2017)

3.4. Hypothesis Development

In order to find whether the developed relationships in the conceptual diagram are true, several hypotheses have been developed. It is assumed that by checking hypotheses and verifying relationships, recommendations can be found to resolve any conflicts that arise.

H_A - Alternative Hypothesis

H_0 - Null Hypothesis

Hypothesis 1

$H1_A$ - Hedonic benefits have a positive impact on customer satisfaction of digital self-service mobile applications.

$H1_0$ - Hedonic benefits have no impact on customer satisfaction of digital self-service mobile applications.

Hypothesis 2

$H2_A$ - Utilitarian benefits have a positive impact on customer satisfaction of digital self-service mobile applications.

$H2_0$ - Utilitarian benefits have no impact on customer satisfaction of digital self-service mobile applications.

Hypothesis 3

$H3_A$ - Perceived value has a positive impact on customer satisfaction of digital self-service mobile applications.

$H3_0$ - Perceived value has no impact on customer satisfaction of digital self-service mobile applications.

Hypothesis 4

$H4_A$ - Incentive has a positive impact on customer value of digital self-service mobile applications.

$H4_0$ - Incentive has no impact on customer value of digital self-service mobile applications.

Hypothesis 5

$H5_A$ - Customer value has a relationship with customer loyalty of digital self-service mobile applications.

$H5_0$ - Customer value has no relationship with customer loyalty of digital self-service mobile applications.

Hypothesis 6

$H6_A$ - Perceived value has a positive impact on customer loyalty of digital self-service mobile applications.

$H6_0$ - Perceived value has no impact on customer loyalty of digital self-service mobile applications.

Hypothesis 7

$H7_A$ - Customer value has a relationship with customer satisfaction of digital self-service mobile applications.

$H7_0$ - Customer value has no relationship with customer satisfaction of digital self-service mobile applications.

Hypothesis 8

$H8_A$ - Customer satisfaction has a relationship with customer loyalty of digital self-service mobile applications.

$H8_0$ - Customer satisfaction has no relationship with customer loyalty of digital self-service mobile applications.

3.5. Questionnaire Instrument Development

Questionnaires have been developed to quantify the variables and capture each respondent's perceptions towards the digital self-service mobile applications.

Table 3.3 Instrument measures of Independent Variables

Variable	**Item count**	**Scale**
Perceived value	5	Five-point Likert Scale
Utilitarian benefits	4	Five-point Likert Scale
Hedonic benefits	3	Five-point Likert Scale
Incentives	3	Five-point Likert Scale

Table 3.4 Instrument Measures of Dependent Variable

Variable	**Item count**	**Scale**
Customer value	3	Five-point Likert Scale
Loyalty	3	Five-point Likert Scale
Satisfaction	3	Five-point Likert Scale

In addition, three demographic items to capture the respondent's *Age, Educational level, Industry* have been used.

3.6. Method of Data Collection

The target population of this study is digital self-service mobile application user base in Sri Lanka. The current study seeks to estimate a problem and determine its prevalence by searching for outcomes that can be projected to a larger population. Therefore, the most appropriate method is the quantitative method ("When to Use Qualitative vs. Quantitative Research," Alchemer, Mar. 17, 2010). The previous research carried out in this area (Chang, 2015) has also been using the quantitative methodology and a questionnaire to collect the data. Therefore, quantitative techniques were used to conduct the study.

Questionnaires are the most appropriate method of data collection for this research. Questions are based on the popular Likert scale because it is a suitable method to assess a person's feelings about something. A five-point scale has been used to collect data.

3.7. Population and Sampling

The target population for this research is digital self-service mobile application users. In order to study the factors affecting digital self-service mobile applications; users should have a basic understanding of what digital self-service mobile applications are. The sample has been selected by using the convenience sampling method.

There are 3.3 million mobile applications available in the Google Play Store ("App Stores List (2020)," Business of Apps, May 12, 2017.). There are 32 app categories in the Google Play Store and 24 in the Apple App Store (B. Poetker, "What Are the Different Types of Mobile Apps?") Approximately there are more than 1200 digital self-service apps available in the Play Store, but the actual user base of the apps is unknown.

3.8. Sample Technique and Sample Size

A subset of the population is defined as a sample. The population of this research is unknown. Therefore, a Z score has been used to calculate the sample size of this research. The Cochran formula used to determine the reliable sample size for unknown populations. (Glen, 2021)

In order to calculate the sample size below formula has been used.

$$n = Z^2\ (P)(1 - P)/C^2$$

Where,

Z = Standard normal deviation set at 95% confidence level

P = Percentage picking choice or response

C = Confidence interval

$$n = (1.96)^2\ (0.6)(1 - 0.6)/(0.05)^2$$

$$n\ =\ 368.7$$

$$n\ \approx\ 369$$

The sample size of 369 is considered as accurate for the present study.

