

THE USE OF DIGITAL CHANNELS TO SERVE CUSTOMERS IN THE TELECOMMUNICATIONS INDUSTRY

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THE USE OF DIGITAL CHANNELS TO SERVE CUSTOMERS IN THE TELECOMMUNICATIONS INDUSTRY

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**A research report submitted to the Faculty of Commerce, Law and Management,
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degree of Master of Management in the field of Digital Business**

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ABSTRACT

The objective of this paper is to establish and examine the factors that influence customer use of digital channels in the telecommunications industry and the impact of use on customer service. The growth of technological innovation and availability of new systems and technologies allow for improved efficiencies and reduced costs associated with customer care. The telecommunications industry is at the forefront of this technology, promoting self-service through the use of digital channels across a multitude of platforms with mobile applications, websites, Short Message Service (SMS), Unstructured Supplementary Service Data (USSD) and WhatsApp.

This study proposes a new conceptual framework based on Delone and McLean's (2003) information systems (IS) model by expanding this model to address individual customer use and its impact on customer service. Delone and McLean's 2003 IS model consists of system quality, information quality, service quality, use and net benefits. The model proposed by this study includes system knowledge, customer innovativeness, service complexity, customer trust, customer satisfaction and customer services.

A structured survey questionnaire was utilised for the study, as the focus of the research report is digital channel use by individuals as the unit of analysis. The survey was distributed to 900 users of digital channels in the telecommunications industry who have used various digital channels in the past 24 months to test the conceptual framework. The response rate to the survey 10,6% and 96 responses were analysed using IBM SPSS version 25 and AMOS, using structured equation modelling to validate the model.

The results supported Delone and McLean's (2003) IS model in terms of system quality, information quality, service quality and use. Furthermore, the factors of system knowledge, customer innovativeness, customer trust, customer satisfaction and customer services have a significant impact on customer use. Service complexity was found not to

be significant in relation to customer use and customer satisfaction. Whilst customer satisfaction is not significant in its influence on customer use.

The proposed conceptual model allows leaders in the telecommunications industry to assess key features of digital channels to drive use and thereby, drive cost efficiencies and cost reduction to service and support customers.

KEYWORDS

Telecommunications; Digital Channels; Self-Service; Self-Service Technologies; Customer Services; Customer Use; Service Complexity; Customer Trust; Customer Innovativeness; System Quality; System Knowledge; Service Quality; Customer Satisfaction.

DECLARATION

I, Jason Kiezer, declare that this research report is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Management in the field of Digital Business at the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.

Name: Jason Kiezer

Signature:



Signed at: Randburg

On the 25th day of June 2023

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TABLE OF CONTENTS

ABSTRACT	i
KEYWORDS.....	iii
DECLARATION.....	iv
ACKNOWLEDGEMENTS	v
LIST OF TABLES.....	x
LIST OF FIGURES	xii
LIST OF ACRONYMS	xiii
CHAPTER 1. INTRODUCTION	1
1.1 STATEMENT OF PURPOSE	1
1.2 BACKGROUND OF THE STUDY	4
1.3 RESEARCH PROBLEM.....	11
1.4 RESEARCH OBJECTIVES.....	12
1.5 RATIONALE	13
1.6 DELIMITATIONS OF THE STUDY.....	14
1.7 DEFINITION OF TERMS	15
1.8 ASSUMPTIONS	16
1.9 CHAPTER OUTLINE.....	16
CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK 19	
2.1 INTRODUCTION	19
2.2 TELECOMMUNICATIONS	19
2.3 DIGITAL CHANNELS	21

2.4	REASON FOR ADOPTION OF SPECIFIC DIGITAL CHANNELS	23
2.5	DELONE AND MCLEAN IS MODEL	24
2.6	FACTORS THAT INFLUENCE USE IN DIGITAL CHANNEL	26
2.6.1	CONCEPTUAL FRAMEWORK	26
2.6.2	SYSTEM QUALITY	27
2.6.3	SYSTEM KNOWLEDGE.....	28
2.6.4	INFORMATION QUALITY	30
2.6.5	SERVICE QUALITY	31
2.6.6	CUSTOMER INNOVATIVENESS.....	33
2.6.7	CUSTOMER USE AND CUSTOMER SATISFACTION	35
2.6.8	CUSTOMER SERVICES	36
2.6.9	CUSTOMER TRUST	37
2.6.10	SERVICE COMPLEXITY	39
2.7	CONCLUSION OF LITERATURE REVIEW	40

CHAPTER 3. RESEARCH METHODOLOGY..... 41

3.1	INTRODUCTION	41
3.2	RESEARCH APPROACH	42
3.3	RESEARCH DESIGN	42
3.4	DATA COLLECTION METHODS.....	43
3.5	POPULATION AND SAMPLE.....	43
3.5.1	POPULATION.....	43
3.5.2	SAMPLE AND SAMPLING METHOD.....	43
3.6	THE RESEARCH INSTRUMENT	45
3.7	PROCEDURE FOR DATA COLLECTION.....	45
3.8	DATA ANALYSIS STRATEGIES AND INTERPRETATION.....	46
3.9	POSSIBLE LIMITATIONS AND CHALLENGES OF THE STUDY	47
3.10	QUALITY ASSURANCE	47
3.10.1	VALIDITY	48
3.10.2	INTERNAL VALIDITY	49
3.10.3	EXTERNAL VALIDITY OR TRANSFERABILITY.....	50
3.11	RELIABILITY	51
3.12	ETHICAL CONSIDERATIONS.....	52
3.13	CONCLUSION	53

CHAPTER 4. Results and Interpretation..... 54

4.1	INTRODUCTION	54
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4.2	SAMPLE SIZE	54
4.3	DEMOGRAPHICS.....	55
4.4	DATA SCREENING	57
4.5	DESCRIPTIVE STATISTICS.....	58
4.5.1	SYSTEM QUALITY (SYQ).....	59
4.5.2	SYSTEM KNOWLEDGE (SK)	61
4.5.3	INFORMATION QUALITY (IQ).....	62
4.5.4	SERVICE QUALITY (SQ).....	64
4.5.5	CUSTOMER INNOVATIVENESS (CI).....	66
4.5.6	CUSTOMER USE (CU)	68
4.5.7	CUSTOMER SATISFACTION (CN)	69
4.5.8	CUSTOMER TRUST (CT)	71
4.5.9	SERVICE COMPLEXITY	73
4.5.10	CUSTOMER SERVICE (CS).....	75
4.6	ASSESSMENT OF NORMALITY	76
4.7	SAMPLE ADEQUACY	76
4.8	PRINCIPAL COMPONENTS ANALYSIS (PCA).....	77
4.9	RELIABILITY AND VALIDITY	81
4.10	CORRELATION MATRIX OF COMPOSITE SCORES	82
4.11	RESULTS OF MODEL TESTING	83
4.12	CFA MODEL RESULTS	84
4.13	GOODNESS OF FIT INDICES	87
4.14	RESULTS OF HYPOTHESIS TESTING	88
4.15	SUMMARIZATION OF HYPOTHESIS	91
4.16	CONCLUSION RESULTS AND INTERPRETATION	92
CHAPTER 5. Discussion.....		93
5.1	INTRODUCTION	93
5.2	PRIMARY RESULTS	94
5.2.1	FACTORS INFLUENCING CUSTOMER USE	95
5.2.2	IMPACT OF USE ON CUSTOMER SERVICE	100
5.3	CONCLUSION	102
CHAPTER 6. Conclusions and Recommendations		103
6.1	INTRODUCTION	103
6.2	SUMMARY OF PREVIOUS CHAPTERS	104

6.3	MAIN CONCLUSIONS FROM THE LITERATURE REVIEW	106
6.4	CONCLUSIONS FROM THE FINDINGS	107
6.5	CONTRIBUTION	108
6.5.1	THEORETICAL CONTRIBUTION	108
6.5.2	CONTEXTUAL CONTRIBUTION.....	109
6.5.3	METHODOLOGICAL CONTRIBUTION.....	110
6.5.4	PRACTICAL CONTRIBUTION	111
6.6	LIMITATIONS	112
6.7	RECOMMENDATIONS FOR FUTURE RESEARCH	112
6.8	CONCLUSION	113
REFERENCES		115

LIST OF TABLES

Table 1 Examples of Previous Studies.....	44
Table 2 Demographics	55
Table 3 Mean and Standard Deviations	59
Table 4 System Quality	60
Table 5 System Knowledge.....	61
Table 6 Information Quality	63
Table 7 Service Quality	65
Table 8 Customer Innovativeness.....	67
Table 9 Customer Use	68
Table 10 Customer Satisfaction	70
Table 11 Customer Trust.....	72
Table 12 Service Complexity.....	73
Table 13 Customer Service.....	75
Table 14 Kaiser Meyer Olkin and Bartlett Test.....	77
Table 15 Principle Components Analysis.....	78
Table 16 Reliability and Validity	82

Table 17 Correlation Matrix	83
Table 18 Model Fit.....	87
Table 19 Hypothesis Tests	89
Table 20 Hypothesis Significance	91
Table 21 Hypothesis findings	95

LIST OF FIGURES

Figure 1 Proposed framework to assess the use of digital channels.....	4
Figure 2 Defining moments of digital transformation (Roxas, 2021).....	22
Figure 3 Updated DeLone and McLean Model (DeLone, 2003).....	26
Figure 4 Conceptual Model	27
Figure 5 Steps in data validation	46
Figure 6 Histogram of System Quality	61
Figure 7 Histogram of System Knowledge	62
Figure 8 Histogram of Information Quality.....	64
Figure 9 Histogram of Service Quality.....	66
Figure 10 Histogram of Customer Innovativeness	67
Figure 11 Histogram of Customer Use	69
Figure 12 Histogram of Customer Satisfaction.....	71
Figure 13 Histogram of Customer Trust	73
Figure 14 Histogram of Service Complexity	74
Figure 15 Histogram of Customer Service	76
Figure 16 Final CFA model	86
Figure 17 Final Model.....	89

LIST OF ACRONYMS

AI - Artificial Intelligence

CFA – Confirmatory Factor Analysis

CFI – Comparative Fit Index

CSP – Communication Service Providers

EFA – Exploratory Factor Analysis

GFI – Goodness of Fit

IFI – Incremental Fit Index

IoT –Internet of Things

IS - Information Systems

NFI – Normed Fit Index

NLU – Natural Language Understanding

OpEx – Operating Expenses

PCA - Principle Components Analysis

RFI – Relative Fit Index

RMSEA – Root Mean Square Error

RPA – Robotic Process Automation

SST – Self-Service Technology

TLI – Tucker-Lewis Index

NPS – Net Promoter Score

CHAPTER 1. INTRODUCTION

1.1 Statement of purpose

The study aims to achieve two key objectives. Firstly, it examines the factors that have an influence on customer use of digital channels in the telecommunications industry. Secondly, the study assesses the impact of customer use of these digital channels on customer service. Digital channels signify methods for customer-business interactions through technological interfaces, such as e-mail, SMS, and websites (Heinonen & Michelsson, 2010).

This study's conceptual research model was adapted by extending the DeLone and McLean Information Systems (IS) Model, which DeLone and Mclean developed in 1992 and updated in 2003, and introduces new variables, such as customer innovativeness, customer trust, service complexity, system knowledge, and customer services. The model is then evaluated using data gathered from an online survey administered to a representative sample of consumers who utilize digital channels in the telecommunications industry.

The updated DeLone and McLean model still exhibits certain limitations, particularly in its failure to account for diverse user interactions and the impact of self-service on customer services. This shortcoming becomes evident when we consider the distinctions between usage patterns, types of devices, channels employed, and innovative utilization (Chen, 2010; Hou, 2012). Hence, there is a compelling rationale for extending the DeLone and McLean model to encompass these distinct usage variations, including innovative utilization and its repercussions on customer service (Popovič et al., 2012).

While the DeLone and McLean's (2003) model has served as a successful tool in the context of e-commerce, there are additional attributes that should be added for robustness when applying the individual use model in explaining the use of mobile

channels. The DeLone and McLean (2003) model did not include attributes, such as customer innovativeness, customer trust, service complexity, system knowledge. These variables also have a significant impact on the use of mobile applications by individuals (Jouini et al, 2012; Sood, 2021; Rocha et al, 2019; Davis, 1986; Yang, 2010; Ellen, Bearden & Sharma, 1991; Saeed, 2011).

Consumers tend to be intrinsically motivated to engage with technology-based products and services, relishing the challenge of finding novel solutions to existing problems (Hirschman, 1980). At times, consumers may express interest in an advanced digital channel, but it might not align with their device specifications hence system knowledge is a factor contributing to digital channel use. While this preference is not universal, it applies to technologically inclined customers who favour cutting-edge, feature-rich digital channels. Consequently, they may resist adopting such a digital channel (Saeed, 2011). System knowledge is therefore an important factor of consideration which is not included in the DeLone and McLean Model (2003).

In Midgley and Dowling's (1978) research, the characteristic of consumer innovativeness has played a crucial role in the process of new product or service diffusion. Consumers with a high level of innovativeness should be open to adopting mobile data services and experimenting with a variety of them (Yang, 2010). Customer innovativeness can drive digital channel use and a factor that influences customer use.

Service complexity can hinder use of digital channels and critical to understanding for customer use, hence its inclusion to the model. A self-service technology (SST) that is challenging to operate and understand can impede role clarity and competence, as it becomes more difficult to operate and comprehend, and the perceived benefits (motivation) may become less evident to users (Meuter, Bitner, Ostrom, & Brown, 2005). Customers are more inclined to shift to other channels with fewer technical difficulties if

these platforms frequently experience technical problems (Prasilowati, Suyanto, Safitri, & Wardani, 2021).

Research studies focused on consumer adoption behaviour have consistently highlighted that cybersecurity risks and threats, coupled with the historical performance of a digital channel, diminish overall trust and reliability (Jibril, Kwarteng, Chovancova, & Denanyoh, 2020). The inclusion of customer trust provides further insight into the customer use of various digital channels.

The study proposes these new attributes that may help in explaining features of digital channels use in order to guide telecommunications leaders in decision making when building digital channel service.

In addition, the study investigates the consumer perceptions to use digital channels and the significance of the variables in use in the industry.

The proposed framework (Figure 1) is therefore based on the model validated by DeLone and McLean (2003), with the additional outstanding variables included, to provide the most robust consideration set for assessment.

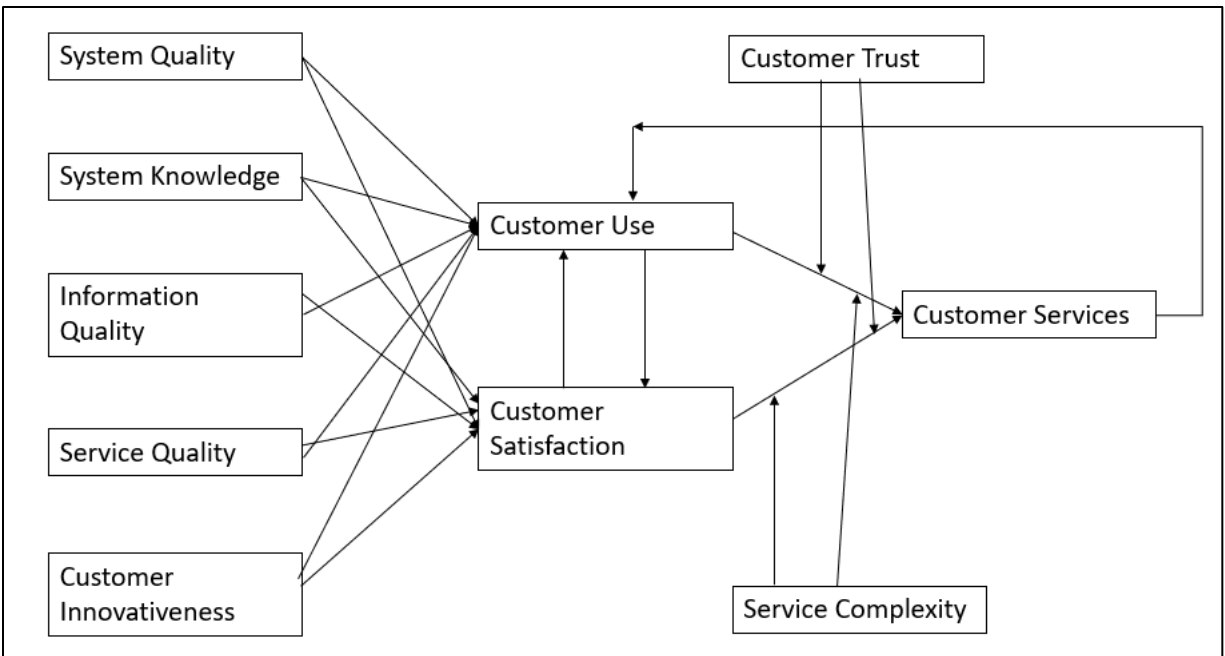


Figure 1 Proposed framework to assess the use of digital channels

Previous research in the field of Information Systems (IS) has examined factors that influence the individual usage of IS systems (Hou, 2012; Popovic, Hackney, Coelho, & Jacklic, 2012) However, these studies did not specifically consider factors such as customer trust, customer innovativeness, service complexity, or their impact on customer services within the context of digital self-service.

1.2 Background of the study

Digital media can be traced back to the pioneering efforts of Vannevar Bush, a physicist and engineer, in 1945. Bush envisioned a network of devices that would aid scientists, physicians, and historians in storing, analysing, and exchanging data. His insightful work not only anticipated the potential societal and intellectual benefits of digital media, but also established the groundwork for a variety of digital innovations, including digital

scholarship, the World Wide Web, wikis, and social media platforms (Simpson, Renear, Mylonas, & van Dam, 1996).

In tandem with the advent of the World Wide Web and the internet, digital media has profoundly reshaped 21st-century society, resulting in a significant transition from an industrial economy to an information economy. This transformation has brought about the Information Age or digital revolution. The impact has been extensive, affecting numerous aspects of our lives and fundamentally altering how we access information, communicate, and conduct business in the digital environment (Simpson, Renear, Mylonas, & van Dam, 1996). Digital channels illustrate how the internet has evolved and resulted in new forms of consumer interaction (Straker, Wrigley, & Rosemann, 2015).

The emergence of innovative technologies like mobile internet and social media has given rise to a new form of communication channels known as digital channels. These channels serve as pathways for interaction between organizations and their customers, playing a pivotal role in the process of digital transformation. By offering novel communication capabilities and round-the-clock online connectivity, digital channels have significantly contributed to reshaping the way businesses engage with their audience in the digital age (Straker, Wrigley, & Rosemann, 2015).

In 2011, the term 'digital transformation' gained popularity through the efforts of Capgemini, a consulting firm, in collaboration with MIT. They provided a definition for digital transformation as the strategic utilization of technology to greatly enhance business performance and expand its reach (Udovita, 2020).

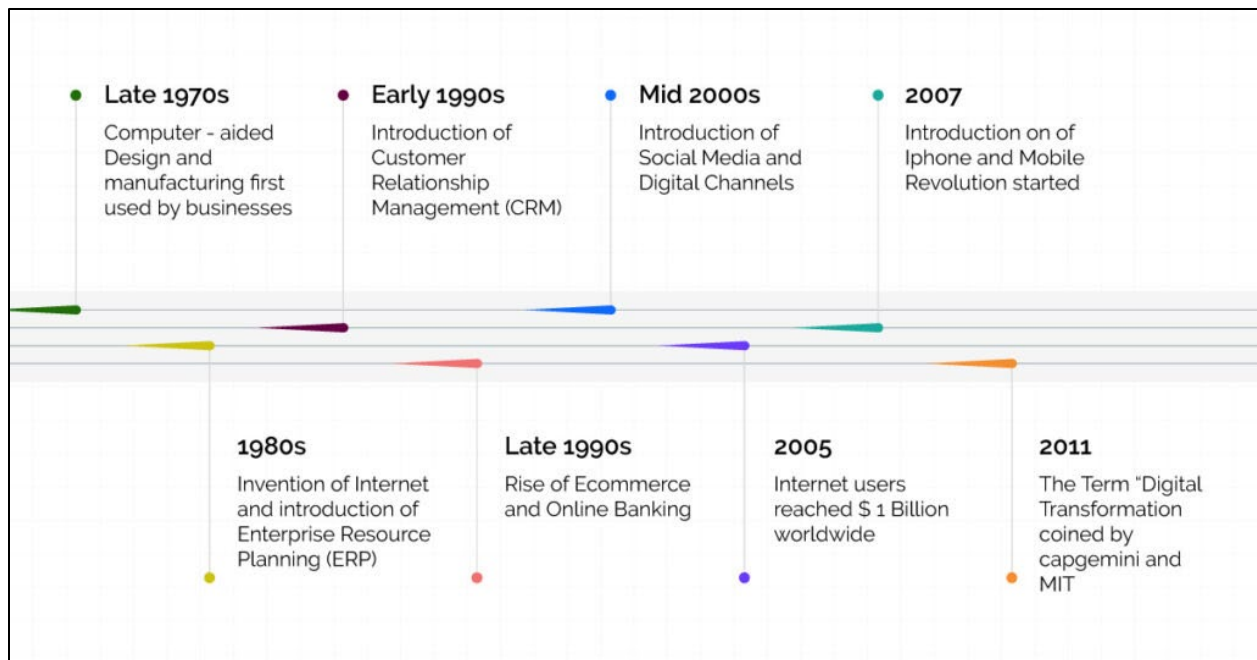


Figure 2: History of digital transformation

Source (TechEela, 2023)

A study conducted jointly by the MIT Centre for Digital Business and Capgemini Consulting reveals that companies face mounting pressure from customers, competitors, and employees to initiate or expedite their digital transformation. The study highlights that the key to a successful digital transformation lies not solely in adopting new technologies but in fundamentally reshaping the organization to fully leverage the advantages offered by these technologies. Recent research in the field of digital transformation indicates that major initiatives primarily focus on revolutionizing the customer experience, operational processes, and overall business models (Udovita, 2020).

Digital channels are defined as the platforms that promote, market, or sell products, services, social media, and applications including websites, mobile applications, electronic stores, self-service machines, chatbots and voice bots (Technopedia). Another

definition that incorporates digital channels are self-service technologies (SSTs). The use of self-service technologies are defined by Meuter et al. (2000) as interfaces that assist the consumer in producing a service without employee involvement.

A substantial proportion of customers embrace digital channels as an additional service channel. Digital channels may also be advantageous for businesses as they attract new consumers while reducing service delivery costs (Straker, Wrigley, & Rosemann, 2015).

Internet-based services, self-checkouts, interactive kiosks, automated airline check-in systems, e-Learning, e-Logistics, e-Commerce, e-Government, e-Purchasing, e-Finance, e-Travel, e-Communication, e-Travel, and TV shopping are increasingly used in service delivery processes (Lee, 2015). Self-service has altered the traditional line between the service provider and the customer (Vargo & Lusch, 2008).

The development of self-service technologies result in greater cost-effective efficiency, customer satisfaction and loyalty, and the identification of new market niches (Bitner, Ostrom, & Meuter, 2002). Moreover, some consumers have found the use of self-service technology to be enjoyable (Dabholkar, Bobbitt, & Lee, 2003).

A significant proportion of consumers utilize digital channels as supplementary service channels. Digital channels may also be advantageous for businesses because they aid in attracting new customers and reduce service delivery expenses (Straker, Wrigley, & Rosemann, 2015).

With the advent of self-service technology, consumers now have the convenience of finding what they need without relying on assistance from employees. This has led to a decrease in the necessity for direct contact and has facilitated the widespread adoption of self-service technology (Lee & Lee, 2020). Notably, consumers have responded favourably to this trend, as highlighted in a study by Kim et al. (2018). The research

reveals that the positive reception is driven by factors, such as cost reduction, immediate satisfaction, and the availability of abundant information (Kim, et al., 2018).

Over the past decade, the business imperative of the global telecommunications industry has steadily increased. Comparing the performance of the domain of telecommunications to that of other economic sectors, it has performed admirably. The communications industry is the fifth greatest sector of the global economy and continues to expand (Global Telecom report, 2020).

As this domain plays a crucial role in the service industry, the Global Telecom Services Market Size Report predicts that the global revenue will reach approximately USD 1,657.7 billion in 2020. Since the telecom industry's growth potential is constantly increasing, it is expected to expand at a rate of 5.8% by 2028, surpassing several thousand billion dollars (Global Telecom report, 2020).