The sample process was carried out by handing online questionnaires which were distributed among the sample in order to collect the primary data.

3.9. Statistical Tool

Collected data has been analysed and interpreted by using the Statistical Package for the Social Sciences (SPSS) statistical software version 25, which was used to test the hypothesis and analyse the responses obtained from the sample.

3.10. Structure of the questionnaire

A questionnaire was developed and distributed among samples to record their responses. The questionnaire was developed based on the conceptual framework and hypothesis. An online survey has been conducted to collect the responses. All the questions are mandatory, and it has been divided into two sections.

The first section of the questionnaire was developed to capture the demographic items such as age, educational qualifications, and industry.

The second section is based on the experience with digital self-service applications. Further, from this section onwards, the questions were given on a 5-point Likert scale where (1= Strongly Disagree and 5= Strongly Agree), (1 = Strongly dissatisfied and 5 = Strongly satisfied). Refer annexure for the detailed final questionnaire.

3.11. Analytical tools used for study.

According to the findings of Boone and Boone (2012) the interval measurement scale is used to analyse data from a Likert scale. The composite score for Likert scales should be analysed at the interval measurement scale since Likert scale items are generated by measuring a composite score (sum or mean) from four or more type Likert-type items. Therefore, in order to do the data analysis, the same variable has been measured by more than four questions.

The analytical tests used for the study are organized as below.

1. Validation of measurement properties
2. Testing of hypothesis

It is critical to assess the goodness of the measures produced, which will include checking the data for reliability and validity using multiple statistical tests, in order to ensure that essential dimensions and elements have not been ignored or that irrelevant ones have not been included.

4. ANALYSIS AND INTERPRETATION

4.1. Overview of the chapter

The current study's thorough analysis and statistical results are presented in this chapter. Data analysed and results are also interpreted in this chapter.

4.2. Data preparation for Analysis

In order to carry out the data analysis of the study, 390 questionnaires were distributed via online, and targeted 369 responses were received. The collected data were first scanned for precision and accuracy.

4.3. Descriptive statistic for the sample profile

The demographic profile of the sample illustrates the personal details of the 369 respondents in the sample.

4.3.1. Personal Information

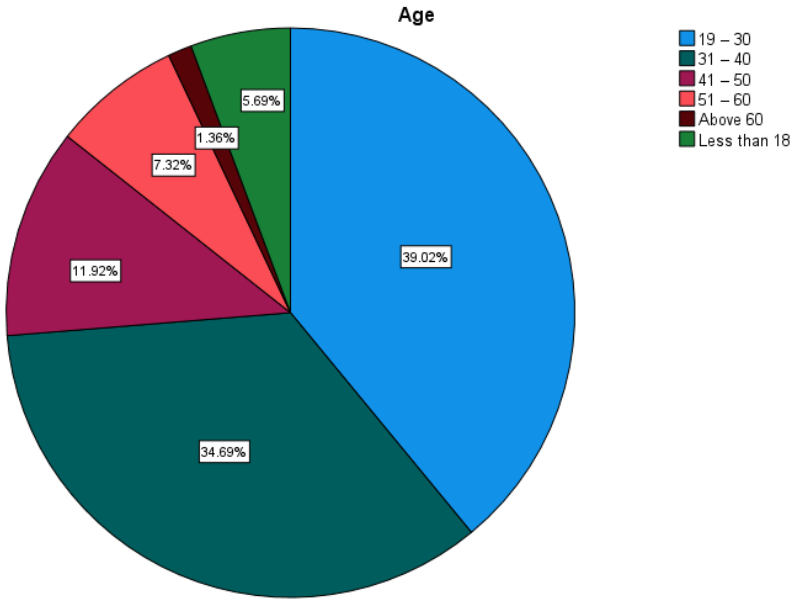

Figure 4-1 Descriptive Statistics - Age

(Source: based on survey responses)

Figure 4.1 illustrates the age distribution of the respondents as depicted by the figure 39.02% of the respondents belong to the age category of 19 - 30 years, 34.69% of the respondents belong to the age category of 31-40 years, 11.92% of them belong to the age group 41- 50 years, 7.32% of the respondents belong to the age group 51- 60 years, 5.69% belong to the age group of below 18 and 1.36% belong to the age category of 60 above.

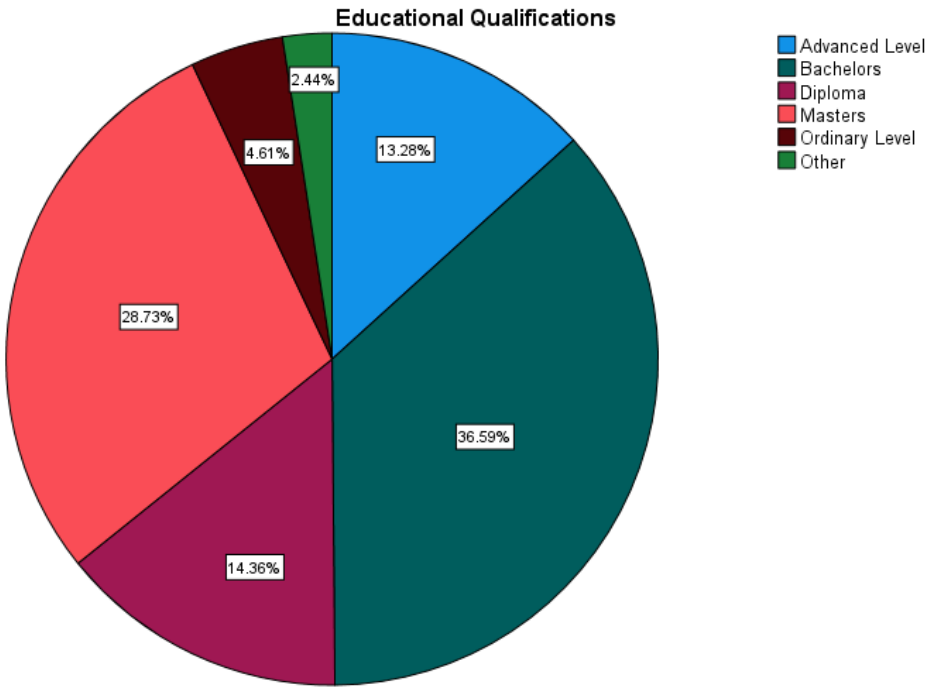

Figure 4-2 Descriptive Statistics - Educational Qualifications

(Source: based on survey responses)

Figure 4.2 illustrates the educational level of the respondents selected for the study. The majority were graduates with a percentage of 36.59%, 28.73% had completed masters, 14.36% had a diploma, 13.28% were qualified up to Advanced Level while 4.61% were qualified up to Ordinary Level and 4.61% were into other categories.

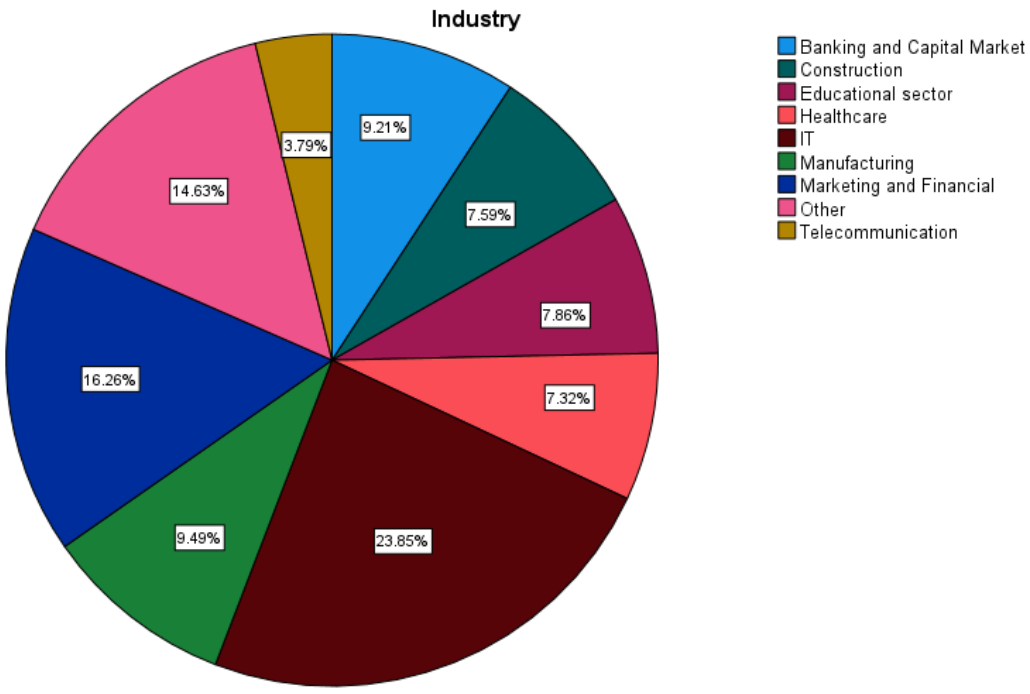

Figure 4-3 Descriptive Statistics - Industry

(Source: based on survey responses)

Figure 4.3, illustrate 23.85% of respondents belong to the IT industry, 16.26% belong to the marketing and finance, 9.49% belong to the manufacturing industry, 9.21% belong to the Banking and capital market industry, 7.86% belong to the educational sector, 7.59% belong to the constructions industry, 7.32% belong to the healthcare sector, 3.79% belong to the telecommunication industry and 14.63% belong to the other.