Customer experience management is valued at \$8.79 billion in 2021 and it is expected to grow annually by 18.1% from 2022 to 2030 (Grand View Research, 2019). Consumers are increasingly utilising mobile devices as the primary means of communication within organisations, and it is therefore critical for businesses to accommodate this preference of communication and ensure that customers receive a high-quality experience (Sayles, Stephenson, Needham, & Dealy, 2015). The increase in mobile device use has resulted in organisations implementing digital service channels and automation to best serve their customers in real time (Grand View Research, 2019).

Internet penetration has increased by more than 20% in Africa since 2019, and globally, 63% of the world's population is online (4.9 billion people worldwide), an increase of 17% since the COVID 19 pandemic (International Telecommunications Union, 2021).

The Grand View Research market analysis report of 2019 estimates that the telecommunications (telecom) services industry will have a market size of \$1707.96 billion

with an annual growth rate of 5.4%. It is estimated that the market size will increase and reach \$2467.01 billion in 2028 (Grand view research, 2019).

Applications of self-service technology in telecommunications have the potential to reduce network rollout and operating costs, increase performance, enhance customer service, and facilitate the development of new services (Balmer, Levin, & Schmidt, 2020).

The Information System Success Model (D&M), proposed by DeLone and McLean in 1992, has been widely employed to elucidate the factors that impact the utilization of systems at an individual level. This model recognizes information quality, system quality, service quality, and user satisfaction as significant determinants affecting the use of Information Systems (IS) by individuals (DeLone & McLean, 1992, 2003).

Despite the extensive utilization of the D&M success model to validate the factors influencing IS system use, there has been inadequate examination regarding whether these factors adequately account for individual usage of digital channels for self-service. Thus, it remains uncertain whether the D&M model is a suitable theoretical framework for analysing customers' individual use of digital channels. Furthermore, factors at the individual level, such as the user's technological experience, customer innovativeness, and customer trust in the usage of these channels, may interact with the factors of the D&M IS success model, influencing the extent to which individuals utilize digital channels for self-service (Schierder & Gluchowski, 2011; Gonzales & Wareham, 2019).

The application of DeLone and Mclean-based research instruments can provide interesting and useful input for managers and future researchers of the telecommunication industry (Rocha et al, 2019). DeLone and Mclean's research instruments focus on system quality, information quality, usage, service quality, and user satisfaction. These points are critical for business management of the telecommunication industry to improve customer services and enable customers to adopt associated digital channels for improved user experiences (Hair, 2015).

McKinsey's (2020) study findings concluded that 35% of business executives believe digital transformation helps them better meet customer expectations and increase operational efficiency (40%), and 38% of executives intend to invest more in technology to make it their competitive advantage.

Digitalisation has influenced how we go about our everyday activities by developing and evaluating advanced applications and devices called intelligent agents that can perform various functions. These are supported by advances in Artificial intelligence (AI) (Adamopoulou, et al., 2020).

The implementation of digital channels has created an alternative to traditional service channels (retail store support or call centres). These digital channels offer productivity and service benefits. These benefits include speed of service, accuracy of information, automation and the ability to scale to large volumes. There may be some resistance to use these channels by consumers for various reasons embedded in consumer behaviour and features of the channel (Shawar and Atwell, 2007; Adamopoulou & Moussiades, 2020).

In the past decade, achieving revenue growth has been a challenging task for communications service providers (CSPs), prompting them to prioritize cost management and, more recently, cost reduction. To achieve efficiency gains, an increasing number of CSPs are dedicated to reducing overall operational expenses (OpEx), leveraging new digital technologies and work methods. Telecommunication transformations are primarily motivated by three factors: enhancing the customer experience, generating new revenue streams, and achieving efficiency gains (Newman & Funnell, 2021). The trend of personalized customer service is rapidly gaining momentum due to its ability to offer maximum convenience to customers. Research studies have revealed various reasons for customers adopting digital channels, with user-friendliness being one of the key factors. If a telecommunication company fails to provide a user-friendly digital channel for

customer service, customers may opt for traditional channels instead (Paul, Mittal, & Srivastav, 2016).

Understanding the behaviour, preferences, barriers, and deterrents of consumer use of digital channels for self-service, will influence the success of the digital channel use and reuse (DeLone & McLean, 2003).

1.3 Research problem

The study aims to achieve two key objectives. Firstly, it identifies and thoroughly analyse and examine the various factors that have an influence on customer use of digital channels. Secondly, the study assesses the impact of customer use of these digital channels on customer service. By examining the relationship between customer use and customer service, the study gains insights into how digital channels contribute to overall customer satisfaction and the quality of customer support provided. Previous research in the field of information systems (IS) by Hou (2012), Popovič, Hackney, Coelho, and Jaklič (2012), has identified factors that influence individual usage of IS systems. However, these studies did not include system knowledge, customer innovativeness, customer trust, service complexity, and customer services, nor were they specifically conducted in the context of digital channels for self-service.

Globally, attitudes and behaviours of consumers toward technology-based self-service are fast changing. This offers huge opportunity for telecommunication providers to engage with customers through technology-based self-service solutions in numerous scenarios. Investigating customer attitudes and behaviours with regard to technology-based self-service is essential, as is comprehending the underlying causes of consumer engagement. There is a shortage of a complete theoretical framework that incorporates all facets of technology-based self-service, even though some studies have looked at

elements connected to technology-based self-service and individual qualities that assist acceptance of new forms of self-service (Bobbitt & Dabholkar, 2001).

The dynamic nature of the global telecommunication industry necessitates a continuous pursuit of improvement and advancement. As competition intensifies, there is an increased demand for innovation and a corresponding increase in the perceived value of the service. Customers seek to attain the utmost level of convenience and value for their monetary expenditure. The demand for expedited service delivery is driven by customers' desire to optimize their use of time and resources (Campbell et al., 2011),

The adaptations to the DeLone and McLean Model (2003) are tested in relation to individual use of digital channels within the telecommunications industry to validate a robust framework for use in the industry and to measure the impact on customer use of digital channels on customer services. The adapted conceptual model which includes system knowledge, customer innovativeness, customer trust, service complexity and customer services are added as they provide more insight into the research work.

1.4 Research objectives

The key objectives of the study are mentioned below:

- Research objective 1 (RO1) - To identify and examine the factors influencing customer use of digital channels.
- Research objective (RO2) - To identify the impact of customer use on customer service.

1.5 Rationale

Telecommunication organisations with effective digital care strategies enjoy lower costs, but also greater customer satisfaction, greater differentiation, and increased brand loyalty (Mckinsey 2020). Understanding the history of technology use is a promising strategy for increasing the probability of success with technology-based service channels (Curran & Meuter, 2007).

The advent of technology has paved the way for new forms of customer experience, enabling customers to self-serve and engage with businesses through various digital channels. By analysing the literature, it is evident that there are opportunities for digital innovation in telecommunication to better service customers through digital channels (De Keyser, Köcher, Alkire, & Verbeeck, 2019).

There is little research on relationships in a digital context or in a context where customer-business interactions occur via technology interfaces. The provision of additional customer benefits beyond those offered by traditional sales methods and online transaction tools is a challenge for digital channels (Heinonen & Michelsson, 2010).

Handling customer issues online may appear to be a simple additional inclusion to traditional call centres and retail stores, but McKinsey's research demonstrates that, when executed effectively, it can represent a paradigm shift in customer satisfaction. Digital customer care is a response to consumer demand for multichannel interactions that are readily accessible and highly rewarding. In one of many examples, a leading mobile operator used digital care initiatives to reduce their total call centre volume by 20 percent in just eight months, resulting in a significant cost reduction and an increase in their net promoter score (NPS) (Mckinsey, 2020).

As the telecommunications industry advances and dominance of digital channels increases, operators must consider how to best to deliver customer services. This leads

to a reconsideration of traditional methods, such as call centres and retail channels. Customer support has been increasingly provided through digital channels and service providers plan to decrease the operational costs and improve self-service channels by yielding increased productivity, reduced service costs and ability to handle customer queries at scale, improving service output (Shawar & Atwell, 2007; Adamopoulou & Moussiades, 2020; Jouini, et al., 2012).

Digital self-service is fully integrated with existing contact centre architecture, and can instantly activate changes to a system's configuration, and the customers' device. Multiple service capabilities can be managed more efficiently by customers through self-service mobile apps (Sayles, Stephenson, Needham, & Dealy, 2015).

This study contributes to the research gap by proposing a revised conceptual model that scrutinises the factors influencing the use of digital channels to serve customers in the telecommunications industry. The proposed model allows businesses to assess all the variables to be considered when implementing a digital channel, to ensure improved operationalisation and optimise the use of digital channels by customers.

1.6 Delimitations of the study

- This study focuses only on individual consumers who have used a digital channel
- This study does not review the types of devices used by consumers in accessing channels
- The study tests the conceptual framework on customers who use digital channels to self-serve only and does not focus on those who choose to only visit retail or call service centres

1.7 Definition of terms

Digitalization is an umbrella term for all phenomena related to new digital objects that have a direct impact on the lives and activities of today's businesses and organizations (Josselin, 2020).

Digital channel: the platforms that promote, market or sell products, services, social media and applications including websites, mobile applications, electronic stores, self-service machines, chatbots and voice bots.

Mobile Applications: a type of application software intended to operate on a mobile device, such as a smartphone or tablet. Mobile applications regularly serve to provide users with comparable functionality to those accessed on personal computers. A mobile application also may be known as an app, web app, online app, iPhone app or smartphone app (Techopedia)

Robotic Process Automation (RPA): a software technology that makes it easy to build, deploy, and manage software robots that emulate human actions interacting with digital systems and software

NLU: Natural language understanding is a division of artificial intelligence that uses computer software to understand input in the form of sentences using text or speech. NLU enables human to computer communication.

Artificial intelligence: a wide-ranging division of computer science concerned with building smart machines capable of performing tasks that typically require human intelligence. Artificial intelligence allows machines to replicate the capabilities of the human mind.

SST: Self-service technologies are interfaces that assist the consumer in producing a service without employee involvement.

1.8 Assumptions

- It is assumed that customers surveyed have used more than one digital channel to self-serve
- Survey responders are clear on their responses on intention to use and reuse digital channels

The sample size represents a significant distribution of customer opinions on digital channel adoption.

1.9 Chapter Outline

The presented research work has six chapters:

Chapter 1 – Introduction

This unit of the research sets the context, defining the background, purpose and framework for the research topic and the rationale to add to the body of knowledge for digital channel use and its impact of customer service. The research objectives are outlined to determine factors that influence the use of digital channels and examine the influence customer use has on customer satisfaction and customer service.

Chapter 2 – Literature Review

Chapter 2 of the study focuses on the literature review, providing a comprehensive analysis of prior research that underscores the significance of digital channels within the telecommunications industry and their transformative impact on customer interactions

and services. The review critically examines existing literature, aligning it with the research objectives of understanding customer use and satisfaction with digital channels. The chapter discusses the limitations of Delone and McLean's Information System (IS) success model in comprehending digital channel usage. Drawing insights from various scholars, the research investigates how advances in digital technologies, including self-service technology (SST), chatbots, and mobile apps, have reshaped customer consumption patterns and enhanced service delivery efficiency.

Chapter 3 – Research methodology

This section outlines the approach to the research methodology for the proposed framework. It discusses research methods used, data collection and the research questionnaire that is used to analyse the conceptual framework.

Chapter 4 – Presentation of results

In Chapter 4, the paper covers the sample size and demographic profile of the dataset. Descriptive statistics, a normality check, and an assessment of whether the sample size is appropriate for the empirical data under consideration are also presented. Prior to investigating the confirmatory factor of the measurement model, reliability, validity, and the correlation matrix are analysed. The results of the structural model are then examined, followed by a discussion of the potential implications.

Chapter 5 – Discussion of results

This chapter focuses on examining the impact of various factors on both customer use and satisfaction with digital channels. The factors under investigation encompass system quality, system knowledge, information quality, customer innovativeness, customer use, customer satisfaction, customer trust, service complexity, and customer service. These factors are carefully evaluated to address the primary objective of the research, which

revolves around identifying and analysing the key elements that influence customer utilization of digital channels.

Chapter 6 – Conclusion and recommendations

This section provides a broad overview of the research, providing a comprehensive understanding of its scope and objectives. Subsequently, it delves into a detailed discussion of the theoretical, contextual, methodological, and practical contributions offered by the study, highlighting the valuable insights and knowledge generated. Furthermore, the chapter addresses the limitations of the research and explores potential avenues for future studies to further advance the field. The conclusion section summarizes the thesis, consolidating the key findings and implications in a concise manner.

CHAPTER 2. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

In Chapter 1, the research topic and problem were introduced. This section of the research paper focuses on the context of collecting, analysing, and reviewing existing literature that helps to explain the concept of digital channels and their use in telecommunications. The evolution, characteristics, and benefits of digital channels are then discussed in depth. The literature review then focuses on the DeLone and McLean IS model and the insufficiencies of existing models in relation to digital channel use. This chapter investigates the potential role of these channels in telecommunications and customer service as well as their potential effects on customers.

This section of the research is based on an analysis of the perspectives of various scholars who provide information about the digital channel usage of customers. It illustrates how previously conducted instruments and research provide valuable information about digital technology in customer use and its effect on the telecommunications industry. In order to accomplish this, a systematic literature review is conducted that provides a critical analysis of the findings of various researchers regarding digital technology use.

2.2 Telecommunications

During the first two-thirds of its 30-year history as a dynamic, competitive market, the telecommunications industry emphasized revenue growth over operational efficiency. Nonetheless, over the past decade, revenue growth has been elusive, compelling

communications service providers (CSPs) to place a greater emphasis on cost management and, more recently, cost reduction (Newman & Funnell, 2021).

The telecommunication industry has expanded due to the advances in digital technologies globally and it is now the most significant aspect of the financial and service sectors. Newly introduced advanced technologies are involved in changing the lifestyle and consumption methods of the customers, which has led to a significant change in the interactions between customers and businesses. The crisis of COVID-19 played a significant role in the improvement of technology adoption (Ilyas, Rehman, & Naït-Ali., 2020).

Governments and different private sector companies are transforming their operating models and increasing their service delivery by improving their efficiency and effective design to increase transparency, interoperability, and customer satisfaction. Several businesses are fulfilling the requirements of customers by introducing unique methods. Similarly, the telecommunications industry is also continuously anticipating customer needs and adopting digital channels that could improve customer satisfaction (Awadhi, Obeidat, & Alshurideh, 2021).

The telecommunication industry is the founder of integrating digital technology in business operations therefore customer expectations are higher, compared to other industries (Sood & Sharma., 2021).

A increasing number of CSPs are committed to reducing overall operating expenses (OpEx), and they are confident that new digital technologies and methods of working will facilitate efficiency gains. There are three primary motivators for telecommunication sector transformation: enhancing the customer experience, generating new revenue streams, and attaining efficiency gains. Telecommunications providers are more likely to focus on indirect costs, such as network and IT operations or reducing the number of

employees and contractors across the organization, when attempting to reduce OpEx (Newman & Funnell, 2021).

2.3 Digital Channels

Historically, employees have played a significant role in the consumer service experience. However, self-service technology (SST) replaces the customer-service agent experience with the customer-technology experience. Hilton, Hughes, Little, and Marandi (2013) argue that organizations adopt self-service technology (SST) in order to accomplish more with fewer resources, as customers engage with channels to perform tasks previously conducted by service employees, thereby transforming the customer role from primarily passive to active.

Digital services refer to the electronic distribution of information across multiple platforms and devices (Stephan, 2016). The information is presented in a way that is easy to use and understand and typically involves transactional services (Stephan, 2016). Digital channels utilize artificial intelligence and robotic processing automation to interact with consumers and systems allowing for end-to-end processing of transactions and services (Adamopoulou & Moussiades, 2020). Digital channels are defined as the platforms that promote, market, or sell products, services, social media and applications including websites, mobile applications, electronic stores, self-service machines, chatbots and voice bots (Technopedia). For example, a chatbot is an artificial intelligence programme which is designed to simulate a conversation with individual users, especially over the internet (Adamopoulou & Moussiades, 2020). Chatbots use natural language processing (NLP) and sentiment analysis to converse with the user, either via text or voice (Adamopoulou & Moussiades, 2020). Chatbots have been used across industries (business, education, e-commerce, and health) and the benefits may include increased productivity, reduced service costs and the ability to handle customer queries at large

scale and improving service efficiency (Shawar & Atwell, 2007; Adamopoulou & Moussiades, 2020).

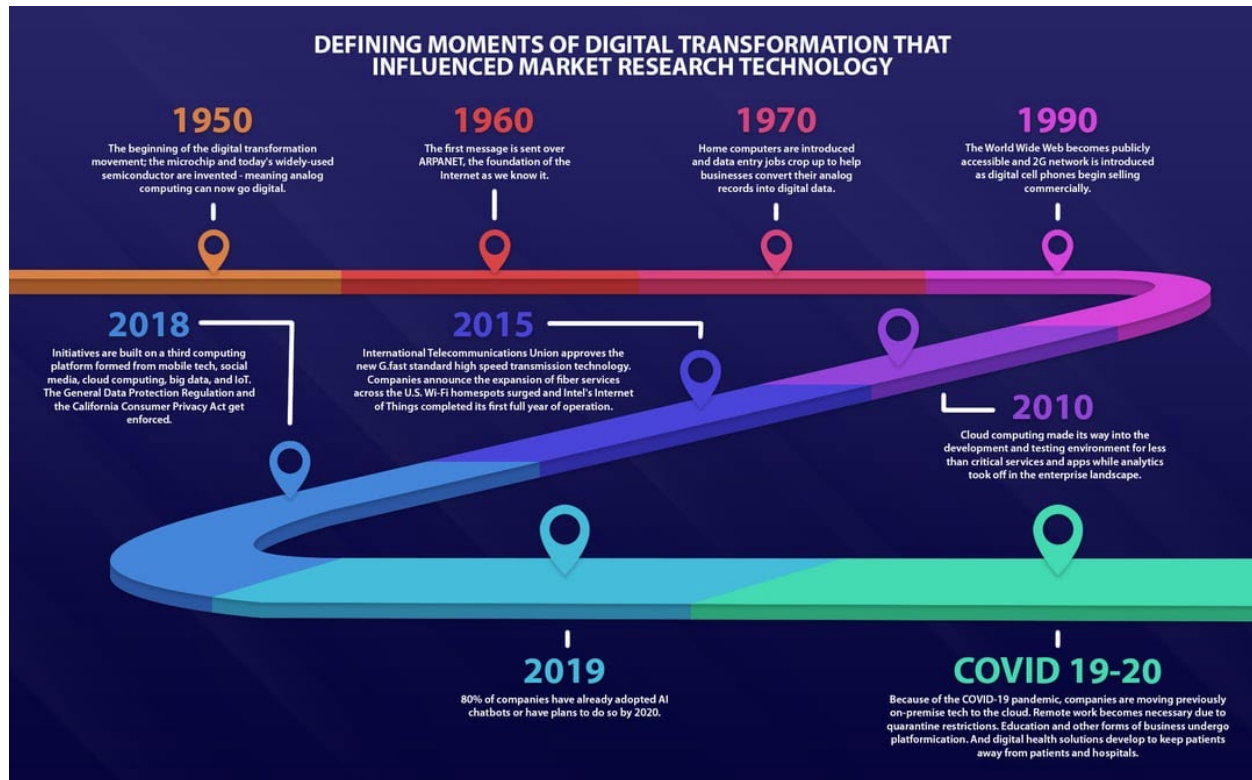


Figure 2 Defining moments of digital transformation (Roxas, 2021)

Similarly, mobile applications (apps), an example of a digital channel for customer service, offer a simple platform for consumers to interact directly with businesses via their mobile device. The application can be adapted to serve a variety of communication preferences, including social media, texts, voice calls, email and instant chat. Automation via mobile apps allow full integration with existing contact centre architecture, and can instantly activate changes to the system's configuration, and the customers' device. Concretely, services such as registering products, creating support tickets, receiving incentive offers and multiple service capabilities can be managed more efficiently by

customers through self-service mobile apps (Sayles, Stephenson, Needham, & Dealy, 2015).

Customers are becoming more accustomed to virtual personal assistants (VPAs), and intelligent products are being developed. Advances in conversational artificial intelligence (AI) and the Internet of Things (IoT) will enable these products and virtual personal assistants (VPAs) to evolve into machine customers who act on behalf of their proprietors, redefining what constitutes a low-effort experience. 37% of customers will use a digital assistant to interact with customer service on their behalf by 2025 (Gartner, 2022).

Digital transformation provides multiple benefits that have a great impact on external factors such as adopting new technology, which is helpful to put a positive impact on the stakeholders. Researchers have explained that the concept of digital transformation could improve the operation of businesses. It provides customer satisfaction that performs a great role in the development of business (Awadhi, Obeidat, & Alshurideh., 2021).

2.4 Reason for Adoption of Specific Digital Channels

The customized customer service trend is increasing rapidly over time because it provides maximum convenience to customers (Paul, Mittal, & Srivastav, 2016). Research studies have shown that there are many reasons for the adoption of digital channels by customers. One of the main reasons is the user-friendly options that many telecommunication companies are providing to their customers. If the digital channel that the organization has developed for providing customer services to their customers is not user-friendly then many customers might shift to traditional channels for customer service, such as voice calls or SMS. It is important that the digital channels that organizations deploy are user-friendly, to enable customers of various age groups to use the channels efficiently (Mahadevan, 2010).

If telecommunication organizations are going to reduce the occurrence of errors and faults then they can boost the usage of digital channels for the purpose of customer service. It is true that when faults and errors in the system are going to decline than not only the customer satisfaction will going to increase but the overall reputation and revenue of the business will also increase. Excellent customer service is mandatory for the high profitability of the business (Kourdi, 2015).

Social media sites provide maximum interaction with the companies which is not possible through any other means. Customers are now using social media sites for the purpose of customer service and providing their feedback. By seeing the popularity of social media sites many organizations have started focusing more on social media instead of other digital platforms. The companies know that through this trend, they can boost customer satisfaction to new levels (Khan & Fasih, 2014).

Through customised services, each customer will get the desired services which will increase customer satisfaction significantly. Customised customer services are the solution to various issues which organizations faced on daily basis. Customised customer services will allow the business to create customer loyalty which ultimately becomes a reason for the increase in the revenue of the organization. Higher revenue will bring higher profits as well (Brown, Lamming, Bessant, & Jones, 2007).

2.5 DeLone and McLean IS Model

The theoretical underpinning for this analysis is rooted in the information system (IS) success model conceived by DeLone and McLean. Their model serves as an instrument to understand the characteristics of an IS system which are relevant to individual users, ultimately leading to their satisfaction, utilization, and improved performance (Cohen, Coleman, & Kangethe, 2016). The DeLone and McLean IS model asserts that system quality, information quality, and service quality are integral elements in an individual user's

assessment of the system. Previous research has confirmed the effectiveness of the D&M IS success model (Wang, Wang, & Shee, 2007; Chen, 2010; Hou C. K 2018) and illustrated its value in various studies involving individual users (Wu & Wang, 2006) (Hou C., 2012; Schmiedel, Vom Brocke, & Recker, 2014). However, it has not yet been adapted sufficiently to support research on digital channels. This work contributes by adapting and extending the D&M IS success model in order to construct the research model and hypotheses that address the research objectives.

DeLone and McLean created the original model based on a review of 180 prior studies on IS efficacy. DeLone and McLean (1992) proposed that the following dimensions are essential contributors to the IS success model: information quality, system quality, system use, user satisfaction, individual impact, and organizational impact.

DeLone and McLean (2003) presented the revised D&M IS success model, which incorporates revisions to their original model. The update to the IS success model included the incorporation of service quality as a system attribute, the differentiation between intended and actual system use, and the consolidation of individual and organizational impacts into a single net benefits construct.