4.4. Reliability Test

Before conducting data analysis, a reliability test was conducted to check the validity of the questionnaire's responses. Reliability tests check whether the data are accurate for the research or not.

Cronbach's Alpha is the most used technique to measure reliability. In this research, Cronbach's Alpha has been used to measure the reliability of the data. In order to calculate the reliability SPSS has been used.

If the alpha value is closer to 1 or greater than 0.6, the data are reliable. If the alpha is less than 0.6 then the data is not reliable.

Cronbach's alpha has been calculated for all 28 items and verifies its reliability.

Table 4.1 Cronbach's Alpha - all variables

Number valid of cases	365	100%
Executed	0	.0
Total cases	365	100.0
Cronbach's Alpha	0.774	
N of items	28	

(Source: based on survey responses)

According to the above table 4.1; Cronbach's Alpha value is 0.774 which is greater than 0.6. The data set is reliable.

After conducting the reliability test for all the items, another reliability test has been completed for each dependent variable separately.

Table 4.2 Reliability Test for Dependent variables for 369 respondents

Dependent Variable	**No of Items**	**Cronbach's Alpha**	**Pass Reliability Test**
Satisfaction	3	0.633	Yes
Customer Value	3	0.837	Yes
Loyalty	3	0.627	Yes

Table 4.2- illustrate that Cronbach's alpha for the dependent variable of Customer Value is 0.837, Cronbach's alpha for Satisfaction is 0.633 and 3 items have been considered to measure the reliability of the satisfaction and it passed the reliability test. Cronbach's alpha for Loyalty is 0.627 and 3 items considered to measure reliability and it passed the reliability test.

4.5. Inferential Statistics - Inter-Item Correlation Analysis

Inferential Statistics conducted to measure the inter-item correlation by using Pearson Correlation Matrix. This has been conducted for each and every variable to verify whether there is an inter-item correlation of each variable.

4.5.1. Inter-Item Correlation of Independent variables

This section describes the inter-item correlation of each independent variable.

Perceived value has two categories as mentioned in the literature review.

- Emotional Value
- Social Value

Table 4.3 Inter-Item Correlation of Perceived Value - Social Value

Perceived - Social value	1	2	3
1. Use of Digital self-service mobile applications help me feel acceptable amongst my peers	1	0.697**	0.425**
2. The use of Digital self-service mobile applications gives me social acceptance	0.697**	1	0.444**
3. The use of Digital self-service mobile applications improves the perceived value	0.425**	0.444**	1

Table 4.4 Inter-Item Correlation of Perceived Value - Emotional Value

Perceived - Emotional value	1	2
1. Digital self-service mobile applications make my day today life easy	1	0.300**
2.I feel relaxed using digital self-service mobile applications" sounds better I think.	0.300**	1

According to the inter-item correlation test for independent variables of perceived value, items were **positively correlated** within respective dimensions at 0.01 significance level.

Table 4.5 Inter-Item Correlation of Incentive

Incentive	1	2	3
1. Digital self-service mobile applications give me offers (Internet data offers, special discounts, buy one get one free offers)	1	0.684**	0.523**
2.I use Digital self-service mobile applications to redeem offers	0.684**	1	0.651**
3.I keep using Digital self-service mobile applications as they provide more benefits (ex: offers)	0.523**	0.651**	1

According to the result of inter-item correlation of incentive; 3 items were carried out to measure the incentive variable and items were **positively, strongly correlated** within respective dimensions at 0.01 significance level.

Table 4.6 Inter-Item Correlation of Hedonic benefits

Hedonic Benefits	1	2	3
1. Digital self-service mobile applications give me pleasure	1	0.845**	-0.126
2.I enjoy using Digital self-service mobile applications	0.845**	1	-0.187
3.Digital self-service mobile applications are well designed	-0.126	-0.187	1

According to the result of the inter-item correlation, even though hedonic benefits have two types they are not correlated within. Two items had been considered to measure the enjoyment and it has a strong positive correlation within items.

Table 4.7 Inter-Item Correlation of Utilitarian benefits

Utilitarian benefits	1	2	3	4
1. Digital self-service mobile applications have consistent quality	1	0.481**	0.588**	0.500**
2.Digital self-service mobile applications have an acceptable standard quality	0.481**	1	0.527**	0.511**
3.Digital Self-service mobile applications help me be more productive	0.588**	0.527**	1	0.776**
4.Digital Self-service mobile applications help me be more effective	0.500**	0.511**	0.776**	1

According to the inter-item correlation of the utilitarian benefits, 4 items are carried out to measure the utilitarian benefits variable and items were **positively correlated** within respective dimensions at 0.01 significance level.