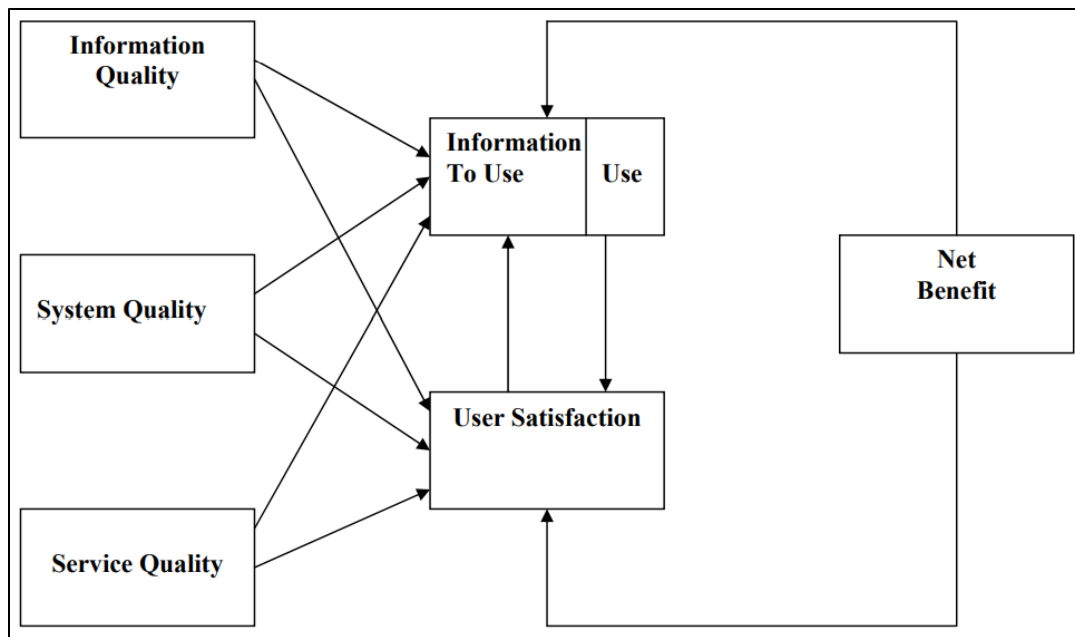


Figure 3 Updated DeLone and McLean Model (DeLone, 2003)

2.6 Factors that influence use in digital channel

2.6.1 Conceptual Framework

The conceptual framework is based on the insight of DeLone and McLean's model related to the attributes of system quality, service quality, information quality and user satisfaction which relates to the fulfilment of customer requirements. The model determines the specific elements as products or services that provide something related to satisfaction. Apart from these attributes, external variables like customer innovativeness, customer trust, service complexity, and system knowledge are also included in this research.

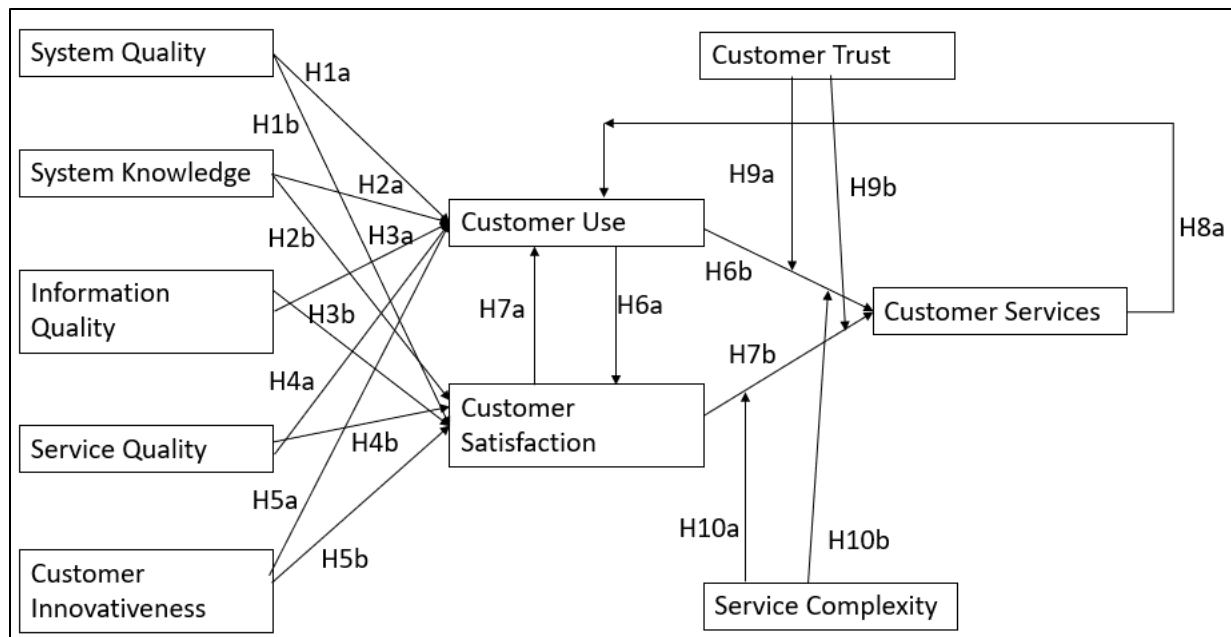


Figure 4 Conceptual Model

The use of digital channels by consumers primarily relates to various factors and conditions. The framework (figure 3) contains multiple components which are interrelated with each other to represent cause-and-effect relationships or associations to some extent. In the following sections, each variable is discussed separately.

2.6.2 System Quality

System quality has a substantial impact on system use and user satisfaction. System usability, availability, reliability, adaptability, portability, integration, and response time are examples of system quality (Petter et al., 2008; Serumaga-Zake, 2017).

McKinney et al. (2002) conducted information system studies and explained different theories that are related to customer satisfaction. The theory explained satisfaction that could be determined with the help of perceived performance and cognitive standards (Chille, 2018).

The digital environment in the telecommunication industry measures the characteristics of these channels. System quality is valued by the users of the telecommunication industry as they prefer to find the usability, availability, reliability, adaptability, and response time of the digital channels (Hoehle, Scornavacca, & Huff, 2012)

System quality refers to the technical aspects and characteristics of the information system itself. It focuses on the extent to which the system provides reliable, accurate, and error-free functionality. System quality can be evaluated, based on criteria such as response time, availability, flexibility, ease of use, compatibility, and security.

In the DeLone and McLean IS Model, system quality is considered as one of the key determinants of information system success. It suggests that a high level of system quality is crucial for achieving positive user perceptions, user satisfaction, and overall organizational performance.

The model posits that system quality influences other dimensions, including information quality, service quality, user satisfaction, and individual impact. Thus, a well-designed, technically sound information system with good system quality is expected to have a positive impact on user satisfaction and overall organizational effectiveness.

It can therefore be hypothesized:

H1a: System quality will have a positive significant influence on customer use.

H1b: System quality will have a positive influence on customer satisfaction.

2.6.3 *System Knowledge*

The system knowledge attribute denotes that a customer needs to be aware of the channels available and their specific use to choose the correct channel and fit for device capability. A research study conducted on consumer behaviour has observed that device

knowledge plays an important role in consumer readiness to adopt a new technology or digital channel. Sometimes, consumers take an interest in an advanced digital channel, but it fails to comply with their device specifications. Although this trait is not universal, it can be applied to a technologically inclined customer who prefers to use top-notch tech-featured digital channels. Consequently, they remain resistant to adopting this digital channel (Saeed, 2011). System knowledge is therefore an important factor of consideration which is not included in the DeLone McLean Model (2003).

The organizations must analyse the behaviour of the customers so that they can understand which digital channels are most preferred by the customers. If the customers prefer a few digital channels and skip other channels, then there might be an issue with the other digital channels. By analysing this behaviour, the organization can identify the issue in other channels and can resolve those issues so that the customers can again move toward those digital channels. By analysing the behaviour, the organizations can further bring improvement in the digital channels, such as providing more features (Awadhi, Obeidat, & Alshurideh, 2021).

Customer analytics provide brief information about the behaviour of the customers and what trends are prevailing in the market. Through customer analytics enable the organization to serve their customers more efficiently and can also increase customer satisfaction significantly (Campbel, Edgar, & Stonehouse, 2011).

When a customer learns about an offering and receives information digitally, and then contacts a service provider to successfully conclude an engagement, it may be a result of the increasing use of self-service technologies, in which the consumer can purchase and utilize the service independently of the service provider (Heinonen & Michelsson, 2010).

It can therefore be hypothesized:

H2a: System knowledge will have a positive significant influence on customer use.

H2b: System knowledge will have a positive influence on customer satisfaction

2.6.4 Information Quality

Information is derived from processed data that is meaningful for decision making. If information outputs are to be useful for planning and decision making, they must be accurate, useful, pertinent, complete, and understandable (DeLone & McLean, 1992).

Research conducted by Fürber and Hepp (2011) found that information quality security primarily relates to accuracy, completeness, security, and availability. Consumers of digital channels should be provided relevant guidelines, policy documents, and other detail to keep using a digital channel or they may shift to a competitive one. The information provided should satisfy all queries and answer all questions of consumers.

In web content, information quality content is required to be modified, complete, relevant, user-friendly, and secure so that it will be convenient for the customers to start the transaction through digital channels (Chille & Shayo., 2021).

In the evaluation and study of student learning systems, the input data sample collected from 882 students outlines the attributes of system quality, information quality, and service quality are given utmost priority and their influence on user satisfaction is underlined (Çelik & Ayaz, 2022).

Digital channels unable to supply such important information usually have low adoption rates because it does not provide a clear overview to the consumers. Ambiguity draws a negative impact on consumer perceptions of a digital channel. Other than clarity and completeness of information, another vital attribute is the accuracy of information. A digital channel not complying with the accuracy requirements will discourage customers to rely

on this channel or platform. As a result, these poor scores for information quality further lead to user dissatisfaction with digital channels which results in rejection of the digital technologies and digital channels. Therefore, previously held research studies on information quality required for the adoption of digital channels have clearly mentioned the importance of the availability and security of information which a digital channel should properly address. Understandability is also an important determinant of information quality. Researchers believe that ambiguity can mislead consumers which can sometimes cause dissatisfaction and complexities (Schivinski & Dabrowski, 2016).

Key for digital channels to improve their use, are the factors of making the output understandable for all users by avoiding complex and unknown terms, the digital channel should ensure the use of basic and easy-to-understand vocabulary (Awadhi, Obeidat, & Alshurideh., 2021).

It can therefore be hypothesized:

H3a: Information quality will have a positive significant influence on customer use.

H3b: Information quality will have a positive influence on customer satisfaction

2.6.5 Service Quality

Service quality refers to the assistance a user obtains when utilizing an information system (Serumaga-Zake, 2017). Typically, support is provided by the service provider. The perceptions of service attributes such as tangibility, dependability, responsiveness, assurance, and empathy can be used to measure service quality (DeLone & McLean, 2003).

The service quality subject is considered by the researchers to provide information about the expectation and actual performance of the product in a way that service has been performed (Kourdi, 2015).

Researchers tend to use the terms 'service quality' and 'customer satisfaction' to construct the factors that are developed fairly to explain the importance of service quality. Most researchers have agreed that customer satisfaction is a short-term approach whereas service quality is an attitude that is established by long-term performance (Campbel, Edgar, & Stonehouse, 2011).

Service quality is a significant factor in customer satisfaction and it is the most reliable evaluation procedure that makes high-quality service offerings. Customer expectations and customer satisfaction are interrelated with each other therefore businesses could not survive without customer satisfaction. It has been seen that creative ideas can increase customer expectation and satisfaction. Therefore, most effort should be made to improve the service quality (Constantiou & Mahnke., 2010).

Jayawardhena and Farrell (2011) recommended that service quality features in internet banking and also considered it a critical factor to increase customer satisfaction (Chille & Shayo, 2021).

In the telecommunication industry, service quality is required to fulfil customer satisfaction and ensure that the satisfaction is primarily based on the service quality and contributes to the development of customer satisfaction (Chille & Shayo, 2021).

In digital communication, there is a variety of financial transactions that are required to use digital channels that could attract new customers to enhance customer satisfaction. Lassar, Manolis, and Winsor (2000) examined the impact of service quality on customer satisfaction by analysing a private financial institute with the help of the SERVQUAL technique.

The research compares the various dimensions of service quality and its impact on customer satisfaction. The results of the research recommended that the functional quality is not only significant, but it is also difficult to understand, therefore the quality dimensions are required to influence the functional dimension to measure satisfaction technically (Dairo & Beyioku., 2022).

Consumers ready for the adoption of digital channels also give significant attention to service quality. One major concern of consumers regarding the selection of digital channels, especially mobile payment systems, is linked with service quality (Brown, Lamming, Bessant, & Jones, 2007).

Three important determinants of service quality presented by this framework are integrity, efficiency, and functionality. According to a research project, service quality plays an important role in consumers to attract them for future business transactions. Consumers satisfied with the service quality usually represent a higher user satisfaction rate (Iqbal, 2020). The digital channel should ensure the integration of all important components in processes, otherwise a process will lose its value. Services should have functionality and efficiency-related features to become the consumer preference (El-Haik, 2005).

It can therefore be hypothesized:

H4a: Service quality will have a positive significant influence on customer use.

H4b: Service quality will have a positive influence on customer satisfaction

2.6.6 Customer Innovativeness

Based on Rogers (1983), innovativeness refers to the extent to which an individual adopts innovation at a comparatively earlier phase than their counterparts. Innovative consumers are more likely to be intrinsically motivated to use technology-based products and

services, and to relish the challenge of attempting novel approaches to old problems (Hirschman, 1980). Analysing the perception of the customer is very important to prudently analyse and measure the effectiveness of the use of digital channels in the telecommunication industry. Customer Innovativeness can be determined by multiple means. At the consumer readiness point, users mainly focus on the adaptability of a digital channel. According to the research studies, consumer readiness relates to device knowledge, user adoption plans, change resistance, and digital savviness.

Kumar and Anne (2016) assert that while incorporating innovative features such as AI infusion and Chatbots is important, it is imperative to comprehend customer orientation and enhance services based on their preferences.

Digital savviness relates to understanding and developing user experience through education and awareness about the expected results of emerging technology on business operations in the future. If consumers believe that the adoption of a digital channel would bring positive outcomes for their business operations then they represent high consumer readiness behaviour toward digital channels (Brito, Dias, & Oliveira, 2018).

According to Dabholkar and Bagozzi (2002), technologically savvy customers frequently seek to test new products and services based on technology without any regard for their dependability or usability. In Midgley and Dowling's (1978) research, the characteristic of consumer innovativeness has played a crucial role in the process of new product or service diffusion. The level of innovativeness exhibited by consumers has a direct impact on their behavioural intention to utilize mobile data services. Consumers with a high level of innovativeness should be open to adopting mobile data services and experimenting with a variety of them (Yang, 2010).

It can therefore be hypothesized:

H5a: Customer innovativeness will have a positive significant influence on customer use.

H5b: Customer innovativeness will have a positive influence on customer satisfaction.

2.6.7 Customer Use and Customer Satisfaction

Usage refers to everything from the website to navigating the information retrieval or execution of the transaction. User satisfaction is significant to analyse the opinion of customers to use digital channels and it should cover the entire customer experience cycle and provide a better experience related to purchasing, payment, receipt, and service (Chille, 2018).

Customer satisfaction measures how well a product or service supplied by a firm meets customer expectations. Ease of use, security, low transaction costs and wide applicability of the solutions increases perceived customer value and should be managed by digital channels (Saleem & Rashid, 2011).

Researchers agree that satisfaction or attitude is a way to evaluate customers by comparing the expectation before the purchase of a product and performance after they have received it (Woodruff, Cadotte, & Jenkins, 1983). Kotler (2000) explained satisfaction as a feeling of an individual experience that provides pleasure or disappointment, resulting from comparing the perceived performance of a product in relation to customers' expectations (Majumdar, 1997). Hunt (1991) explained satisfaction as a function of the customer's belief that he wanted to be treated fairly.

The expectation of customers can be explained as a belief about the product. When customers adopt different channels to improve satisfaction, quality, and reliability, their judgement of customers is influenced by these factors. Oliver (1980) explained the procedure of satisfaction judgement and the figure explains how satisfaction judgement could be explained, according to the perspective of customers.

It can therefore be hypothesized:

H6a: Customer use will have a positive significant influence on customer satisfaction.

H6b: Customer innovativeness will have a positive influence on customer service.

H7a: Customer satisfaction will have a positive influence on customer use.

H7b: Customer satisfaction will have a positive effect on customer services.

2.6.8 Customer Services

In the framework, customer services are linked with business success measures for cost avoidance to lower customer services use or escalations, customer satisfaction, and service complexity.

Customer services refers to the overall support that is delivered by the service provider and applies to the support of the information system of the department that is significant enough to provide equal satisfaction to the new and existing customers (Chille & Shayo, 2021).

Studies show that the use of digital channels for customer support is greatly reduced due to errors and technical issues with telecommunications companies' websites, mobile applications, and systems. Customers are more inclined to transfer to other channels with less technical difficulty if these platforms frequently have technical problems (Prasilowati, Suyanto, Safitri, & Wardani, 2021).

The prevalence of faults, defects, and technical problems is frequently the primary factor in the declining adoption of digital channels. Telecommunication companies can enhance the use of digital channels for customer assistance by reducing these incidents. Additionally, decreasing system flaws and failures improves customer satisfaction.

It can therefore be hypothesized:

H8a: Customer services will have a positive significant influence on customer use.

2.6.9 Customer Trust

Apart from all these, trust and reliability are also important considerations for consumers when it comes to system usability. Research studies focused on consumer adoption behaviour have clearly mentioned that cybersecurity risks and threats linked with the historical performance of a digital channel reduce overall trust and reliability. Consumers who avoid digital channels have a history of cybersecurity threats and incidents. Poor security systems badly impact the user trust levels and reliability of the digital channels as they represent a high probability of data breaching events and information manipulations (Jibril, Kwarteng, Chovancova, & Denanyoh, 2020).

For example, digital channels dealing with monetary transactions and banking services cannot afford cybersecurity threats and issues because any bad event of the data breach (stealing of user credentials, credit card details, or bank account details) can cause financial loss as well as future loss of loyal customers (Mahmood, Chadhar, & Firmin, 2022).

As technology is becoming more advanced day-by-day, the frequency of cyber-attacks and incidents of hacking is also increasing with the passage of time. Today, cyber attackers are using the latest means for hacking the systems and using the information of the company and their clients for their own benefit. Due to hacking and cyber-attacks, many organizations have incurred substantial financial losses. If the organizations have not implemented strong measures of protection, then there is a chance that the

corporation will have to face cyber problems in the future which can cause serious financial loss (Spender, 2014).

The organizations that have faced cyber-attack in the past might be unable to convince the users to use their digital channels for customer service. Many customers are afraid that if they are going to use digital channels then their personal information will get into the hands of hackers and they might have to face problems in the future. Cyber-attacks reduce the reputation of the organization to a large extent and in the future, many customers might be unable to trust the digital services of the business. It is very important for the business to protect the IT system so that it can remain protected from cyber-attacks (Kennedy, 2006).

Many studies have shown that there are factors that determine the usage of the digital channel by customers. One of the main factors is the quality of the system. If the quality of the system is high and in the past, no issues have occurred in the system, then customers will definitely be going to prefer such a digital channel. However, if the quality of the system is poor and in the past, several incidents of technical faults have occurred in the system along with cyber-attacks, then the customers will never prefer such digital channels (Kourdi, 2015).

It can therefore be hypothesized:

H9a: Customer trust moderates the relationship between customer use and customer services.

H9b: Customer trust moderates the relationship between customer satisfaction and customer services.

2.6.10 Service Complexity

Often, digital efforts result in the creation of yet another channel, including mobile, social, and messaging sub-channels. Given that channel conflicts have plagued large companies for decades and that competition between channels is sometimes more intense than competition with the outside world, it is not optimal to add to the list. This results in more complexity and expense for the business and a below standard customer experience (Bianchi, Cermak, & Dusek, 2016).

Prior research indicates that time, effort, complexity, dependability, precision, and enjoyment are vital to customers when evaluating and selecting technology-based self-service options (Dabholkar, 1996). Dabholkar (1996) notes that some prospective customers of technology-based self-service options were concerned about the effort required to use these options and the complexity of the service delivery process, according to qualitative research. Bagozzi, Davis, and Warshaw (1992), Davis, Bagozzi, and Warshaw (1989), Davis et al. (1989); Bagozzi (1990) found "ease of use" to be an essential attribute for customers when utilizing computer technology. These two characteristics - effort and complexity appear to be related and encompassed by "ease of use."

A difficult-to-operate, difficult-to-understand SST will hinder role clarity and capability because it will be more difficult to operate and comprehend, and the user may find the benefits (motivation) less evident (Meuter, Bitner, Ostrom, & Brown, 2005).

Organizations have to tear down their particular internal barriers by first gaining a more nuanced comprehension of how their consumers perceive all available channel options. Incorporating digital into an omni-channel experience eliminates barriers for customers and for performance, enabling businesses to refine their digital skills while capitalizing on their traditional channel expertise (Bianchi, Cermak, & Dusek, 2016).

H10a: Service complexity moderates the relationship between customer use and customer services.

H10b: Service complexity moderates the relationship between customer satisfaction and customer services.

2.7 Conclusion of Literature Review

This chapter presented the theoretical foundation for this study's structure. The chapter began with a literature review concerning telecommunications, digital channels, and the DeLone and McLean IS Model. From the reviewed literature, theories of individual use were presented and their applicability to this investigation was discussed. Elements of the conceptual research framework were contextualized for digital channel use in telecommunications to conclude the chapter.

CHAPTER 3. RESEARCH METHODOLOGY

3.1 Introduction

In chapter 2, the literature review relevant to this study was discussed. Prior research emphasizes the significance of digital channels in the telecommunications industry, and how they transform customer interactions and services. It critically analyses existing literature to address the research objectives of understanding customer use and customer services in digital channel use. The chapter discussed the DeLone and Mclean Information System (IS) success model, highlighting its limitations concerning understanding digital channel usage. Through insights from various scholars, the research investigates how advances in digital technologies, including self-service technology (SST), chatbots, and mobile apps, have altered customer consumption patterns and improved efficiency in service delivery (Meuter, Bitner, Ostrom, & Brown, 2005).

The conceptual framework in this research is based on DeLone and McLean's model, which focuses on system quality, service quality, information quality, and user satisfaction in relation to fulfilling customer requirements. External variables, such as customer innovativeness, customer trust, service complexity, and system knowledge are also considered.

The primary purpose of this research is to identify and empirically examine the factors influencing consumer use of digital channels, investigate customer satisfaction in the use of digital channels, and to validate the updated Information Systems model. This chapter describes the approach and process for this study.

3.2 Research approach

The research approach adopted for this study is quantitative. A quantitative approach is one in which the researcher uses experiments and surveys to collect data on predetermined instruments that yield statistical data (Creswell, 1999). One of the advantages of quantitative research is its ability to use smaller groups of people to make inferences about the population that are statistically validated that would otherwise be too expensive to measure (Bartlett, Kotrlik, Higgins, & Williams, 2001).

3.3 Research design

The research design adopted for this study is a survey. Pinsonneault and Kraemer (1993) state that surveys produce quantitative descriptions of a population and assist in identifying relationships between variables. This research methodology is thus suited for studies that aim to validate relationships between several predictor variables and one or more criterion variables (Leedy & Ormrod, 2005). Therefore, to empirically test the hypotheses, a quantitative survey is used.

An advantage of using surveys is that respondents can be assured of confidentiality and thus are more likely to be truthful in their responses (Leedy & Ormrod, 2005). Surveys are also efficient, inexpensive, accurate and quick (Zikmund, 1987).

A disadvantage of survey questionnaires is that the response rate is usually poor, and the data can be biased, based on the participants' level of comprehension and understanding (Leedy & Ormrod, 2005). Another disadvantage is that surveys are not able to provide a deeper understanding of respondents' opinions which cannot be clarified (Cooper & Schindler, 1998).

3.4 Data collection methods

This study utilises a structured survey questionnaire as its data collection method. As this study considered the unit of analysis to be the individual, a structured survey questionnaire was best suited for the data collection. Bhattacharjee (2012) states that collection of data through survey questionnaires is an appropriate choice for studies in which the individual is the unit of analysis as they possess the strength of measuring an array of unobservable variables. Another strength of the survey questionnaires that was exploited for this study was the ability to collect data that was spread over a significant geographical area.

3.5 Population and sample

3.5.1 *Population*

For this study, the population is defined as any person in South Africa who has accessed a digital channel for the purpose of self-service in last 24 months.

3.5.2 *Sample and sampling method*

A survey can be conducted through sample surveys or consensus surveys (Evans, 2010). Sample surveys are used to collect data from a representative subset of a population, where census surveys collect data for the whole population (Salkind, 2009). Probability sampling gives an equal opportunity to all members of the population to be sampled using a random sample (Evans, 2010). To address the needs of this study, the data was collected by means of a sample survey of consumers who have accessed digital channels for the purpose of self-service in the previous 24 months. An adequate sample size of 10 cases or observations per indicator variable is recommended as the minimum number of respondents for structural equation modelling (Nunnally, 1978). Because the study is analysing nine variables, a minimum of 90 responses is required to

conduct the analysis. The current average survey response rate is estimated to be 30% (Cleave, 2020). The initial sampling outreach targeted 900 respondents, with the aim to achieve a statistically significant response rate with at least 100 completed survey responses.

Table 1 Examples of Previous Studies

Scope of the study	Sample used	Data analysis	Authors
Individual innovative use of IS	1000 (response rate 51%)	SEM (PLS)	(Al Hajri, Xu, Nuwangi, & Sedera, 2014)
Understanding factors affecting the use on mobile application Fujian, China	500 (response rate 81%)	SEM	(Chen, 2020)
Impact of BI system on performance	500 (response rate 11%)	SEM (PLS)	(Wierder & Ossimitz, 2015)
Choosing Among Alternative Service Delivery Modes: An Investigation of Customer Trial of Self-Service Technologies	800 (51% response rate)	Multiple regression and linear regression	(Meuter, Bitner, Ostrom, & Brown, 2005)

The sample size of 900 employed in this study is aligned with previous studies (Meuter et al., 2005; Hajri et al., 2014; Wierder & Ossimitz, 2015; Chen, 2020), as demonstrated in Table 1. These previous studies were instrumental in informing the determination of the sampling size for the present study.

Structural equation modelling is a powerful multivariate technique, found increasingly in scientific investigations to test and evaluate multivariate causal relationships (Fan, Chen, Shirkey, John, & Wu, 2016). Structural Equation Modelling is different from other modelling approaches as it tests the direct and indirect effects on pre-assumed causal relationships (Fan, Chen, Shirkey, John, Wu, Park & Shao, 2016).

3.6 The research instrument

An effective questionnaire is one that allows the transmission of valuable and accurate data from the respondent to the researcher. Questionnaires can be designed and used to collect quantities of data from different respondents (Wilkinson & Birmingham, 2003).

The research instrument comprised nine core constructs, namely, system quality, system knowledge, service quality, customer innovativeness, customer use, customer satisfaction, customer trust, service complexity and customer services. Constructs were measured using multi-item Likert scales (“1=strongly disagree” to “7=strongly agree”). The research instruments were adopted from the work of DeLone and McLean (2003), as well as Jouini, et al. (2012), Sood (2021), Rocha, et al. (2019), Davis (1986), Yang (2010), Ellen, Bearden and Sharma (1991) and Saeed (2011). The instrument includes a filter question to ensure that only consumers who have used a digital channel are respondents to the survey.

3.7 Procedure for data collection

The data was collected via an online survey. The survey was distributed via LinkedIn to telecommunications consumers who have used a digital channel for self-service in the previous 24 months. Field (2009) suggests that larger sample sizes boost statistical power, enabling researchers to draw conclusions regarding the statistical significance of observed relationships. The study's sampling method permits the selection of a 900-person sample from network acquaintances and the sourcing organizations' databases. Given the average survey response rate of 30% (Cleave, 2020), this robust outreach to participate is likely to yield more than the minimum number of respondents required.

3.8 Data analysis strategies and interpretation

The data from the individual questionnaires was exported into an SPSS spreadsheet, and thereafter the following steps were taken (Figure 5):

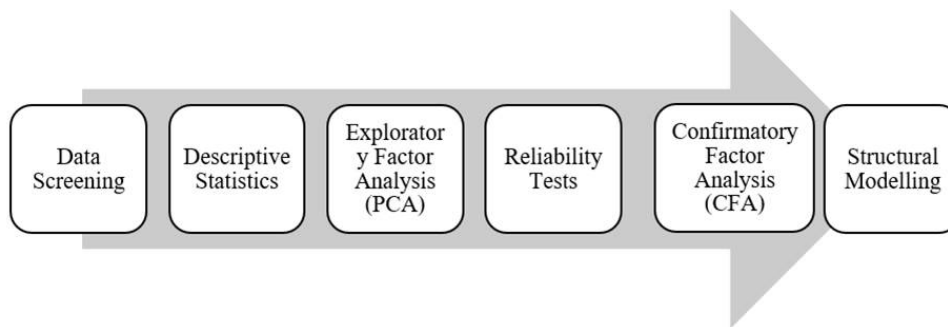


Figure 5 Steps in data validation

The study conducted data screening to identify and eliminate errors before further data processing (Evans, 2010). Descriptive statistics (including the means, standard deviations, skewness, and kurtosis of scale items) was used to describe the sample profile and shape or distribution of the collected data. Sample profiles are further described using frequency counts and percentages. Exploratory Factor Analysis (EFA) was used to reveal the underlying foundation of a large set of variables (Vonglao, 2017; Abdi, 2010). Reliability tests are applied to ensure measurement is free from error and results are reputable (Collis & Hussey, 2009). Confirmatory Factor Analysis (CFA) was used to test if the measures selected are consistent with the proposed models or theories, thereby measuring the hypothesized model (Lee & Lings, 2008). Assessing the measurement models through CFA provides the final confirmation of “validity and reliability” of items measuring the variables (Lucadamo & Amenta, 2014; Russolillo, 2012).

Structural Equation Modelling (SEM) was used to analyse the data using SPSS. SEM delivers a test of the structural model and a confirmatory test of the measurement model (Hair, Black, Babin, & Anderson, 2010).

3.9 Possible limitations and challenges of the study

While this study assesses the variables influencing use of digital channels for self-service in general, one limitation is that the broad definition of digital channels does not allow for feedback specific to individual digital channels (for example, chatbots and specific mobile apps). This introduces an opportunity for further research, applying the proposed model to gather feedback on individual digital channel examples.

The study objective focused only on the ‘use’ of digital channels, where ‘adoption’ of digital channels is not addressed.

3.10 Quality Assurance

Quality assurance and assessment is a very important measure that helps telecommunication providers to understand the effectiveness of their services and how they have been received by the customers. Ensuring the efficacy and proper working of a product or service according to the organizational standards, using step-by-step evaluation is called quality assurance (Hamilton, 2020). It can also be coined as meeting the customer needs that are concerned with the design, durability, responsiveness, validity, reliability and efficiency of the product or service. The primary functions of quality assurance are to design a service based on the data collected, to validate the devised plan and process, to document all the major and minor functions, to ensure the quality and to provide improvement plans (Azar, 2022). Although all the etiquettes are important and essential, the attributes of validity and reliability gain the most prominence. Also, these two features are considered to play a pivotal role in the creation of research design, and methodical process planning of the quantitative research model (Middleton, 2019).

Validity and reliability should be considered in order to ensure sound results from the study. Reliability indicates the accuracy and preciseness of the measurement

process while validity ensures the study evaluates what is relevant to deliver reliable results (Kothari, 2004). In an assessment set-up, validity is considered an effective measurement tool to denote the actual and real-worldness of a product or service. Whereas the service's appropriateness, practicality and usefulness are determined by the attribute of reliability. In quantitative research, ensuring validity indicates that the results correspond and can be extrapolated to real-life scenarios (Sale, Lohfeld, & Brazil, 2002). Analysing the two features of validity and reliability in the research gives us a detailed orientation of determining the consistency and accuracy of the digital channels and how useful they are in serving the potential customers of the telecommunication industry. From the references, contemporary works and other findings mentioned below, a relative understanding of the digital savviness of advanced digital channels used by the telecommunication industry can be checked, analysed and understood.

3.10.1 Validity

Validity is one of the most significant attributes used as a pivotal tool to measure the quality of the research. It is considered to be the most fundamental part of an assessment process. The validity process reflects the outcomes of the research work. What is usually taken into consideration is whether the research work can claim to be valid. It is estimated to be a very independent process that measures and portrays the exactness and accuracy of the research work (Hamilton, 2020). The author says when the right intended variable of measurement is included in the research, a valid and verifiable result can be obtained as a conclusion. Validity offers aid to the research. In general, the validity term is used to denote the necessary factors that determine all the attributes that are going to be measured. It also takes into account all the factors and how well these respond and are correlated to the assessment process (Bryant, 2000). There is a great prominence on the usage of the right tools, operational processes and right methods to achieve validity. According to Carlson and Herdman (2012), validity can be clearly understood when the researcher puts forth the question, of whether he is

including all the necessary measuring that one thinks he ought to measure. There is also a great amount of emphasis on developing target questions, based on the research concept to achieve the steps of validity in order. From Borsboom, Mellenbergh, and van Heerden's (2004) research paper – the concept of validity is clearly understood that to clearly establish validity in your research, the researcher must present all the logical and statistical underpinnings without fail. Even in this research work, validity plays a very important role in sketching out how accurately and effectively the evolved digital channels serve the customers in the telecommunication industry.

Validity is of many different types. Face validity, construct validity and criterion-related validity are the three main constructs (Nevit, 2015). The face and primary value of the research are estimated with the help of face validity. The construct validity can be checked and estimated with a help of an expert panel by analysing the external factors, meanwhile, the criterion validity can be comprehended by observing the existing research and practices. It can also be easily carried out with the help of comparison with other research scopes.

However, only the external and internal validity are related to this work. Both are explained in brief below.

3.10.2 *Internal validity*

The primary validity type is the internal one and it deals with all the internal association part of the research work. It denotes the usefulness and accuracy of the internal components like data collection and analysis tools, processing procedures and other research techniques. It depicts the exact accuracy of the internal design. The researcher must be very cautious and prudent while carrying out the research analysis as an incorrect design can lead to inaccurate and inefficient outcomes (Roberts & Priest, 2006). According to the author, validity is closely associated with the influence and effect rendered by the relationship between independent and dependent variables of research work. It is also termed

as a causal relationship. That is why the measurement of variables should be done with caution, as a small alteration can cause a huge impact on the outcomes of the research (Borsboom, Mellenbergh, & van Heerden, 2004). In order to prove internal validity, the cause-and-effect relationships necessary for establishing cause and effect should be established (Onwuegbuzie, 2000). To maximize the validity of this measurement, factor analysis was used to test whether the items measuring negative effects are more correlated to items than items measuring somatic indicators (Clark & Watson, 1995). Many contemporary research works have established the importance of validity assessment in the draft of the relationship between the variables. One such work by Slack and Draugalis (2001) portrays the cause and effect momentum of the research design, the dependent and independent variables, outcome, etc. The insight achieved from the said research is observed to be beneficial for this research design.

3.10.3 *External validity or transferability*

External validity is the extent to which the results are generalizable to groups, environments, and contexts outside of the experimental settings (Onwuegbuzie, 2000). The design of this study adopts randomized, probability sampling, as opposed to defining a specific population of participants with unique attributes, allowing the research findings to be more generalizable to populations, and carrying a higher external validity. In simple terms, the generalization of the procured outcomes is represented by the term called external validity. This attribute helps in promoting your research work to reach a very large audience base. Observed from the research work and findings of Slack and Draugalis (2001), it is evident that the experiments performed in a varied and natural setting will eventually improve the external validity criteria of the research work. One of the major advantages of this external validity is that it includes a wider audience which brings diversity to the research method. The researcher cannot limit the scope of the external validity only to the laboratory standards. Since it is extensive and more inclusive across populations and domains, this attribute cannot be

confined only to the experiments conducted (Steckler & McLeroy, 2008). The generalized category like different avenues and audiences is taken into consideration here. The external validity helps us to understand the views and perceptions of a wider audience regarding the effective service of telecommunication channels. This is why it is considered pivotal for this research work.

3.11 Reliability

An internal consistency measure is needed to establish reliability. The term reliability is used to denote the standards of repetitiveness and consistency. It is a well-known fact that consistency and practice are key to producing good outcomes. That is why it is mandatory to consider reliability in high standards while carrying out the research process. According to the author (Thanasegaran, 2009), a researcher should be consistent to perform experiments in varied settings to compare and consider reliable outcomes. Only then, there may be scope for further improvements. Repetition of the experiments is the only recognised way to improve the reliability of a particular research work. The majority of the contemporary researchers employ the tool of objectivity to enhance the reliability scope of the research. An effective instrument of reliability will help the researcher achieve the favourable outcome they are hoping to obtain. Particularly in a quantitative study like this research, achieving the intended objectivity is rather easy and effortless when compared to the qualitative methods (Noble & Smith, 2015). However, achieving higher reliability in research works involving data collection and human behaviour is quite complicated. This is because human perception and thinking is not consistent and differs from one period to another. There is also a myriad external factors involved in influencing a particular thought or opinion. So, predicting the relationship between the dependent and independent variable becomes quite a task in itself (Sürücü & Maslakçı, 2020). Although to achieve a higher standard of reliability in qualitative research, there are numerous techniques employed by the researchers which

were found to be quite effective. Modulating the rigour, controlling, and repeating the sample in different settings, by providing adequate justifications and qualifications are some of the foremost ways to increase the reliability levels (Noble & Smith, 2015).

Reliability is one of four different constructs and each holds a representation. The popular types are Test-retest reliability, Inter-rated reliability, parallel forms reliability, and internal consistency reliability (Meyer, 2010). The first type denotes measuring the standards of reliability over a point of time at adequate intervals. The parallel forms' reliability can be tested and measured by monitoring two different forms of experiments at the same time to check whether they produce a similar result. Inter-rater reliability is a concept where multiple researchers or a panel of judges are appointed to check the reliability of the research. The final reliability divides the research into behaviour and attitude and measures the results simultaneously to check the efficacy. Finally, the results are correlated to reach the stipulated outcomes. The study implemented internal consistency as a degree of reliability and factors in the use of Cronbach's alpha and the commonly acknowledged cut-off of 0.7 (Hair et al., 2010). This technique plays a vital role in the research. Lower values advance concerns about the occurrence of too much measurement error.

3.12 Ethical considerations

This study received ethical clearance on 25 January 2023 with certificate number issued WBS/DB416577/536 (see certificate in appendix C).

This study followed the following ethical principles described by Battacherjee (2012):

- Ensured that voluntary participation allowed participants to avoid any exposure to harm during the research.

- Anonymity guaranteed that the researcher cannot identify the participants and their answers in the research study. Furthermore, confidentiality allows for the identities of the participants not be revealed with regards to the research.
- The principle of disclosure as related to the details of the research to the participants. This included who was conducting the research, why the research was being conducted, how the results will be used. This allows participants to be in better position to decide if they wanted to proceed or withdraw their participation from the study.
- Analysis and reporting - a researcher has the obligation to report the findings as they have been observed in the study and not elaborate or modify them in order to offer a more appropriate conclusion to their research as this is grounds for dishonesty.

3.13 Conclusion

In this chapter, the research methodology employed in the study is presented. The research method adopted for this study is quantitative, utilizing a survey based on a 7-point Likert scale. The survey was conducted among 900 users of digital channels in the telecommunications industry. The data collected through the survey was analysed using Structural Equation Modeling (SEM).

CHAPTER 4. Results and Interpretation

4.1 Introduction

The research methodology used, was detailed in Chapter 3. This Chapter analyses the study's collected data. The objective of identifying and analysing the factors that influence customer use of digital channels is investigated and tested. In addition, the second research objective, "to determine the effect of customer usage on customer service," is investigated and evaluated. Through the distribution of questionnaires, a survey was conducted to obtain feedback from consumers of digital channels in the telecommunications industry. The collected data from users was used to evaluate the model's hypotheses. Initial sections addressed sample size, respondent demographics, data screening, and sample outliers. In addition, the following sections present descriptive statistics, an evaluation of the empirical data's normality, and an analysis of the sample size. Also, the principal component analysis, reliability and validity, and correlation matrix are executed prior to analysing the model's results. Finally, model results, discussion, and a conclusion are provided.

4.2 Sample size

For our study, we took a total of 121 observations. Twenty-five observations were removed as incomplete surveys. The survey comprised 10 variables with 96 completed responses. The first variable, 'System Quality (SYQ),' was measured with five items, ranging from SYQ 1 to SYQ 5. The second variable, "Service Quality (SQ)," was measured with six items, ranging from SQ 1 to SQ 6. The third variable, "System Knowledge (SK)," was measured with five items, ranging from SK 1 to SK 5. The fourth variable, "Customer Use (CU)," was measured with four items, ranging from CU 1 to CU 4. The fifth variable, "Customer Trust (CT)," was measured with five items, ranging from CT 1 to CT 5. The sixth variable,

“Customer Service (CS),” was measured with four items, ranging from CS 1 to CS 4. The seventh variable, “Service Complexity (SC),” was measured with five items, ranging from SC 1 to SC 5. The eighth variable, “Information Quality (IQ),” was measured with four items, ranging from IQ 1 to IQ 4. The ninth variable, “Customer Satisfaction (CN),” was measured with five items, ranging from CN 1 to CN 5. The last variable, “Customer Innovativeness (CI),” was measured with four items, ranging from CI 1 to CI 4.

4.3 Demographics

A descriptive analysis is performed before the model is developed to get an idea of the data set. The demographic profile of our data set is shown in Table 1.

The results in Table 1 show that participants who are aged between 35 and 44 years old (36.5%) were the highest category of age group, and those aged 65 and over were the lowest category of age group. For this study, we took 50% male and 50% female participants. The majority of participants (53.1%) were from Gauteng province. 99% of participants had used digital self-service channels in the past 24 months and over 58% of users used more than one channel. Most participants (49%) used digital channels for self-service daily. 59.4% of participants belong to the telecommunications industry.

Table 2 Demographics

Demographics	Category	Frequency	Percentage
Age	18-24	3	3.1
	25-34	13	13.5
	35-44	35	36.5
	45-54	32	33.3
	55-64	12	12.5
	65 and over	1	1

Gender	Male	48	50
	Female	48	50
	Prefer not to say	0	0
Province	Eastern Cape	1	1
	Free State	1	1
	Gauteng	51	53.1
	KwaZulu-Natal	9	9.4
	Limpopo	1	1
	Mpumalanga	1	1
	Northern Cape	0	0
	North West	0	0
	Western Cape	32	33.3
Usage	Yes	95	99
	No	1	1
Channels used	USSD	2	2.1
	SMS	0	0
	Online	10	10.4
	App	11	11.5
	WhatsApp	8	8.3
	Chatbot	4	4.2
	Voicebot	5	5.2

	All seven channels	7	7.3
	Two Channels	9	9.4
	Three Channels	16	16.7
	Four Channels	9	9.4
	Five Channels	15	15.6
	Six Channels	0	0
Freq. of use channel	Daily	47	49
	Weekly	27	28.1
	2-3 times a month	17	17.7
	Once a month	2	2.1
	Every 2-3 month	2	2.1
	2-3 times a year	1	1
Telco Industry	Yes	57	59.4
	No	39	40.6

4.4 Data Screening

"Statistical Package for the Social Sciences (SPSS) Version 26" was used to analyse the data and check for any missing data. Missing values were not

recoverable because of the low sample size. Therefore, observations with missing values were removed, using IBM SPSS Version 26.

According to Hair et al. (2010), outliers are defined as data points that differ significantly from other observations. Any responses with very high or unusually low values were evaluated to find potential outliers (Tarka, 2018). Extreme responses may indicate that the respondents do not belong to the same population. According to Hair et al. (2010), the extreme values are often responses that are more than three standard deviations above or below the sample mean. However, there were no outliers in this data set. Each respondent's standardized scores were checked for each questionnaire item, and no outliers were found. Given that each question on the questionnaire was graded on a specific scale, this is not surprising.

4.5 Descriptive statistics

A seven-point Likert scale (Strongly Disagree, Disagree, Somewhat Disagree, Neither Agree Nor Disagree, Somewhat Agree, Agree and Strongly Agree) was used to assess each research construct. The value of 1 corresponds to “Strongly Disagree” and the value of 7 corresponds to “Strongly Agree”. The value of 2 corresponds to “Disagree” and the value of 6 corresponds to “Agree”. The value of 3 corresponds to “Somewhat Disagree” and the value of 5 corresponds to “Somewhat Agree”. Finally, the value of 4 represents “Neither Agree Nor Disagree”. The mean and standard deviation of ten variables is presented in Table 3.

Table 3 Mean and Standard Deviations

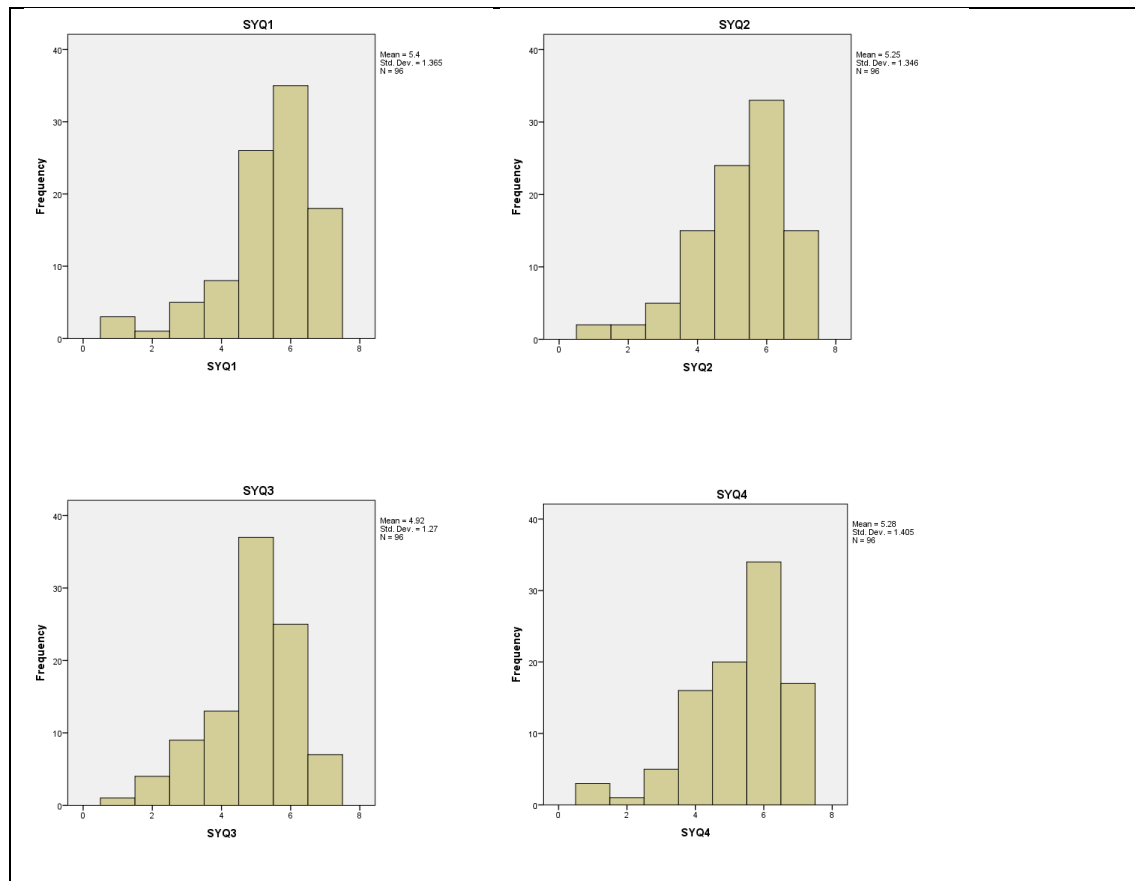
	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
SYQ	96	1.60	6.60	5.2208	1.08637	-1.755	.246	2.651	.488
SK	96	1.40	6.60	5.4000	1.24951	-1.722	.246	2.195	.488
IQ	96	1.33	7.00	5.2257	1.45538	-1.665	.246	1.773	.488
SQ	96	1.33	6.67	5.2135	1.22587	-1.961	.246	3.255	.488
CI	96	1.67	7.00	5.7153	1.02367	-2.688	.246	8.445	.488
CU	96	1.67	7.00	5.8090	1.08982	-2.663	.246	7.273	.488
CN	96	1.40	7.00	4.5688	1.44465	-.810	.246	-.498	.488
CT	96	1.60	6.60	5.0979	1.31357	-.810	.246	-.498	.488
SC	96	1.75	7.00	5.1302	1.19096	-1.380	.246	1.838	.488
CS	96	1.50	6.50	4.9818	1.35881	-1.184	.246	.430	.488
Valid N (listwise)	96								

4.5.1 System Quality (SYQ)

System Quality refers to the system's usability and user satisfaction is significantly impacted by system quality. System quality includes things like response time, integration, flexibility, portability, availability, and reliability (Petter et al., 2008; Serumaga-Zake, 2017). The overall mean is 5.2208 and standard deviation is 1.08637, as presented in Table 3. The mean of items ranges from 4.92 (1.27) and 5.40 (1.365). It indicates that most participants agree with the five statements which collectively highlight the positive qualities of the digital channel system, emphasizing its ease of use, availability, customer-friendly nature, acceptable response time, and stability. Figure 6 shows the histogram of service quality items and supports that most participants agree with the statements.