4.5.2. Inter-Item Correlation of Dependent variables

Table 4.8 Inter-Item Correlation of Satisfaction

Satisfaction	1	2	3
1.I am satisfied with the experience of using Digital self-service mobile applications	1	0.470**	0.293**
2.My decision to use Digital self-service mobile applications is good	0.470**	1	0.374**
3.I keep using Digital self-service mobile applications because I am satisfied with their application and the service, they provide	0.293**	0.374**	1

There were three items for satisfaction and those are **positively correlated** with each other.

Table 4.9 Inter-Item Correlation of Loyalty

Loyalty	1	2	3
1.Even if close friends recommend another Digital self-service mobile application, my preference for the current app would not change	1	0.747**	0.073
2.My preference for Digital self-service mobile applications would not change	0.747**	1	0.138**
3.I intend to keep using Digital self-service mobile applications	0.073	0.138	1

In order to measure loyalty, three items have been used and item 1 and item 2 are strongly correlated with each other. But item 3 is not correlated with item 2 and item 1.

Table 4.10 Inter-Item Correlation of Customer Value

Customer Value	1	2	3
1.Digital self-service mobile applications give valuable benefits	1	0.668**	0.599**
2.Digital self-service applications pay their attention on customer values	0.668**	1	0.733**
3.I keep using Digital self-service mobile applications as they know the importance of customer values	0.599**	0.733**	1

There were three items for customer value and those are **positively correlated** with each other.

4.6. Inferential Statistics - Pearson's Correlation Analysis

In this section, the hypothesis has been tested by using Pearson's correlation matrix. Hypothesis 1 to Hypothesis 8 has verified the relationship between the dependent variable and independent variable. Standard averaging had been used for each variable in order to analyse the significance, by using Pearson Correlation Matrix.

Hypothesis 1

Table 4.11 Pearson Correlation - Hedonic benefits and customer satisfaction

		Satisfaction	Hedonic Benefits
Satisfaction	Pearson Correlation	1	-0.02
	Sig.(2 tailed)		0.974
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

According to the result of Pearson's correlation, the relationship between hedonic benefits and satisfaction is not significant. Therefore, $H1_A$ is rejected and $H1_0$ is substantiated. Hence, hedonic benefits have no impact on customer satisfaction of digital self-service mobile applications. This means that app aesthetics and enjoyment have no impact on the satisfaction of digital self-service mobile applications.

Hypothesis 2

Table 4.12 Pearson correlation - Utilitarian benefits and customer satisfaction

		Satisfaction	Utilitarian Benefits
Satisfaction	Pearson Correlation	1	0.431**
	Sig.(2 tailed)		<0.001
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

According to the result of Pearson's correlation, utilitarian benefits and satisfaction are significantly positively correlated. Therefore, the null hypothesis ($H2_0$) has been rejected and the alternative hypothesis ($H2_A$) is substantiated. Hence, utilitarian benefits have a positive impact on customer satisfaction of digital self-service mobile applications. This means, app utility and quality of the digital self-service mobile application impact customer satisfaction.

Hypothesis - 3

Table 4.13 Pearson correlation - Perceived value and customer satisfaction

		Satisfaction	Perceived value
Satisfaction	Pearson Correlation	1	0.539**
	Sig.(2 tailed)		<0.001
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

According to the result of Pearson's correlation, perceived value and satisfaction are significantly positively correlated. Therefore, null hypothesis $H3_0$ has been rejected and alternative hypothesis $H3_A$ is substantiated. Hence, Perceived value has a positive impact on customer satisfaction of digital self-service mobile applications. This means that both emotional value and social value impact satisfaction of digital self-service mobile applications.

Hypothesis - 4

Table 4.14 Pearson correlation - Incentive and customer value

		Customer Value	Incentive
Customer Value	Pearson Correlation	1	0.543**
	Sig.(2 tailed)		<0.001
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

The above table illustrates, incentive and customer value are significantly positively correlated. Therefore, the null hypothesis ($H4_0$) has been rejected and alternative hypothesis ($H4_A$) is substantiated. Hence, Incentive has a positive impact on customer value of digital self-service mobile applications. That means; customer value will increase when digital self-service mobile applications provide more benefits to customers.

Hypothesis - 5

Table 4.15 Pearson correlation - Customer Value and Customer Loyalty

		Loyalty	Customer Value
Loyalty	Pearson Correlation	1	0.355**
	Sig.(2 tailed)		<0.001
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

According to Pearson's correlation, customer value and loyalty have a significantly positive relationship. Therefore, the null hypothesis ($H5_0$) has been rejected and ($H5_A$) is substantiated. This means that customer value has a relationship with customer loyalty of digital self-service mobile applications.

Hypothesis - 6

Table 4.16 Pearson correlation - Perceived value and Customer loyalty

		Perceived Value	Loyalty
Loyalty	Pearson Correlation	1	0.270**
	Sig.(2 tailed)		<0.001
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

According to the above result, perceived value and customer loyalty are significantly positively correlated. Therefore, the null hypothesis ($H6_0$) has been rejected and the alternative hypothesis ($H6_A$) is substantiated. Hence, Perceived value has a positive impact on customer loyalty of digital self-service mobile applications.

Hypothesis - 7

Table 4.17 Pearson correlation - Customer value and satisfaction

		Satisfaction	Customer Value
Satisfaction	Pearson Correlation	1	0.385**
	Sig.(2 tailed)		<0.001
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

According to the above result, customer value and customer satisfaction are significantly positively correlated. Therefore, the null hypothesis ($H7_0$) has been rejected and the alternative hypothesis ($H7_A$) is substantiated. Hence, customer value has a relationship with customer satisfaction of digital self-service mobile applications.

Hypothesis - 8

Table 4.18 Pearson correlation - Customer satisfaction and Customer Loyalty

		Loyalty	Satisfaction
Loyalty	Pearson Correlation	1	0.429**
	Sig.(2 tailed)		<0.001
	N	369	369
**. Correlation is significant at the 0.01 level (2-tailed).			

According to the above result, customer satisfaction and customer loyalty are significantly positively correlated. Therefore, the null hypothesis ($H8_0$) has been rejected and the alternative

hypothesis ($H8_A$) is substantiated. Hence, customer satisfaction has a relationship with customer loyalty of digital self-service mobile applications.

4.7. Discussion of study

According to the findings of the present study, there are several factors that impact customer value, satisfaction, and loyalty on digital self-service mobile applications, such as utilitarian benefits, incentives, and perceived value.

As per Pearson's correlation obtained, the incentive has a significant correlation with customer value.

Even though utilitarian benefits have a significantly positive correlation with customer satisfaction on digital self-service mobile applications, hedonic benefits have no correlation with customer satisfaction. Perceived value has a significant positive relationship with customer satisfaction. And customer value has a significant positive relationship with customer satisfaction of digital self-service mobile applications.

According to the findings of the current study, customer satisfaction has a significant relationship with customer loyalty. Not only that but also perceived value and customer value has a- significant correlation with customer loyalty on digital self-service mobile applications.

Even though the previous research related to mobile application’s customer value, satisfaction and loyalty says that hedonic benefits are impacted, according to findings of the current study hedonic benefits do not impact the customer satisfaction of digital self-service mobile applications. Other than that, same as the previous studies related to enhanced VSL model of mobile applications, it can be concluded that perceived value, utilitarian benefits and incentive impact on customer loyalty, satisfaction, and customer value on digital self-service mobile applications.

5. CONCLUSION AND RECOMMENDATION

5.1. Overview of Chapter

This chapter contains the present study's conclusions and recommendations for analysing the statistical results obtained.

5.2. Research Implication

This research was conducted to identify the factors affecting Customer Value, Satisfaction, and Loyalty of digital self-service mobile applications. In this study, an extended VSL model on mobile applications was used. Customer value was measured by incentive, customer satisfaction was measured by different angles such as, utilitarian benefits, hedonic benefits, perceived value and customer value, and customer loyalty was measured by perceived value, satisfaction, and customer value. The conceptual framework shown in Figure 3.2 was instrumental in analysing the perception towards the factors affecting customer value, satisfaction, and loyalty on digital self-service mobile applications. As a second step, the hypothesis was developed to analyse the data which was collected via the online survey. Data analysis was done with the help of descriptive statistics, reliability test using Cronbach’s alpha, Inferential Statistics - Inter-Item Correlation Analysis, and hypothesis test using Pearson’s correlation.

According to the results of the present study, incentives affect customer value of digital self-service mobile applications (Hypothesis 4). Customers who use digital self-service mobile applications are expecting more benefits like cashback offers, free data bundles, discounts etc. while using the application.

According to hypothesis 3, it was found that Perceived value has a positive impact on customer satisfaction of digital self-service mobile applications. Perceived value has been categorized into two categories according to the literature review: emotional value and social value. Both values are captured via questionnaire and those are correlated within. Therefore, in order to enhance customer satisfaction on digital self-service mobile applications, mobile application providers need to enhance the perceived value of customers such as emotional value and social value. But the present study found that hedonic benefits have no impact on customer satisfaction of digital

self-service mobile applications (Hypothesis - 1). Hedonic benefits categorized into two parts as app aesthetic and enjoyment. Since customers who use digital self-service mobile applications cannot entertain themselves by using digital self-service mobile applications, and they do not much care about the app aesthetics, hedonic benefits have no impact on customer satisfaction of digital self-service mobile applications. Although the hedonic benefit has no impact on the customer satisfaction, the present data analysis results show that utilitarian benefits have a positive impact on customer satisfaction of digital self-service mobile applications (Hypothesis 2). The user base of the digital self-service mobile applications considers the quality of the application and app utility. According to the result of the present study, customer value has a relationship with customer satisfaction of digital self-service mobile applications (Hypothesis 7). This means, customer value directly affects customer satisfaction. These results show that customer satisfaction is impacted by several factors like customer value, utilitarian benefits, and perceived value.