Table 4 System Quality

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
SYQ1	96	1	7	5.40	1.365
SYQ2	96	1	7	5.25	1.346
SYQ3	96	1	7	4.92	1.270
SYQ4	96	1	7	5.28	1.405
SYQ5	96	1	7	5.26	1.216



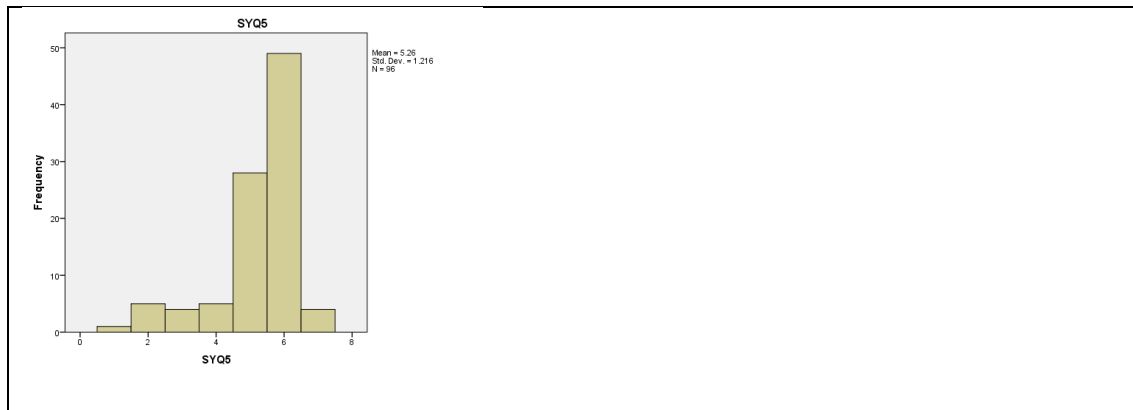


Figure 6 Histogram of System Quality

4.5.2 System Knowledge (SK)

The system knowledge characteristic indicates that a customer must be aware of the channels available and their intended usage to select the right channel and match it to the capabilities of their device. The overall mean is 5.4 and standard deviation is 1.2495, as presented in Table 3. The mean of items reflected in Table 5 ranges from 5.20 (1.419) and 5.55 (1.45). This indicates that most of participants agree with five statements, these statements mutually highlight the customer's knowledge and familiarity with the digital channels available for self-service. They suggest that the customer finds the digital channels easy to learn and use, effective in providing the required information, and is aware of the available channels and how to navigate them.

Table 5 System Knowledge

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
SK1	96	1	7	5.54	1.368
SK2	96	1	7	5.20	1.419
SK3	96	1	7	5.28	1.607
SK4	96	1	7	5.43	1.434
SK5	96	1	7	5.55	1.450

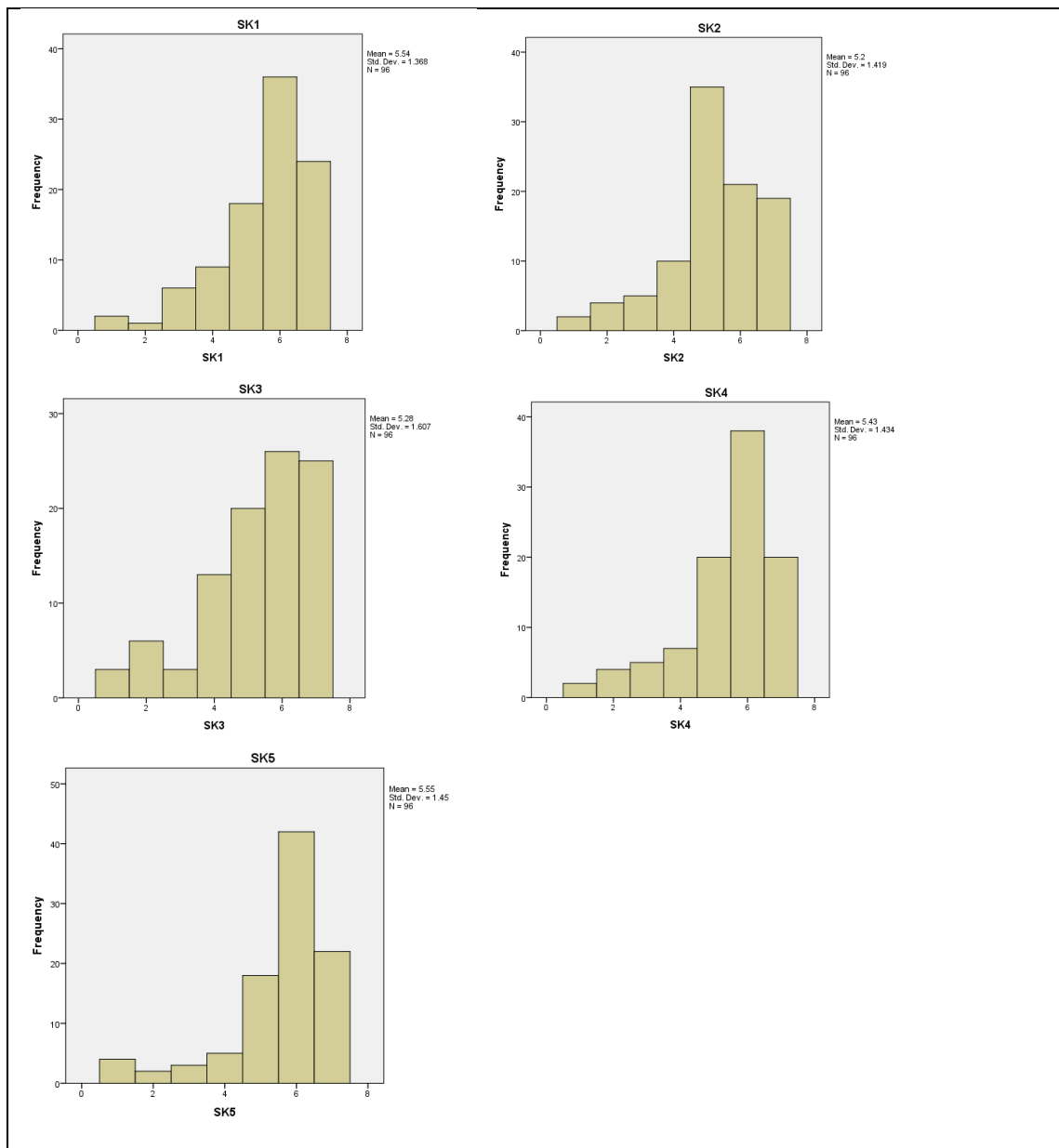


Figure 7 Histogram of System Knowledge

4.5.3 Information Quality (IQ)

Information Quality relates to the correctness, completeness, security, and availability, according to Fürber and Hepp (2011), who state that consumers of

digital channels should be given pertinent instructions, policy documents, and other information so they can stick with one digital channel or switch to a rival one. Consumers' enquiries and questions should be fully addressed by the material offered. The overall mean is 5.2257 and standard deviation is 1.45538 as presented in Table 3. The results of each survey question in Table 6 below note the mean range from 4.91 to 5.30 suggests that most respondents tend to agree that the information quality provided by the system is relevant, reliable, easy to understand, relevant to their needs and up-to-date and current. This is clearly represented in figure 8.

Table 6 Information Quality

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
IQ1	96	1	7	5.30	1.699
IQ2	96	1	7	5.15	1.542
IQ3	96	1	7	4.91	1.392
IQ4	96	1	7	5.23	1.539

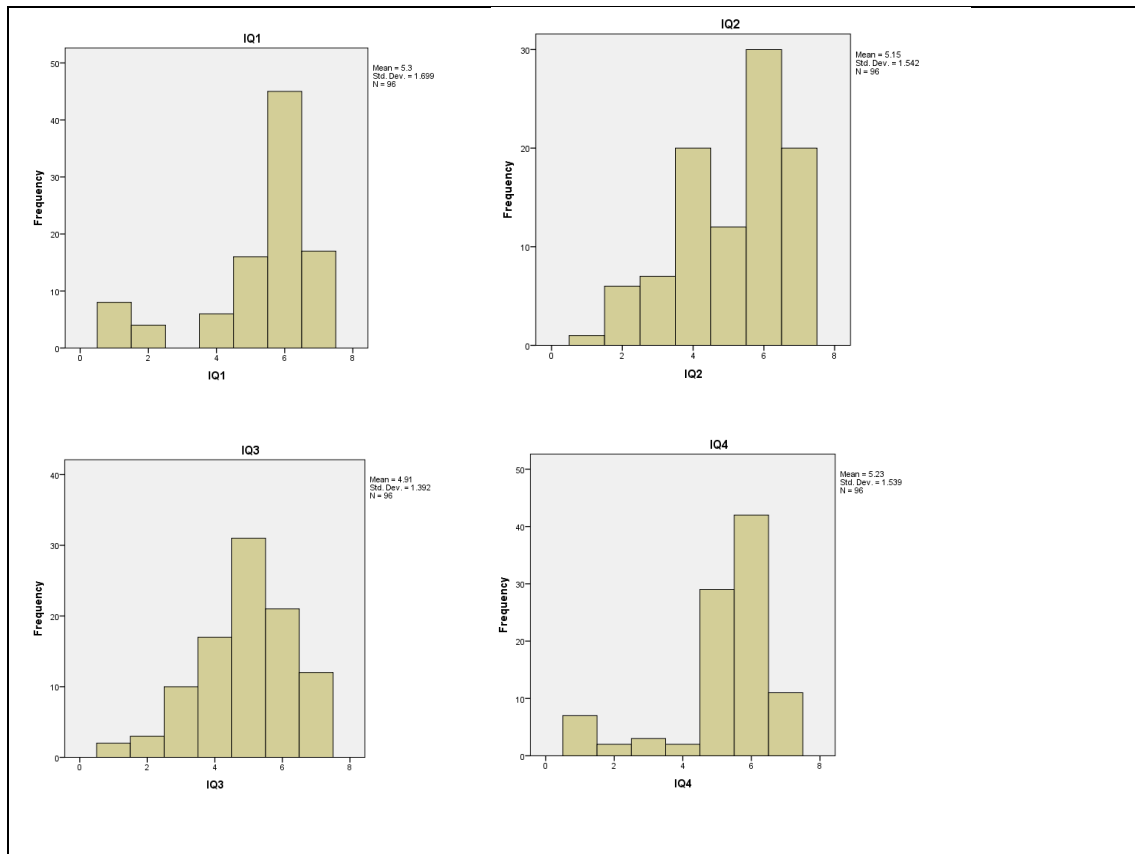


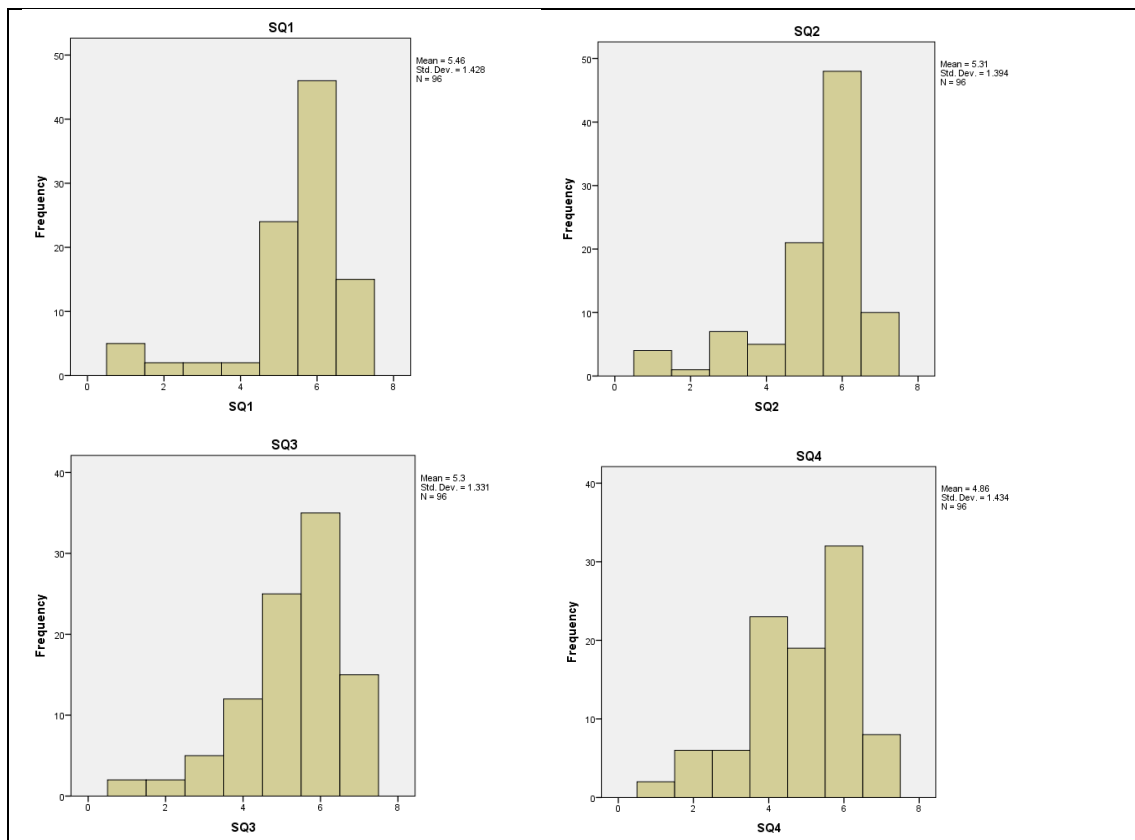
Figure 8 Histogram of Information Quality

4.5.4 Service Quality (SQ)

Service Quality is the level of support a user receives when using an information system (Serumaga-Zake, 2017). The overall mean is 5.2135 and standard deviation is 1.2258, as presented in Table 3. The breakdown of results of each survey question in Table 7 denotes the mean range from 4.81 to 5.46. This suggests that most respondents tend to agree that these statements collectively highlight positive aspects of the service quality of the digital channel, including promptness, efficiency, customer satisfaction, meeting expectations, provision of support, confidence-building, and responsive support teams.

Table 7 Service Quality

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
SQ1	96	1	7	5.46	1.428
SQ2	96	1	7	5.31	1.394
SQ3	96	1	7	5.30	1.331
SQ4	96	1	7	4.86	1.434
SQ5	96	1	7	5.33	1.427
SQ6	96	1	7	5.01	1.497



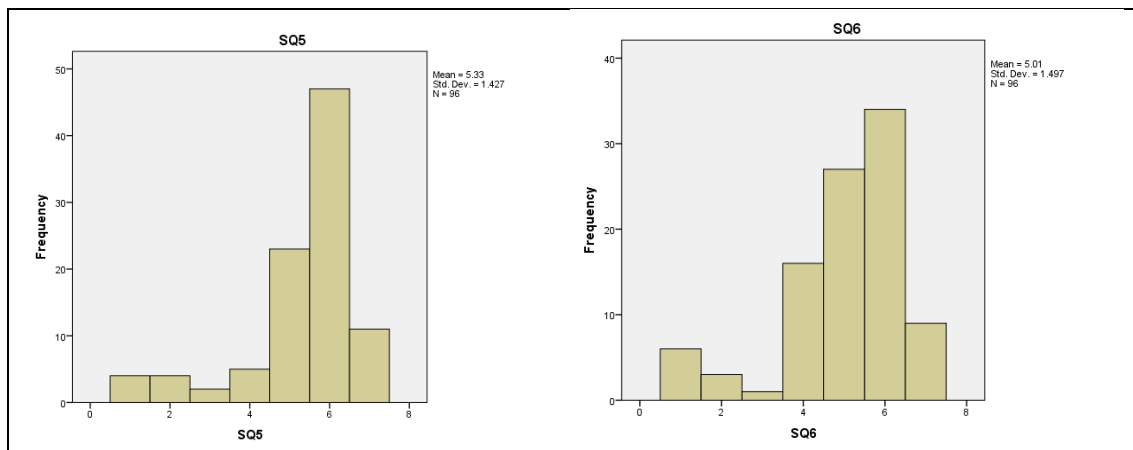


Figure 9 Histogram of Service Quality

4.5.5 Customer Innovativeness (CI)

Customer Innovativeness considers how open consumers are to new items is a concept known as consumer innovativeness. According to one definition, consumer innovativeness is the tendency or inclination to purchase or use new items or to prefer new and different experiences. According to Rogers (1983), the degree to which a person accepts innovation at a significantly earlier stage than their peers is referred to as innovativeness. The overall mean is 5.7153 and standard deviation is 1.0236 as presented in Table 3. Table 8 shows that the mean ranged from 5.38 to 5.83 for the survey questions linked to customer innovativeness. This suggests that most respondents tend to agree that these statements indicate that the customer is comfortable, open-minded, and eager to explore innovative ways of using digital channels. Figure 10 proves that customers demonstrate a willingness to experiment with new features, explore different methods, welcome fresh ideas, and take calculated risks in order to enhance their digital experience and potentially uncover new advantages or functionalities.

Table 8 Customer Innovativeness

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
CI1	96	2	7	5.78	1.097
CI2	96	1	7	5.53	1.329
CI3	96	1	7	5.38	1.378
CI4	96	1	7	5.83	1.237

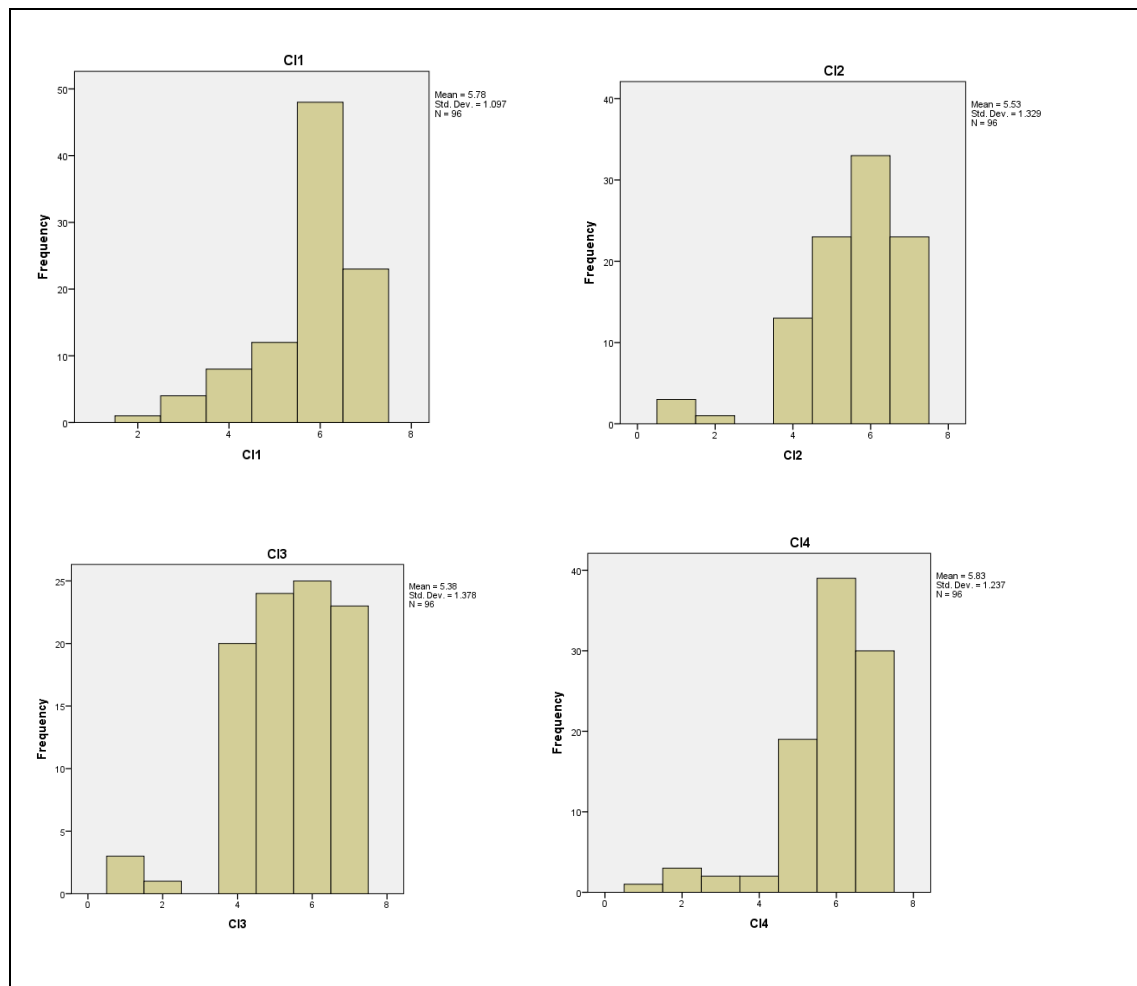


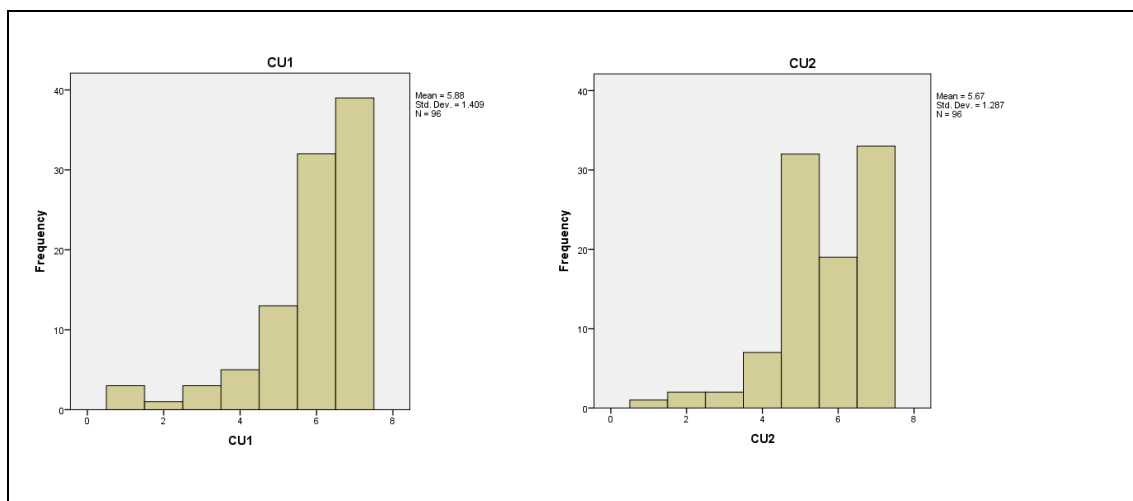
Figure 10 Histogram of Customer Innovativeness

4.5.6 Customer Use (CU)

Customer Use includes everything from using a website to finding information or completing a purchase (Chille F., 2018). The overall mean is 5.8090 and standard deviation is 1.0898, as presented in Table 3. This suggests that most respondents tend to agree that customer use collectively emphasizes the customer's preference for using the digital channel, their perception of its efficiency, their quick learning curve, and their confidence in utilizing the system. Figure 11 indicates a positive user experience and a favourable view of the digital channel's usability and effectiveness. This is supported by the statistical mean in Table 9 that ranges from 5.67 to 5.88.