Data analysis results of the present study found that there is a relationship between perceived value and customer loyalty (Hypothesis 6). Emotional value and the social value impact on the customer loyalty of the digital self-service mobile applications. Since users use digital self-service mobile applications to do a transaction without having the help of a customer representative, perceived value of the customer highly impacts the customer loyalty. Table 5.1 depicts that customer satisfaction has a relationship with customer loyalty of digital self-service mobile applications (Hypothesis 8) This means, to have loyal customers in digital self-service applications, customer satisfaction needs to be improved. And according to the analysis of the present research, customer value has a relationship with customer loyalty of digital self-service mobile applications (Hypothesis 5). This result depicted that when customers get more customer value his loyalty towards digital self-service mobile applications will increase.

5.3. Recommendation

5.3.1. Customer Value

According to the results of the data analysis of the current thesis, we found that incentive affects the customer value of digital self-service mobile applications. Incentives that are provided by digital self-service mobile applications are more like free data bundles, cashback offers, discounts etc. Therefore, in order to increase the customer value on digital self-service mobile applications, digital self-service mobile application providers need to enhance the incentives which they provide to customers and need to educate the customers by doing promotional campaigns about these benefits.

5.3.2. Customer satisfaction

The present research found that customer satisfaction is impacted by several factors like customer value, utilitarian benefits, and perceived value.

According to the literature review, utilitarian benefits are categorized into two such as; app quality and app utility. According to the result of the present study users who use digital self-service mobile applications consider whether the application maintains the standard quality and utility of the application. Therefore, in order to enhance customer satisfaction towards digital self-service mobile applications, development teams of the digital self-service mobile apps need to maintain the standard quality and the utility of the application.

Results say that customer satisfaction is impacted by customer value, and customer value impacted by incentives. This means when users get more customer value their satisfaction towards digital self-service mobile applications will increase. Therefore, digital self-service mobile application providers need to improve the customer value and need to use recommended methods mentioned above to enhance the customer value.

Customer satisfaction is impacted by perceived value. According to the literature, perceived value is categorized into two; emotional value and social value. We can find bad reviews which are given by users if we check the review comments related to applications in the Play Store. There is a high impact on the perceived value on customer satisfaction. Dissatisfied customers do not hesitate to give bad reviews and low app ratings. Therefore, the developers and the application providers need

to pay attention to the social value and emotional value of the users when they introduce new features to the application, promotion, or new application to the market.

5.3.3. Customer Loyalty

Present study results depicted that customer loyalty is impacted by customer value, satisfaction, and perceived value. Recommendations mentioned to enhance the customer value, satisfaction and perceived value can be used to enhance the customer loyalty. Increase of perceived value, customer value and satisfaction, will enhance the customer loyalty of digital self-service mobile applications.

5.4. Future Work and Limitations

5.4.1. Future Work

Further research can be carried out by enhancing the model of the digital self-service mobile application. First, we paid attention to only digital self-service mobile applications, and it is just one category of mobile apps. Further studies could examine customer value, satisfaction, and loyalty by category wise. Our respondents represent the Sri Lankan population. Thus, further research could examine how culture influences the customer value, satisfaction, and loyalty of digital self-service mobile applications. Loyalty is a multifaceted concept, and in this research, loyalty was not narrowed down further. Future research can investigate these facets of loyalty.

5.4.2. Limitations

Demographic data do not present the actual population of Sri Lanka. Most of the respondents are graduates and many work in the educational sector. This is unlikely to be representative of the population of digital self-service mobile application users in Sri Lanka. Therefore, this has become a limitation of the research.

5.5. CONCLUDING REMARKS

The research problem of the present research was.

What are the factors affecting the customer value, satisfaction, and loyalty of digital self-service mobile applications?

In order to answer the research question three objectives had been defined.

To identify the key factors affecting customer value, satisfaction, and customer loyalty of mobile applications

The present study has referred to a considerable amount of literature and identifies the key factors that affect customer value, satisfaction, and customer loyalty of mobile applications. Different types of angles discussed customer value, satisfaction, and loyalty. In order to formulate the conceptual framework, research variables and their significance of previous research has been studied. Based on the research, the relationship between customer loyalty, satisfaction and customer value and factors affecting them have been identified. Therefore, this research objective is successfully substantiated.

To identify how different factors, influence customer value, satisfaction, and customer loyalty of digital self-service mobile applications

A survey was conducted to investigate the relationship between customer value, satisfaction and customer loyalty, and factors affecting them. Data analysis was conducted and analysed the data to find impacted factors. And this analysis helps to find factors that affect customer value, satisfaction, and customer loyalty individually. Therefore, this research objective is successfully substantiated.