Table 9 Customer Use

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
CU1	96	1	7	5.88	1.409
CU2	96	1	7	5.67	1.287
CU3	96	1	7	5.76	1.263
CU4	96	1	7	5.79	1.230



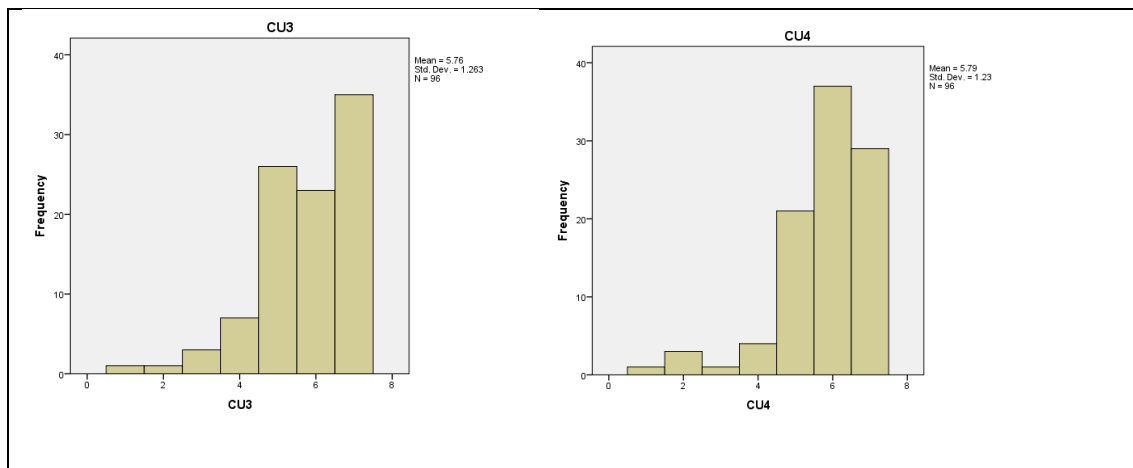


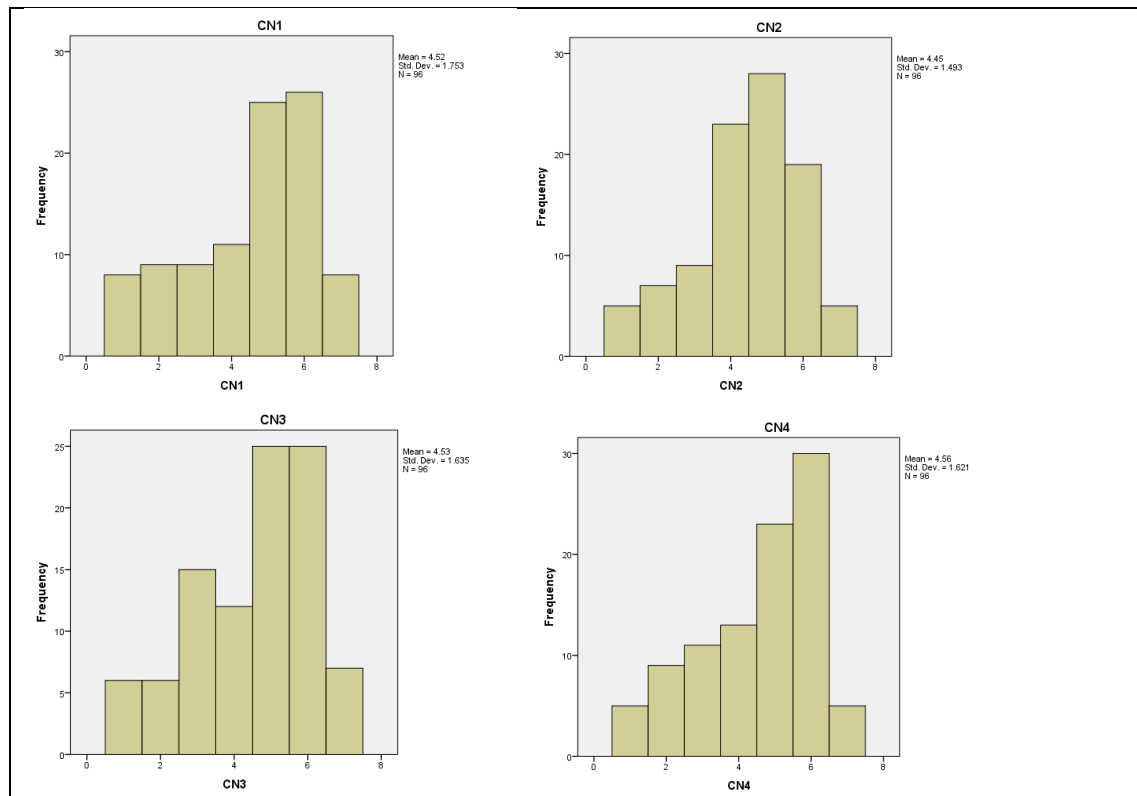
Figure 11 Histogram of Customer Use

4.5.7 Customer Satisfaction (CN)

Customer Satisfaction is a measure of how effectively a company's product or service satisfies a customer's expectations and is measured by customer satisfaction (Saleem & Rashid, 2011). The overall mean is 5.5688 and standard deviation is 1.4446, as presented in Table 3. The breakdown of results for customer satisfaction range from 4.45 to 4.78 in Table 10, which demonstrates the customer satisfaction with various aspects of using the digital channel for self-service. They indicate contentment with the system's functionality, ability to meet needs and expectations, speed and performance, overall experience, and user-friendliness. The satisfaction expressed by the customers suggests a positive evaluation of the digital channel's effectiveness and its ability to cater to their self-service requirements, as supported by the histogram in figure 12.

Table 10 Customer Satisfaction

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
CN1	96	1	7	4.52	1.753
CN2	96	1	7	4.45	1.493
CN3	96	1	7	4.53	1.635
CN4	96	1	7	4.56	1.621
CN5	96	1	7	4.78	1.649



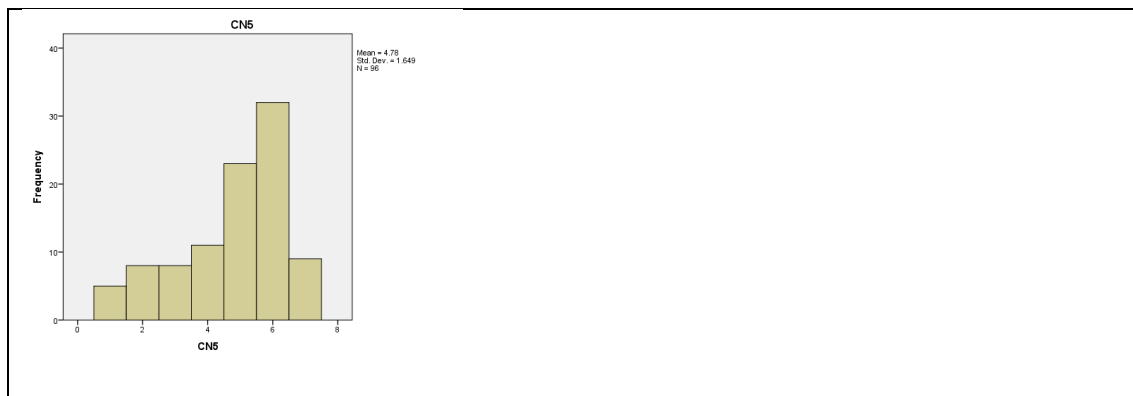


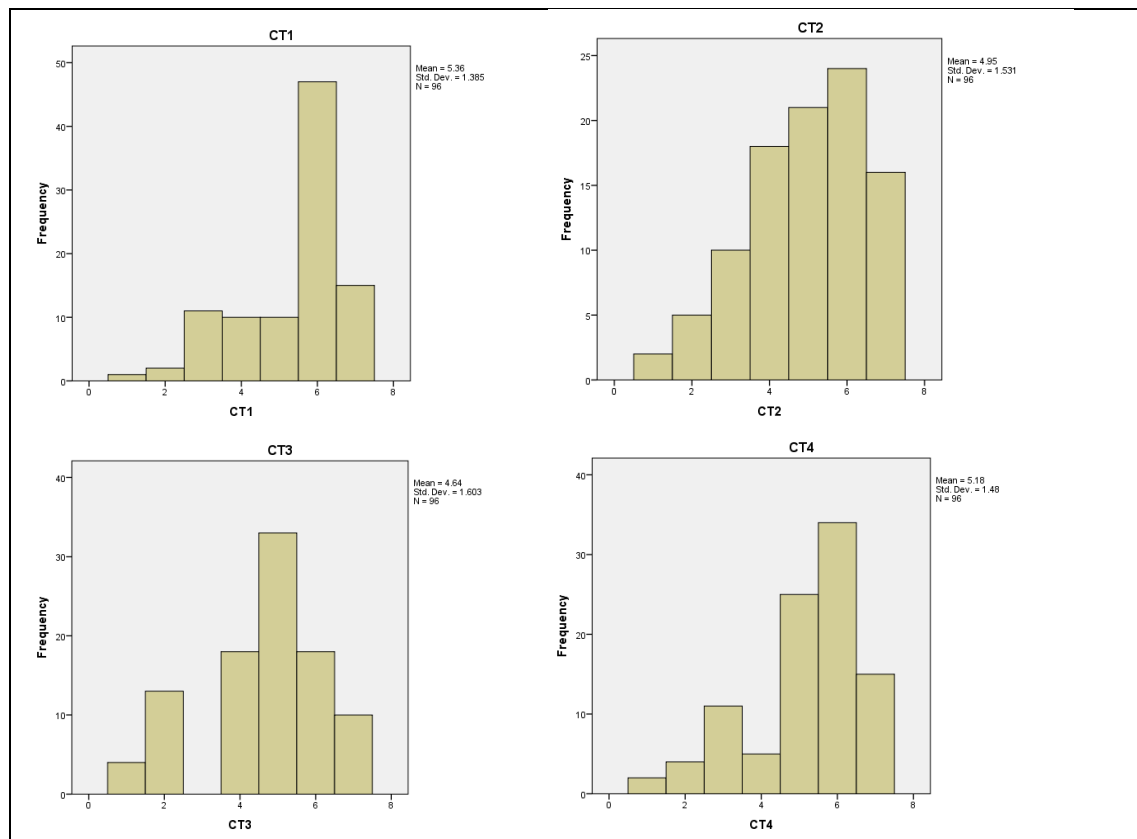
Figure 12 Histogram of Customer Satisfaction

4.5.8 Customer Trust (CT)

Customer Trust relies on consumer confidence in a brand. It demonstrates faith in a business' dedication to keeping its commitments and acting in the best interests of the customer (Jibril, Kwarteng, Chovancova, & Denanyoh, 2020). The overall mean is 5.0979 and standard deviation is 1.3135, as presented in Table 3, with Table 11 mean ranging from 4.46 to 5.36. This suggests customer trust and confidence in the digital channel. They indicate that customers enjoy using the system, would recommend it to others, find it aligned with their expectations, are satisfied with its use, and perceive it as a pleasant experience. These sentiments suggest a positive perception of the digital channel's reliability, functionality, and overall performance, fostering trust and loyalty among customers. The histogram reflected in figure 13, shows the trust of customers using the service and the importance of this metric.

Table 11 Customer Trust

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
CT1	96	1	7	5.36	1.385
CT2	96	1	7	4.95	1.531
CT3	96	1	7	4.64	1.603
CT4	96	1	7	5.18	1.480
CT5	96	1	7	5.36	1.437



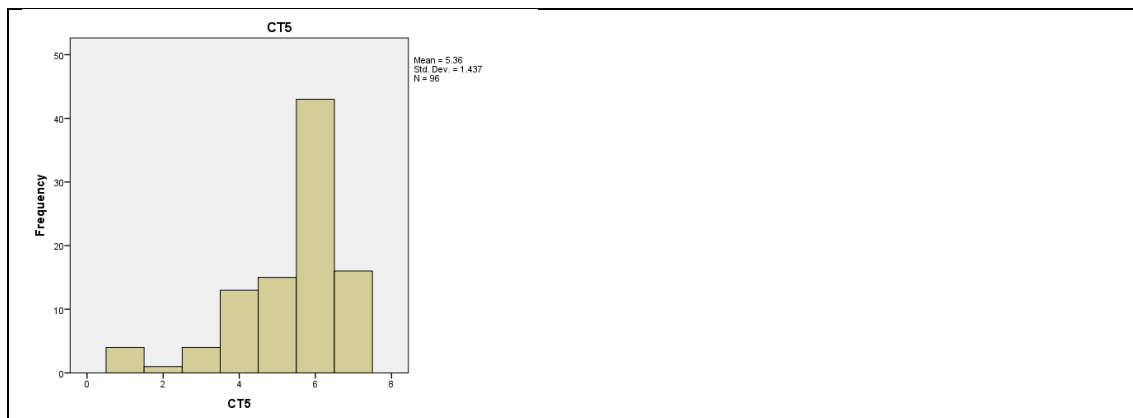


Figure 13 Histogram of Customer Trust

4.5.9 Service Complexity

Service Complexity levels for configuring delivered and provided service items can deter use of a digital channel. The overall mean is 5.1302 and standard deviation is 1.1909, as presented in Table 3. This suggests that customers prefer channels where transactions are routine, the system is easy to navigate, well-organized, straightforward, and simple to use. The emphasis on simplicity, clarity, and ease of use indicates that customers are more inclined to choose digital channels that offer a user-friendly experience with reduced complexity (Dabholkar, Bobbitt, & Lee, 2003). Table 12 below captures the results as ranging from 4.67 to 5.35 for the mean, similarly figure 14 reflects customer support of ease of use in digital channels.

Table 12 Service Complexity

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
SC1	96	1	7	5.35	1.353
SC2	96	1	7	5.03	1.269
SC3	96	2	7	4.67	1.287

SC4	96	1	7	5.19	1.371
SC5	96	1	7	5.31	1.431

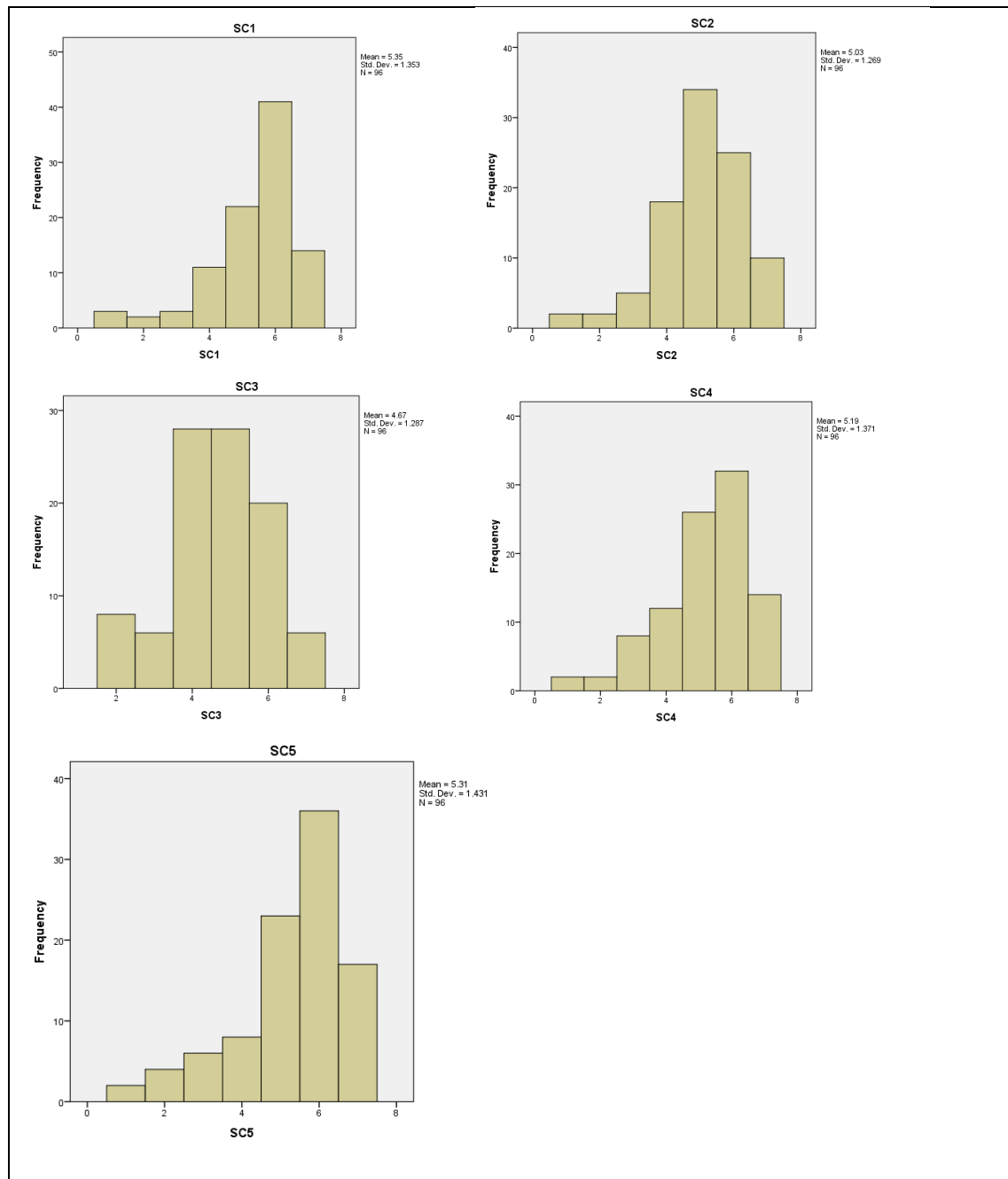


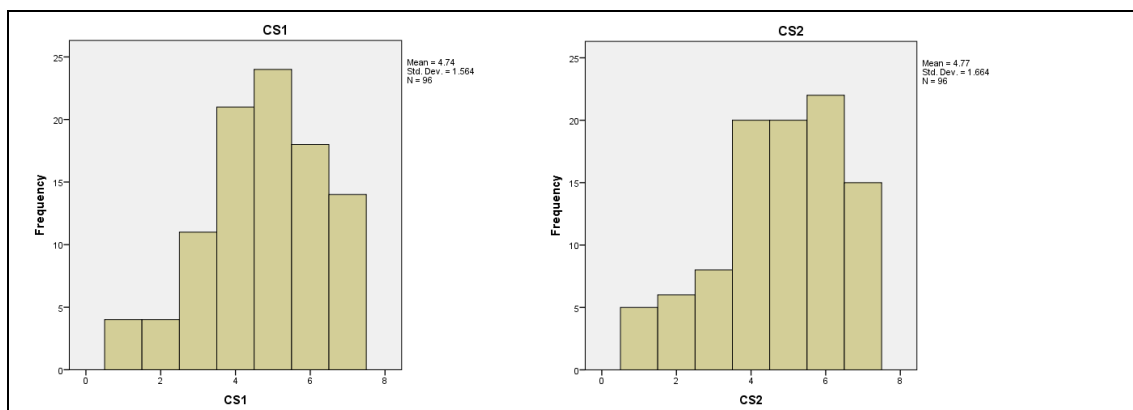
Figure 14 Histogram of Service Complexity

4.5.10 Customer Service (CS)

Customer Service influences digital customer care use which is a response to consumer demand for multichannel interactions that are readily accessible and highly rewarding for corporate performance in terms of lowering customer service use or escalations (Bianchi, Cermak, & Dusek, 2016). The overall mean is 4.9818 and standard deviation is 1.3588 as presented in Table 3. This indicates a preference for using the digital channel, a perception of efficiency in time utilization, quick adaptation to using the system, and a high level of confidence in customer service support when required. Table 13 has the mean ranging from 4.74 to 5.35. These sentiments suggest a positive user experience and a positive view of digital channels as effective tools for customer service interactions.

Table 13 Customer Service

	N	Minimum	Maximum	Mean	Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic
CS1	96	1	7	4.74	1.564
CS2	96	1	7	4.77	1.664
CS3	96	1	7	5.06	1.520
CS4	96	1	7	5.35	1.515



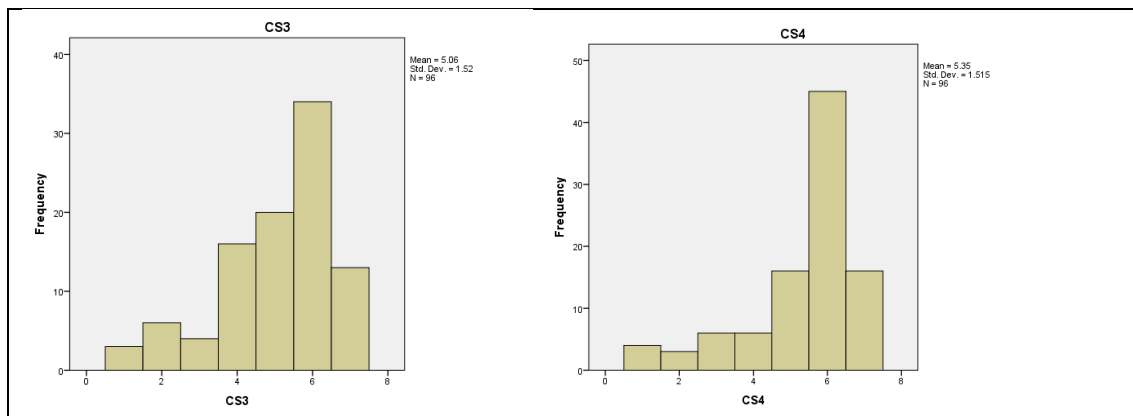


Figure 15 Histogram of Customer Service

4.6 Assessment of Normality

Table 3 above indicate “Skewness and Kurtosis coefficients” of all the items of constructs appearing in the model. The value for “skewness and kurtosis” between -2 and +2 is considered an acceptable indication of normality (George & Mallery, 2010). Most of the items show that the values of most kurtosis and skewness are between -2 and +2 except for SQ1, CI4, CU1 and CU4 which have kurtosis of +3. However, the central limit theorem stipulates that deviation from the normality has little effect on the data for large sample size (Muzaffar, 2016). This means that the abnormal kurtosis of the variables (items or constructs) exceeding the thresholds of -2 and + 2 will not be of concern in the overall results. Since the normality is not an issue, we can confidently use the SEM to check the results.

4.7 Sample Adequacy

It is required to first demonstrate sample adequacy before moving further with a "principal component analysis (PCA)" in order to confirm the validity of the multi-item scales. The “adequacy of the sample is measured using the Kaiser-Meyer-

Olkin (KMO)” test. KMO is a test used to evaluate how well the components explain one another in terms of partial correlation between the variables. KMO values around 1.0 are excellent, whereas those below 0.5 are considered unacceptable. Most scholars now contend that factor analysis can begin with a KMO of at least 0.80. Table 14 below provides an illustration of the study's findings and shows that the KMO score was 0.859. The KMO results show that the sample adequacy is within acceptable bounds. This suggests that the sampling size is sufficient to produce accurate factors.

Table 14 Kaiser Meyer Olkin and Bartlett Test

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.859
Bartlett's Test of Sphericity	Approx. Chi-Square	3,346
	df	903
	Sig.	0.000
Variance	78%	

The correlation matrix's identity as an identity matrix is tested using the Bartlett's test of sphericity. Variables are unrelated if an identity correlation matrix is present, which makes factor analysis a poor choice. The correlation matrix is shown in Table 14 above, and a significant statistical test (less than 0.001) demonstrates that it is not an identity matrix (rejecting the null hypothesis). The results of the research indicate that the Chi-square is 3346 and its significance is less than 0.001. This indicates that the data can usefully be analysed with the PCA analysis.

4.8 Principal Components Analysis (PCA)

Principal components analysis is a variable-reduction technique that shares many similarities to exploratory factor analysis. Its aim is to reduce a larger set of

variables into a smaller set of 'artificial' variables, called 'principal components', which account for most of the variance in the original variables.

A Principal Components Analysis was performed using a maximum likelihood and promax rotation. The minimum factor loading criteria was set to 0.5. Some variables had extreme deviated extraction values. Items with loadings of less than 0.50 were eliminated from the study.

Table 15 Principle Components Analysis

Rotated Component Matrixa										
	Component									
	1	2	3	4	5	6	7	8	9	10
SYQ1					0.7553					
SYQ2					0.8153					
SYQ3					0.7119					
SYQ4					0.7648					
SYQ5					0.8315					
SK1				0.6865						
SK2				0.6410						
SK3				0.8231						
SK4				0.7951						
SK5				0.8268						
IQ1								0.8204		
IQ2								0.8047		
IQ4								0.7898		
SQ1	0.8051									
SQ2	0.7491									
SQ3	0.7603									
SQ4	0.6527									
SQ5	0.8201									
SQ6	0.7660									
CI1									0.6198	
CI2									0.8471	
CI4									0.8430	
CU1										0.6746
CU3										0.6649

CU4										0.6903
CN1			0.8502							
CN2			0.8529							
CN3			0.8258							
CN4			0.8477							
CN5			0.8536							
CT1		0.8523								
CT2		0.7284								
CT3		0.7992								
CT4		0.7931								
CT5		0.7438								
SC1							0.6953			
SC3							0.7911			
SC4							0.7692			
SC5							0.7531			
CS1						0.7533				
CS2						0.7545				
CS3						0.7903				
CS4						0.7770				
Extraction Method: Principal Component Analysis.										
Rotation Method: Varimax with Kaiser Normalization.										
a. Rotation converged in 7 iterations.										

We removed IQ3, CI3, CU2, and SC2. Then we repeated the EFA without including these items. Kaiser-Meyer-Olkin Measure of Sampling Adequacy was 0.859. The results of Bartlett's Test of Sphericity were significant, chi-square ($n=96$) = 3346 ($p=0.000$), which indicates its suitability for factor analysis. The result of variance was 78%.

System Quality was measured through five items. As per Table 15, five items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. Therefore, no items for service quality needed to be dropped.

System Knowledge was measured through five items. As per Table 15, five items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. Therefore, no items for system knowledge needed to be dropped.

System Quality was measured through five items. As per Table 15, five items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. Therefore, no items for service quality needed to be dropped.

Information Quality was measured through four items. As per Table 15, three items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. One item (IQ3) with loading of less than 0.50 was eliminated from the study.

Service Quality was measured through six items. As per Table 15, six items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. Therefore, no items for service quality needed to be dropped.

Customer Innovation was measured through four items. As per Table 15, three items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. One item (CI3) for Customer Innovation needed to be dropped because items with loading of less than 0.50 was eliminated from the study.

Customer Use was measured through four items. As per Table 15, three items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. One item (CU2) with loading of less than 0.50 was eliminated from the study.

Customer Satisfaction was measured through five items. As per Table 15, five items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. Therefore, no items for customer satisfaction needed to be dropped.

Customer Trust was measured through five items. As per Table 15, five items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. Therefore, no items for customer trust needed to be dropped.

Service Complexity was measured through five items. As per Table 15, four items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. One item (SC2) with loading of less than 0.50 was eliminated from the study.

Customer Services was measured through four items. As per Table 15, four items loaded highly onto the same factor and non-cross-loaded above 0.50 onto other factors. Therefore, no items for customer satisfaction needed to be dropped.

The underlying factor structure retrieved by the PCA verified the model's total of ten components. The investigation could then move on to look at the validity of the scales.

4.9 Reliability and Validity

A measure's reliability is related to its consistency. Every time they take the test, participants should provide roughly the same answers on a motivational assessment tool. Despite the fact that reliability cannot be calculated precisely, it can be estimated using a variety of techniques. The degree to which a concept is precisely quantified in a quantitative investigation is known as validity.

In measuring the reliability, the "Cronbach's alpha" was used. The scale is regarded as reliable if the "Cronbach's alpha" is at least 0.70. Table 16 indicates that the "Cronbach's alpha" ranges from 0.784 to 0.932, this is above the recommended value of 0.70. The CR ranges from 0.7169 to 0.9264, which is above the threshold of 0.70. In addition, the AVE for each construct was calculated. The AVE has a minimum value of 0.4578 which is more than the recommended 0.40 threshold.

Table 16 Reliability and Validity

						Composite scores	
Variables	Number of Initial items	Number of surviving items	Cronbach's alpha	"Average variance extracted (AVE)"	"Composite reliability (CR)"	Mean	Standard deviation
SYQ	5	5	0.880	0.6036	0.8836	5.2208	1.086
SK	5	5	0.910	0.5750	0.8701	5.4000	1.249
IQ	4	3	0.899	0.6481	0.8467	5.2257	1.455
SQ	6	6	0.932	0.5787	0.8913	5.2135	1.225
CI	4	3	0.784	0.6041	0.8179	5.7153	1.023
CU	4	3	0.785	0.4578	0.7169	5.8090	1.089
CN	5	5	0.931	0.7158	0.9264	4.5688	1.444
CT	5	5	0.929	0.6155	0.8886	5.0979	1.313
SC	5	4	0.898	0.5670	0.8394	5.1302	1.190
CS	4	4	0.890	0.5912	0.8525	4.9818	1.358

4.10 Correlation Matrix of Composite Scores

According to the "discriminant validity" principle, a construct's measurements should correlate more strongly with one another and less strongly with those of other constructs. The "inter-construct correlations" and the AVE or "square root of AVE of each construct" can be used to examine this principle. For each variable construct, data are shown at the diagonal position as "square roots of AVE". Each variable construct's "square root of AVE" exceeds the correlation coefficient between variables. Constructions share more variation with their own items than with other constructions in the model, confirming the "discriminant validity" of the constructs.

Table 17 Correlation Matrix

Correlations											
		SYQ	SK	IQ	SQ	CI	CU	CN	CT	SC	CS
SYQ	Pearson Correlation	0.777									
SK	Pearson Correlation	.433**	0.758								
IQ	Pearson Correlation	.411**	.443**	0.8049							
SQ	Pearson Correlation	.416**	.550**	.533**	0.761						
CI	Pearson Correlation	.217*	.421**	.174	.231*	0.777					
CU	Pearson Correlation	.377**	.347**	.323**	.503**	.442**	0.677				
CN	Pearson Correlation	.225*	.241*	.292**	.480**	.093	.359**	0.846			
CT	Pearson Correlation	.225*	.241*	.292**	.480**	.093	.359**	1.000**	0.785		
SC	Pearson Correlation	.248*	.344**	.343**	.487**	.242*	.489**	.351**	.351**	0.753	
CS	Pearson Correlation	.308**	.327**	.343**	.396**	.161	.423**	.334**	.334**	.604**	0.769
**. Correlation is significant at the 0.01 level (2-tailed).											
*. Correlation is significant at the 0.05 level (2-tailed).											

4.11 Results of Model Testing

This section formally tests the measurement and “structural model” of the study using the data that was gathered. It is advisable to conduct CFA as a final test of

the “measurement model” before the hypothesized structural model can be examined to determine if all the items are loading correctly on the hypothesized constructs in the model.

The CFA analysis excluded four measuring items (IQ3, CI3, CU2 and SC2) and used only the 39 items measuring the main variables, none of which were dropped in the “exploratory factor analysis (PCA)” stage. The CFA was used to confirm that the proposed factor structure is a good fit to the data.

The link between the independent and dependent variables served as the basis for the second step, which involved testing the hypotheses using “Structural Equation Modelling (SEM)”. AMOS version 25 was used to run the SEM model.

4.12 CFA Model Results

The links between various constructs within the established theoretical model and associated assessment items were evaluated using the CFA. Figure 13 shows the interconnection of all variables, and the measured variables (construct items) are represented as rectangles. Figure 16 depicts the covariance using two headed arrows, while the causal link is shown using single headed arrows. Only the measurement items and main effects components are included in the model shown in Figure 16.

The CFA was employed to assess the connections among the different elements within the established theoretical framework and their corresponding measurement components. When assessing the model, it's crucial to examine the fitness of the measurement model and the validity of the tested model. It's worth noting that distinguishing between exogenous and endogenous factors is unnecessary when evaluating the measurement model in CFA. This differentiation becomes essential only when conducting model testing.

The final model excludes the variables for customer satisfaction on customer use as it constrained the model along with customer services to customer use. The final model results χ^2 / DF was found to be under 3 indicating a good model fit. The model indicates the final indices as follows (GFI= 0.905; NFI=0.949; CFI=0.956; IFI=0.978; RMSEA=0.0260; $P < 0.001$; DF=2,772; TLI=0.943 and RFI=0.925). The validity of the CFA model indicates that all model fit indices are satisfactory. However, the main objective of the CFA model was to check if all the items of the scale are loading on the model. The CFA test was conducted to confirm construct validity and factor loadings which are in the acceptable range.

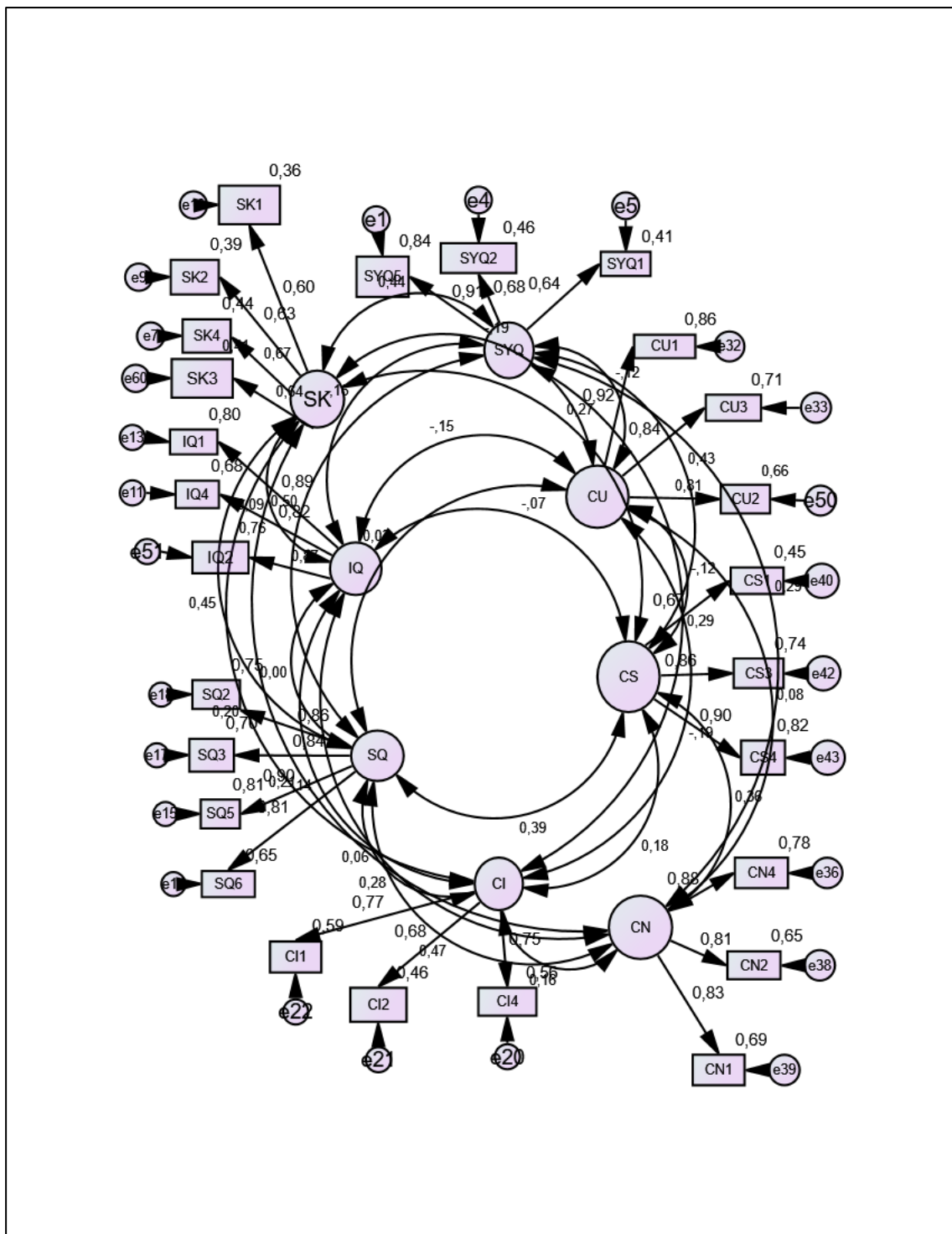


Figure 16 Final CFA model

4.13 Goodness of Fit Indices

How closely the model's indicated covariance matrix corresponds to the sample covariance matrix is determined by the model fit. In here we choose Goodness-of-fit (GFI), Normed fit index (NFI), Comparative fit index (CFI), Incremental fit index (IFI), Root mean square error of approximation (RMSEA), Chi-square (χ^2 /DF), Tucker-Lewis Index (TLI) and Relative Fit Index (RFI) as model fit indices.

Initially, the GFI value was 0.686, which did not meet the recommended value. A GFI value greater than 0.9 indicates a perfect fit. Similarly, the χ^2 /DF value indicated a good fit initially. The CFI, IFI, and TLI values were 0.937, 0.938, and 0.933, respectively. When these values exceed 0.9, it suggests a good fit. Initially, these values indicated a satisfactory fit. The recommended values for NFI and RFI are also greater than 0.9. However, the NFI and RFI values were less than 0.9 (Table 18). The RMSEA value also fell outside the recommended range, being greater than 0.05. After developing the model, the model fitting values improved significantly. Table 18 presents the before and after results of the model fitting process.

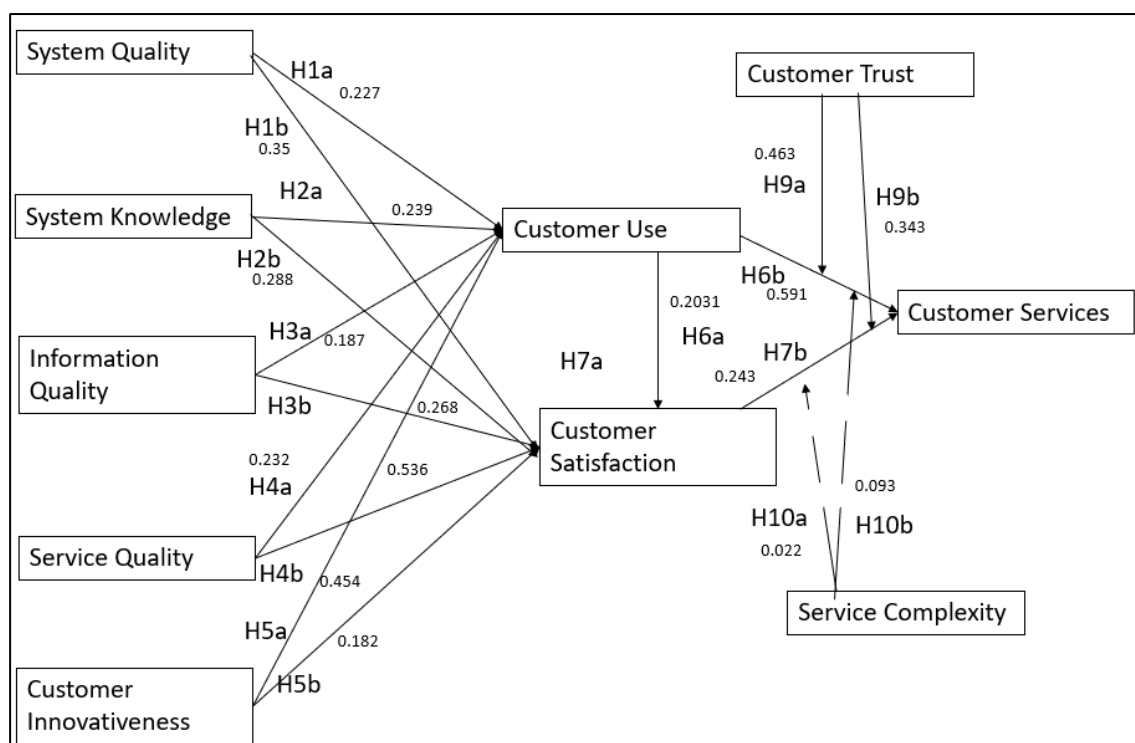
Table 18 Model Fit

Fit Index	Recommended Value	CFA Results	Final Model Structural
Goodness-of-fit (GFI)	Less than 0.80 (No fit)	0.686	0.905
	Between [0.80-0.90] (acceptable)		
	Above 0.90 (Perfect fit)		
Normed fit index (NFI)	Less than .80 (poor)	0.736	0.949
	Between [0.80-0.90] (acceptable)		
	Above 0.90 (good)		

Comparative fit index (CFI)	Less than 0.90 (poor) Above 0.90 (good)	0.937	0.956
Incremental fit index (IFI)	Less than 0.90 (poor) Above 0.90 (good)	0.938	0.978
Root mean square error of approximation (RMSEA)	Less than 0.05 (good) Between [0.06-1] (acceptable) Above 1 (poor)	0.049	0.0260
Chi-square (χ^2 /DF)	Less than 3 (good) Between [3-5] (acceptable) Above 5 (poor)	1.228	2.772
Tucker-Lewis Index (TLI)	Less than 0.80 (poor) Between [0.80-0.90] (acceptable) Above 0.90 (good)	0.933	0.943
Relative Fit Index (RFI)	Less than 0.80 (poor) Between [.80-.90] (acceptable) Above .90 (good)	0.721	0.925

4.14 Results of Hypothesis Testing

The variables for Customer satisfaction to Customer use and service complexity to customer satisfaction were removed as these constrained the model as shown in figure 17 below. These variables proved to be insignificant as per results reflects in Table 18.



*dotted line represents not significant variables

Figure 17 Final Model

Table 19 Hypothesis Tests

		Estimate	S.E.	C.R.	P	
H1a	SYQ-->CU	0.227	0.094	2.421	0.015	Significant
H2a	SK-->CU	0.239	0.06	3.983	***	Significant
H3a	IQ-->CU	0.187	0.074	2.526	0.012	Significant
H4a	SQ-->CU	0.232	0.084	2.773	0.006	Significant
H5a	CI-->CU	0.454	0.137	3.306	***	Significant
Control Variable	CT-->CU	0.463	0.091	5.082	***	Significant

Control Variable	SC-->CU	0.093	0.099	0.935	0.35	Not Significant
H1b	SYQ-->CN	0.35	0.1	3.500	***	Significant
H2b	SK-->CN	0.288	0.12	2.4	0.015	Significant
H3b	IQ-->CN	0.268	0.087	3.08046	***	Significant
H4b	SQ-->CN	0.536	0.136	3.93	***	Significant
H5b	CI-->CN	0.182	0.055	3.3091	***	Significant
Control Variable	CT-->CN	0.343	0.144	2.379	0.017	Significant
Control Variable	SC-->CN	-0.022	0.16	-0.138	0.89	Not Significant
H7b	CN-->CS	0.243	0.087	2.804	0.005	Significant
H8	CU-->CS	0.591	0.139	4.26	***	Significant
H7a	CU-->CN	0.2031	0.054	3.761	***	Significant
SYQ=System quality SK= System knowledge IQ=Information quality SQ=Service quality CI=Customer innovativeness CT=Customer trust CN=Customer satisfaction CU=Customer use SC=Service complexity CS=Customer services						

As presented in Table 19, fifteen out of nineteen hypotheses were directly supported on the model being tested. Two hypothesis were removed as they constrained the model, namely, H7a customer satisfaction to customer use and customer services to customer use H8a.

The factors influencing customer use [SYQ ($p<0.05$); SK ($p<0.001$); IQ ($p<0.05$); SQ ($p<0.05$); CI ($p<0.001$); CT($p<0.001$)] of the digital channels were found to have positive significance influence on the behaviour of customer use. These support H1a, H2a, Ha3b, H4a, H5a and H9a. This means that improving system

quality, system knowledge, information quality, service quality, customer innovativeness and customer trust will persuade customers to use digital channels.

The factors influencing customer satisfaction of digital channel use were also found to have positive significance influence on the behaviour of the user [SYQ ($p < 0.001$); SK ($p < 0.05$); IQ ($p < 0.001$); SQ ($p < 0.001$); CI ($p < 0.001$); CT ($p < 0.005$)]. These results support H1b, H2b, H3b, H4b and H5b.

In addition, improvements for customer use was found to positively influence customer satisfaction ($p < 0.001$) and supports hypothesis H6a. Similarly, customer services is positively influenced as the results show for hypothesis H7b and H6b being supported with customer satisfaction ($p < 0.05$) and customer use ($p < 0.001$).

Service complexity ($p > 0.05$) was found to be not significant on customer use. This too was found for the service complexity ($p > 0.05$) relationship with customer satisfaction. Therefore, H10a and H10b were rejected as the relationship was of the opposite direction. This means that the service complexity has no bearing on the use and satisfaction of users when using digital channels to self-serve.

4.15 Summarization of hypothesis

Table 20 Hypothesis Significance

H1a & b	System Quality (SYQ) will have a positive impact on Customer Use (CU) and Customer Satisfaction (CN)	Significant
H2a & b	System Knowledge (SK) has a positive influence on Customer Use (CU) and Customer Satisfaction (CN)	Significant
H3a & b	Information Quality (IQ) will have a positive influence on Customer Use (CU) and Customer Satisfaction (CN)	Significant

H4a & b	Service Quality (SQ) will positively influence Customer Use (CU) and Customer Satisfaction (CN)	Significant
H5a & b	Customer Innovativeness (CI) will have a positive impact on Customer Use (CU) and Customer Satisfaction (CN)	Significant
H7a & b	Customer Satisfaction (CN) positively influences Customer Use (CU) and Customer Services (CS)	Significant
H8	Customer Services (CS) has a positive influence on Customer Use (CU)	Significant

4.16 Conclusion results and interpretation

The objective of the study was to identify and analyse the factors that influence consumer use of digital channels and to assess their impact on customer service in the telecommunications industry. The final analysis revealed statistically significant positive correlations between customer use and system quality, system knowledge, information quality, service quality, customer innovation, and customer trust. However, there was no statistical significance between service complexity and consumer usage. In addition, these variables, along with customer satisfaction, demonstrated significant positive correlations with customer service. The correlation between customer utilization and customer satisfaction was statistically significant as well.

Overall, the results of the study cast light on the factors influencing customer use of digital channels and their impact on customer service in the telecommunications industry, providing valuable insights for businesses operating in this industry.

CHAPTER 5. Discussion

5.1 Introduction

In chapter 4, results of model testing to validate the conceptual model against the research objective 1 of examining the factors that influence customer use of digital channels and research objective 2 the impact of customer use on customer service are shown. The outcomes of the research instrument and SPSS interpretations of the outputs were discussed with the analysis of collected data revealing positive correlations between customer usage and variables, such as system quality, system knowledge, information quality, service quality, customer innovation, and customer confidence. The relationship between service complexity and customer usage was not statistically significant, unlike the relationship between customer satisfaction and customer usage.

This chapter discusses the effect of factors influencing customer use and customer satisfaction of digital channels. The factors of interest are system quality, system knowledge, information quality, system quality, customer innovativeness, customer use, customer satisfaction, customer trust, service complexity and customer service. These factors were assessed to cover the primary objective of this research, which is, identifying and examining the factors influencing customer use of digital channels. The results obtained from the analysis were then utilized to covers the remaining objectives, which are, providing an inclusive model considering all the variables to serve as a benchmark against which future digital channels should be assessed, and validating the updated model with consumers in the area of digital channel use.

The DeLone and McLean (2003) model was used as the basis of the model developed in this study. Even though DeLone and McLean's (2003) model has been useful in the context of e-commerce, some extra characteristics should be included for robustness when using the model to explain the use of mobile

channels. Characteristics such as customer innovativeness, customer trust, service complexity, and system knowledge were not included in the DeLone and McLean (2003) model. Individuals' utilization of mobile applications is significantly impacted by these absent elements as well (Jouini et al., 2012; Sood, 2021; Rocha et al., 2019; Davis, 1986; Yang, 2010; Ellen, Bearden and Sharma, 1991; Saeed, 2011). Hence, the objectives of this study were generated aiming to bridge the gap between the existing model and an inclusive model.

In response to the surge in mobile device utilization, organizations have integrated digital service channels and automation to provide real-time service to their clientele (Grand View Research, 2019). The latest technological breakthroughs have enabled numerous companies to provide innovative and high-quality services. The advent of digital channels has introduced competition to conventional service channels. These digital platforms boast efficiencies and improvements in customer service, such as speed, accuracy, automation, and scalability to handle large volumes. However, due to factors associated with consumer behaviour and channel characteristics, some customers may exhibit reluctance towards adopting these channels (Shawar & Atwell, 2007; Adamopoulou & Moussiades, 2020).

5.2 Primary results

In the initial steps of the analysis, the impact of the above-mentioned factors on customer use and customer satisfaction were tested. This chapter, here onwards, discusses the obtained results in an extended manner. The initial results can be summarized, as follows in Table 21.