To provide recommendations on how to maintain and improve customer value, satisfaction and customer loyalty on digital self-service mobile applications by reducing the impact of affected factors.

Recommendations to enhance customer value, satisfaction and customer loyalty of digital self-service mobile applications have been provided. Recommendations for future research have been mentioned.

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Appendix A- QUESTIONNAIRE INSTRUMENT

Dear Sir/Madam,

This survey is a mandatory requirement of my MBA thesis in IT at University of Moratuwa. I am undertaking this research to investigate the Factors Affecting Customer Value, Satisfaction and Loyalty of Digital Self-Service Mobile Applications in Sri Lanka.

I kindly expect your valuable support for the succession of my research by filling this questionnaire. And, I certify that this information is only used for my educational purposes and the collected information will not be shared with any party.

Imasha Jayawickrama

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Definition - Digital Self-service Mobile Applications; A digital self-service mobile application could be defined as a mobile application that allows a user to obtain information or complete a business function/transaction without requiring the help of a customer representative. (ex: FriMi, SLT self-care app, mobile banking apps such as NTB)

https://docs.google.com/forms/d/1lUD5vzeFMdgM_t2lUiZw_clji4LE01GaFgEqTUYGM9o/prefill

Factors Affecting Customer Value, Satisfaction and Loyalty of Digital Self-Service Mobile Applications

Demographic data										
#	Question									
1	What is your age?	Less than 18	19 – 30	31 – 40	41 – 50	51 – 60	Above 60			

2	What is your highest educational qualification?	Ordinary Level	Advanced Level	Diploma	Bachelors	Masters	Other			
3	What is your industry?	IT	Educational sector	Healthcare	Marketing and Financial	Construction	Manufacturing	Banking and Capital Market	Telecommunication	Other
4	Do you use Digital self-service mobile applications?	Yes	No							
Please answer the following questions based on your personal experience using digital self-service mobile applications.										
		Highly dissatisfied	Dissatisfied	Neutral	Satisfied	Highly satisfied				

5	I am satisfied with the experience of using Digital self-service mobile applications									
6	My decision to use Digital self-service mobile applications is good									
7	Digital self-service mobile applications make my day today life easy									
8	Digital self-service mobile applications give me pleasure									
9	I feel relaxed using Digital self-service mobile applications									
10	I enjoy using Digital self-service mobile applications									
11	Use of Digital self-service mobile applications									

	help me feel acceptable amongst my peers									
12	The use of Digital self-service mobile applications gives me social acceptance									
13	The use of Digital self-service mobile applications improves the perceived value									
14	Digital self-service mobile applications give me offers (Internet data offers, special discounts, buy one get one free offers)									
15	I use Digital self-service mobile applications to redeem offers									
16	Digital self-service mobile applications give valuable benefits									

17	Digital self-service mobile applications have consistent quality									
18	Digital self-service mobile applications are well designed									
19	Digital self-service mobile applications have an acceptable standard quality									
20	I keep using Digital self-service mobile applications as they provide more benefits (ex: offers)									
21	I keep using Digital self-service mobile applications because I am satisfied with their application and the service they provide									

22	Even if close friends recommend another Digital self-service mobile application, my preference for the current app would not change									
23	My preference for Digital self-service mobile applications would not change									
24	I intend to keep using Digital self-service mobile applications									
25	Digital self-service applications pay their attention on customer values									
26	I keep using Digital self-service mobile applications as they know the importance of customer values									

27	Digital Self-service mobile applications help me be more productive									
28	Digital Self-service mobile applications help me be more effective									
29	Please mention one or few Digital self-service mobile applications you use									

Appendix B - Definition of a Questionnaire

There are 29 questions included in the questionnaire and the first three questions represent demographic information. Fourth question is to check whether the person has been using a digital self-service mobile application. Q5 to Q29 needs to answer based on the customer experience of the digital self-service mobile applications.

Variable	Dimension	Scale	Questionnaire item
Age	N/A	Nominal	Q1
Educational Qualifications	N/A	Nominal	Q2
Industry	N/A	Nominal	Q3
Satisfaction	N/A	Interval	Q5, Q6, Q21
Customer Value	N/A	Interval	Q26, Q25
Loyalty	N/A	Interval	Q22, Q23, Q24
Incentive	N/A	Interval	Q14, Q15,Q16, Q20
Perceived value	Social value	Interval	Q11, Q12,, Q13
	Emotional value	Interval	Q7, Q9
Hedonic Benefits	App aesthetic	Interval	Q27,Q28
	Enjoyment	Interval	Q8,Q10
Utilitarian Benefits	App Utility	Interval	Q18
	App Quality	Interval	Q17,Q19