Table 21 Hypothesis findings

Variables	Customer use	Customer satisfaction
System quality	Positive	Positive
System knowledge	Positive	Positive
Information quality	Positive	Positive
Service quality	Positive	Positive
Customer innovativeness	Positive	Positive

5.2.1 Factors influencing customer use

The influence of system quality on the use of digital channels was examined, revealing its significance as a determining factor. System quality encompasses measures of usability, availability, reliability, adaptability, portability, integration, and response time of the channel (Delone & McLean, 1992, 2003). The majority of respondents expressed satisfaction with high system quality, strongly agreeing that the digital channel is user-friendly, reliable, and readily available. This positive perception of system quality was found to have a significant impact on customer use, validating hypothesis H1a in the model. Additionally, hypothesis H1b proposing that the perception of digital channel system quality positively influences user satisfaction was also supported. These findings align with prior studies (Serumaga-Zake, 2017; Chille, 2018, Kourdi, 2015) that emphasize system quality as a crucial attribute of system success, promoting its use.

Therefore, the results reinforce the importance of system quality in the context of digital channels, further substantiating previous research. The relationship between system quality and customer satisfaction was also observed to be a statistically significant positive relationship. Customer satisfaction measures how effectively a company's product or service satisfies a customer's expectations. The client's perceived value is increased by the solutions' ease of use, security, low transaction costs, and broad application, which should be managed by digital channels (Saleem & Rashid, 2011). This is supported by previous studies in the literature. Customer satisfaction is significantly influenced by service quality, which is also the most dependable method of evaluating high-quality service offers. Businesses cannot thrive without customer satisfaction since consumer expectations and customer satisfaction are intertwined (Constantiou & Mahnke, 2010).

System knowledge refers to the customer's awareness of the available channels and their understanding of how to select the appropriate channel, based on device capabilities. A study on consumer behaviour has indicated that device knowledge plays a vital role in determining a consumer's readiness to adopt new technologies or digital channels (Saeed, 2011). System knowledge is supported as one of the factors that influence the use of digital channels and is a new contribution to the body of knowledge. This influence of system knowledge was found to have a significant impact on customer use, validating hypothesis H2a in the model. Additionally, hypothesis H2b proposing that knowledge of systems capability and device use positively influences user satisfaction was also supported.

This finding highlights the significance of having a certain level of understanding and familiarity with the system in order to effectively utilize and embrace digital channels. The results of this study reveal that customers tend to use the channels abundantly when they have a sound knowledge of the utilized system. Previous studies (Awadhi et al., 2021; Campel et al., 2011, Saeed, 2011) have supported

this finding where they have emphasized the importance of system knowledge. According to a study on consumer behaviour, system knowledge and device capacity are key factors in determining whether a customer is willing to accept new digital channels or technologies. Consumers may be interested in a cutting-edge digital channel, but it may not meet the requirements of their device. As a result, people continue to be reluctant to utilize this digital route (Saeed, 2011).

It was observed that information quality and customer use have a statistically significant positive relationship. Information quality is mainly associated with accuracy, completeness, security, and availability (Fiber & Hepp, 2011). Consumers of digital channels should be given pertinent instructions, policy documents, and other information so they can stick with one digital channel or switch to a rival one. Consumers' enquiries and questions should be fully addressed by the material offered. Digital channels that are unable to deliver such crucial data typically have low usage rates since they do not give a clear picture to consumers. It can cause a reduction in customer usage.

Information quality and customer satisfaction have also shown a statistically significant positive relationship between them. Poor information quality ratings of digital channels further increase user dissatisfaction, which causes users to reject digital technologies and channels. Therefore, the importance of information availability and security has been explicitly stated in earlier research studies on the information quality necessary for the adoption of digital channels. This finding is supported by some previous studies (Delone & McLean, 1992; 2003; Torres & Sidorova, 2019) where it was observed that there exists a positive relationship between information quality and user satisfaction. Hence, it is evident that the obtained results support H3a and H3b hypotheses of the study, which is, Information Quality will have a positive influence on Customer Use and Customer Satisfaction.

In a study conducted by Çelik and Ayaz (2022), the input data of 882 students were used to evaluate and investigate student learning systems. It highlighted the

importance of system quality, information quality, and service quality, as well as their impact on user satisfaction. This is because customers expect to receive accurate and timely information from their telecommunication service providers. When customers receive high-quality information, they are more likely to be satisfied with their service provider. In contrast, when customers receive low-quality information, they are more likely to be dissatisfied with their service provider.

Service quality and customer use is a statistically significant positive relationship. Customers who are prepared to use digital channels also place a high priority on service quality. Service quality is a crucial concern for consumers when choosing digital channels, particularly mobile payment solutions (Brown, Lamming, Bessant, & Jones, 2007). Service quality positively influences customer use in the telecommunication industry by impacting customer satisfaction and loyalty. When customers are satisfied with the quality of service provided by a telecommunication company, they are more likely to continue using the company's services and recommend it to others. This leads to increased customer loyalty and retention.

Furthermore, the results reveal that the relationship between service quality and customer satisfaction is also statistically significant, and the correlation is positive. This result is supported by previous studies as well (Delone & Mclean, 2003; Serumaga-Zake, 2017; Chille & Shayo, 2021). Constantiou and Mahnke (2010), state that customer satisfaction is significantly influenced by service quality, which is also the most dependable method of evaluating high-quality service offers. Businesses cannot thrive without customer satisfaction since consumer expectations and customer satisfaction are intertwined. Creative solutions have been shown to raise client expectations and satisfaction. Service quality was advocated as a characteristic of Internet banking by Jayawardhena and Foley (2000), who also thought it was essential for boosting customer satisfaction. Customers who are happy with the service's quality typically have higher

customer satisfaction rates. Further, some other prior studies (Delone & McLean, 2003; Popovič et al., 2014; Ameen et al., 2020) have concluded that the relationship between service quality and customer satisfaction is significantly positive. These results clearly support H4a and H4b hypotheses of the study, which reads as Service Quality will positively influence Customer Use and Customer Satisfaction.

The data analysis has shown that there is a statistically significant positive relationship between customer innovativeness and customer use. Innovativeness is the extent to which a person adopts innovation significantly earlier than other people (Rogers, 1983). Consumer behaviour about their inclination to use mobile data services is directly influenced by innovation. Consumers with a high level of innovation are anticipated to be open to utilizing and experimenting with a variety of mobile data offerings (Yang, 2010). Further, Midgley and Dowling (1978) have stated in their study, that the consumer innovativeness characteristic has been critical in determining the diffusion of new products or services.

The results have shown that customer innovativeness has a statistically significant positive relationship with customer satisfaction as well. According to Kumar and Anne (2016), it is crucial to understand client orientation and improve services depending on their preferences, while implementing cutting-edge features like chatbots and AI infusion. Studies have shown that the two components of service innovation, interaction and support, are the key determinants of customer satisfaction and customer retention in the telecommunication industry. This provides important information for telecommunication managers in service strategy planning. The results of H5a and H5b hypotheses, that Customer Innovativeness will have a positive impact on Customer Use and Customer Satisfaction is a new contribution and closes the gap in the body of knowledge for digital channel use.

It was observed that there is a significant positive correlation between customer use and customer satisfaction. Usage includes everything from using a website to finding information or completing a transaction (Chille F., 2018). In order to understand how customers feel about using digital channels, it is important to analyse user happiness. User satisfaction should span the full customer experience cycle and offer a better experience for acquiring, paying for, receiving, and using services. Customer satisfaction is essential in keeping current consumers and retaining new ones. Dissatisfied customers are a retention risk; losing them will hurt the overall customer journey. The benefits of customer satisfaction are various, including increased competitiveness and growth (Saleem & Rashid, 2011). Customer use is found to be a factor that influences customer satisfaction positively and supports hypothesis H6a.

5.2.2 Impact of use on customer service

Customer services refer to the total support provided by the service provider and include any assistance with the department's information system that is significant enough to satisfy both new and recurring customers equally (Chille & Shayo, 2021). The data analysis revealed that customer satisfaction and customer services also have a statistically significant positive relationship with customer service. This new contribution to the model indicates that customer use H6b positively influences customer services as does customer satisfaction H7b. The main cause of the reduced use of digital channels is frequently the presence of flaws, malfunctions, and technical issues. By lowering these occurrences, telecommunication companies can improve the usage of digital channels for customer support. In addition, fewer system defects and failures lead to higher customer satisfaction. These findings support H7a and H7b hypotheses, which is, Customer Satisfaction positively influences Customer Use and Customer Services.

According to the results, there is a statistically significant positive relationship between customer use and customer services. Previous studies have demonstrated that glitches and technical problems with telecommunication companies' websites, mobile applications, and systems significantly reduce the utilization of digital channels for customer service. If these platforms routinely have technological issues, customers are more likely to switch to other channels with simpler technical requirements (Suyanto, Safitri, & Wardani, 2021).

Hypothesis H8a, customer service as a factor that influences customer use, was removed from the model as it constrained the model fit and test.

The effect of control variables Customer trust and service complexity are analysed. When it comes to system usability, consumers also place a lot of weight on trust and dependability. Studies on consumer adoption patterns have made it abundantly evident that cyber security risks and vulnerabilities connected to the past success of a digital channel undermine overall confidence and dependability. Consumers with a history of cyber security concerns and incidents tend to steer clear of digital channels. Due to the increased likelihood of data breaches and information manipulation, inadequate security solutions have a negative influence on user confidence levels and the dependability of digital channels (Jibril, Kwarteng, Chovancova, & Denanyoh, 2020; Mahmood et al, 2022). The present study revealed that Customer Trust and hypothesis H9a and H9b have a significant positive effect on Customer Use and Customer Satisfaction. This is a new contribution to the model for testing factors that influence use and their impact on customer service and supports prior studies which have highlighted the importance of customer trust (Kennedy, 2006; Spender, 2014). Protecting the IT system is crucial for the company's continued defence against cyber-attacks, because cyber-attacks severely damage an

organization's reputation, and in the future, many clients may lose faith in the company's digital services (Mahmood, Chadhar, & Firmin, 2022).

The results of the study showed that there is no significant positive effect of Service Complexity on Customer Use and Customer Satisfaction, thereby rejecting hypothesis H10a and H10b stating service complexity can be a determinant of use. This goes against prior research stating that service complexity can have adverse effects on customer use and customer satisfaction. Dabholkar (1996) notes that some prospective customers of technology-based self-service options were concerned about the effort required to use these options and the complexity of the service delivery process, according to qualitative research. Davis et al. (1989) and Bagozzi (1990) found "ease of use" to be an essential attribute for customers when utilizing computer technology. A difficult-to-operate, difficult-to-understand SST will hinder role clarity and capability because it will be more difficult to operate and comprehend, and the user may find the benefits less evident (Meuter, Bitner, Ostrom, & Brown, 2005).

5.3 Conclusion

This chapter focused on the factors that influence the use of digital channels and the impact of customer use and satisfaction on customer services. This chapter presented the detailed interpretation of the key findings of the structural model on customer use of the digital channels and provide an answer to RO1 and RO2.

The chapter has found, through analysis of responses from 96 surveys, that the factors influencing the customer use are system quality, system knowledge, information quality, service quality, customer innovativeness along with customer trust. However, Service Complexity was found to not be a significant influence on use.

CHAPTER 6. Conclusions and Recommendations

6.1 Introduction

In chapter 5, we validated the conceptual model's individual applicability. In chapter 5, the factors that influence customer use and satisfaction of digital channels, with a particular focus on system quality, system knowledge, information quality, service quality, customer innovativeness, customer trust, and service complexity, were analysed to fulfil the primary objective (RO1) of identifying and examining the key determinants of customer use in the context of digital channels. The outcomes obtained from the analysis were then utilized to address the remaining objectives of this research, which include the impact of customer use on customer services (RO2).

The model developed in this study is based on DeLone and McLean's (2003) framework, which has been widely used in the context of e-commerce. However, it was necessary to incorporate additional characteristics into the model to enhance its robustness when explaining the use of mobile channels. Factors, such as customer innovativeness, customer trust, service complexity, and system knowledge were not originally included in DeLone and McLean's (2003) model, even though they significantly influence individuals' utilization of mobile applications.

It presents a detailed interpretation of the key findings derived from the structural model analysis concerning customer use of digital channels, addressing research objectives RO1 and RO2. The analysis of 96 survey responses revealed that the factors significantly influencing customer use of digital channels include system quality, system knowledge, information quality, service quality, customer innovativeness, and customer trust. However, it was found that service complexity does not exert a significant influence on use.

This chapter contains the research findings' conclusions and recommendations. The chapter begins with a general overview of the research, followed by a discussion of the theoretical, contextual, methodological, and practical contributions made by the study. In addition, the limitations of the research and the direction of future studies are discussed. The concluding section provides a general summary of the thesis.

6.2 Summary of previous chapters

In chapter 1, the study introduced research problems and the motivation of conducting the study. This section of the study establishes the background, goal, and framework for the research issue, as well as the justification for expanding the body of information regarding the use of digital channels. The research objectives of the factors that influence customer use (RO1) and the impact of customer use on customer service were established. The introduction to digital transformation which gained popularity in 2011 through the efforts of consulting firm Capgemini and MIT, defining it as the strategic utilization of technology to enhance business performance and expand its reach (Udovita, 2020). Digital channels were defined and the business imperative to reduce operating costs by deploying self-service options to customers through digital channels. These channels provide convenience to customers and cost reduction for businesses (Straker, Wrigley, & Rosemann, 2015). Self-service technologies empower customers to access services without employee involvement, leading to greater efficiency, satisfaction, and the identification of new market niches (Bitner, Ostrom, & Meuter, 2002). In summary, digital transformation and the adoption of digital channels are essential for businesses to thrive in today's competitive landscape. These technologies provide opportunities for growth, improved customer experiences, and cost savings, making them key drivers in various industries, including telecommunications.

Chapter 2 delves into the relevant literature review, highlighting the significance of digital channels in the telecommunications industry and their transformative impact on customer interactions and services. The chapter critically analyses existing literature to address the research objectives of understanding customer use and services in digital channel usage. It discusses the limitations of the DeLone and McLean Information System (IS) success model in comprehending digital channel usage. Further, the research investigates how advances in digital technologies, such as self-service technology, chatbots, and mobile apps, have revolutionized customer consumption patterns and enhanced service delivery efficiency (Meuter et al., 2005).

The approach to the research technique for the suggested framework is described in Chapter 3. It addresses the data gathering process, the research questionnaire, and the research methods that were utilized to examine the conceptual framework.

We covered the sample size and demographic profile of our data set in chapter 4 of the paper. The following sections also describe the descriptive statistics, a normality check, and if the sample size was appropriate, given the empirical data under consideration. Prior to examining the confirmatory factor of the measurement model, reliability, validity, and correlation matrix are performed. The results of the structural model are next investigated, and a list of possibilities is offered. An examination of the factors that impact consumer utilization of digital channels and evaluate their effects on customer service within the telecommunications industry was carried out. The final analysis revealed statistically significant positive relationships between customer use and system quality, system knowledge, information quality, service quality, customer innovation, and customer trust. However, no statistical significance was found between service complexity and consumer usage. Additionally, these variables, along with customer satisfaction, demonstrated significant positive associations

with customer service. The correlation between customer utilization and customer satisfaction was also found to be statistically significant.

The impact of variables impacting consumer use and satisfaction with digital channels was covered in Chapter 5. It also highlights the connections between each property. Chapter 5 focuses on the analysis of factors that influence customer use and satisfaction of digital channels. The primary objective (RO1) of this research is to identify and examine the key determinants of customer use in the context of digital channels. The findings obtained from the analysis are then utilized to address the secondary objective (RO2), which involves exploring the impact of customer use on customer services.

The developed model in this study is based on DeLone and McLean's (2003) framework, which has been widely used in the field of e-commerce. However, to enhance the model's explanatory power in understanding the use of mobile channels, additional characteristics were incorporated. Factors, such as customer innovativeness, customer trust, service complexity, and system knowledge, which significantly influence individuals' utilization of mobile applications, were included in the model, despite their absence in DeLone and McLean's original framework.

6.3 Main Conclusions from the Literature Review

According to the literature on the development of digital technologies, the telecommunications industry has encountered significant changes, which have altered customer-business interactions and consumer behaviour. In the telecommunications industry, digital channels, such as self-service technology (SST), mobile applications, chatbots, and virtual personal assistants (VPAs), have emerged as essential customer service tools. User-friendliness, error reduction, social media interaction, and the provision of customized services are among the factors driving the adoption of digital channels in customer service.

The benefits of digital transformation include operational efficiency, consumer satisfaction, and business expansion.

The IS model, developed by DeLone and McLean, provides a theoretical basis for understanding the impact of digital channels on the satisfaction, utilization, and performance of individual users. The adaptation and expansion of the IS model developed by DeLone and McLean, can contribute to research on digital channels and shed light on their efficacy in the telecommunications industry.

Digital channels have a significant impact on the transformation of customer service in the telecommunications industry, as they offer convenience, efficiency, and customization. The IS model developed by DeLone and McLean provides a useful framework for analysing the impact of these channels on the experiences of individual users.

The development of a conceptual framework, based on the DeLone and Mclean IS model, with attributes of system quality, service quality, information quality, user satisfaction, and external variables like customer innovativeness, customer trust, service complexity, and system knowledge provide an holistic view of all factors affecting digital channel use. These contributions provide insights into the factors and variables that affect customer use and satisfaction of digital channels in the telecommunications industry, offering valuable information for practitioners and researchers in understanding and improving the adoption and effectiveness of these channels.

6.4 Conclusions from the Findings

A high-quality system is crucial for attracting consumers and ensuring their satisfaction with digital channels. Customers who have a clear understanding of the digital channel and its capabilities are more likely to use digital channels and be satisfied with their experience. Providing accurate, complete, and secure information is important for attracting and satisfying consumers using digital

channels. Delivering high-quality service, including tangibility, dependability, responsiveness, assurance, and empathy, is crucial for consumer adoption and satisfaction. Innovative consumers are more likely to adopt and experiment with new digital channels, leading to increased usage and satisfaction. Satisfied customers are more likely to continue using digital channels and have improved interactions with customer services. Providing effective and reliable client services enhances the overall customer experience and encourages continued use of digital channels. These findings emphasize the importance of various factors in influencing customer use and satisfaction of digital channels. Understanding and addressing these factors can help organizations improve the adoption and effectiveness of their digital channels, resulting in higher customer satisfaction and retention.

6.5 Contribution

6.5.1 *Theoretical Contribution*

The study contributes to the existing theoretical framework, specifically DeLone and McLean's model, which focuses on system quality, service quality, information quality, and user satisfaction in meeting customer requirements. The research also considers additional factors, such as customer innovativeness, customer trust, service complexity, and system knowledge.

The findings support the importance of system quality as a key determinant of information system success, indicating that a high level of system quality positively influences user perceptions, satisfaction, and organizational performance. Further, the study demonstrates the significance of service quality and its impact on customer satisfaction.

The increasing frequency of cyber-attacks and hacking incidents in today's advancing technological landscape highlights the need for organizations to

implement strong protective measures. Failure to do so may result in significant financial losses and damage to a company's reputation (Spender, 2014). The study also explores the relationships between customer trust, customer use, and customer service, providing valuable insights into the interplay between these factors.

6.5.2 Contextual Contribution

The study made a contextual contribution by examining the use of Digital Channels to Serve Customers in the Telecommunications Industry. This study found that system quality has a positive impact on customer use and customer satisfaction. This indicates that the quality of the system is a major factor that determines the usage of the digital channel by customers. When enhancing the quality of the system in telecommunications self-service channels can improve customer use and customer satisfaction.

A substantial positive link between system knowledge and customer use was discovered by this study. According to customer's system knowledge, in order to choose the appropriate channel and match it to the capabilities of their equipment, a client must be informed about the channels that are available and their intended applications.

Customer use and information quality were found to be statistically significantly positively correlated. Accuracy, completeness, security, and availability are the four key components of information quality. This study found that when quality of information is enhanced, it can improve customer usage. Digital channels that are unable to provide such important data often have low utilization rates since as they do not provide customers with a clear representation of the information they require. Reduced customer usage may result from it and impact customer use and satisfaction.

This study discovered a statistically significant positive link between customer use and service quality. Customers who are willing to use digital channels also give excellent customer service a high priority. Consumers must carefully consider service quality when selecting digital channels, especially mobile payment options.

This study also found that there is a statistically significant positive relationship between customer innovativeness and customer use. The study has shown that, the two components of service innovation, interaction and support, are the key determinants of customer satisfaction and customer retention in the telecommunication industry.

This study found a strong positive association between customer use and customer satisfaction. Usage comprises all activities, such as browsing a website, gathering data, or carrying out a purchase. Analysis of user inclination is crucial to comprehending how clients feel about using digital channels. User happiness should improve the process of purchasing, paying for, receiving, and using services throughout the entire customer experience cycle.

This study found that there is a statistically significant positive relationship between customer use and customer services. Therefore, enhancing usage can improve customer service.

6.5.3 *Methodological Contribution*

A multivariate statistical analytic method called structural equation modelling (SEM) was employed to examine structural relationships. This method examines the structural link between measured variables and latent constructs by combining component analysis and multiple regression analysis. The researcher favours this approach since it estimates numerous and connected dependencies in a single investigation. Endogenous and exogenous variables are the two types

of variables employed in this analysis. Endogenous variables are the same as both the independent and dependent variables.

The study commenced with descriptive analysis utilizing IBM SPSS Statistics 26 to examine the data. The reliability of the constructs was assessed using Cronbach's alpha. Exploratory factor analysis was then conducted to identify the most appropriate items for further analysis. Specifically, IQ3, CI3, CU2, and SC2 items were excluded from the analysis. After removing these items, the variance accounted for reached 70%, indicating a satisfactory level of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy. Structural Equation Modelling (SEM) was performed using IBM SPSS Amos to construct the model.

6.5.4 *Practical Contribution*

The results of this study can assist in the use of Digital Channels to Serve Customers in the Telecommunications Industry. The findings of this study offer valuable insights for organizations aiming to enhance their decision-making regarding the investment and deployment of digital channels for customer use. It highlights the importance of understanding the dynamic nature of customer use, user satisfaction, and customer services in order to improve overall customer experience. The results provide organizations with a stronger rationale for investing in the implementation of digital channels and managing their use by customers and customer services effectively.

The study emphasizes the significance of both customer use and customer services in driving overall utilization and adoption of digital channels. This has implications for organizations in terms of promoting the implementation and usage of digital channels without compromising customer service and brand reputation. It is crucial for organizations to pay attention to customer use and find ways to encourage greater engagement by leveraging the framework provided in

this study. This framework can help identify specific areas of improvement for their digital channels, leading to enhanced customer experiences.

Overall, the findings of this study contribute to the body of knowledge in the field and provide practical insights for organizations seeking to optimize their digital channel strategies and improve customer service.

6.6 Limitations

There are several limitations to the study, which must be addressed. First, data at the organizational level was gathered using a single cross-sectional survey, which poses serious obstacles to establishing temporal precedence in the data and drawing conclusions about causality.

Another limitation that we made in this study was not to consider the moderation effect of customer trust and service complexity.

6.7 Recommendations for Future Research

Future research should focus on examining the moderation effects of customer trust and service complexity. It would be beneficial to increase the number of observations to effectively analyse these moderation effects. Additionally, investigating the role of customer trust as a mediator between the independent variable and dependent variable should be considered for further research.

The findings of this study indicate that system quality positively influences customer use and satisfaction. Further research should investigate whether there is a seasonal pattern in the relationship between system quality and customer use, as well as customer satisfaction. Additionally, this study reveals that system knowledge has a positive impact on customer use and satisfaction. It is important to identify the factors that affect system knowledge, as understanding these factors can guide efforts to enhance system knowledge. By improving system

knowledge, customer use and satisfaction can be automatically enhanced as well.

The findings of this study demonstrate that information quality has a positive influence on customer use and satisfaction. Future researchers are encouraged to explore strategies for improving information quality, as it can lead to enhanced customer service. Additionally, it is recommended to further investigate the factors that impact system quality and customer innovation in future research.

A further recommendation is to test the new conceptual model with other industries and channels.

6.8 Conclusion

This research paper aimed to identify and analyse the factors influencing consumer use of digital channels and their impact on customer service in the telecommunications industry. The analysis revealed statistically significant positive correlations between customer use and factors, such as system quality, system knowledge, information quality, service quality, customer innovation, and customer trust. However, service complexity did not have a statistically significant impact on consumer usage. Moreover, these factors, along with customer satisfaction, showed significant positive correlations with customer service. The study provides valuable insights for businesses operating in the telecommunications industry regarding the factors influencing customer use of digital channels and their effects on customer service.

It presented a detailed interpretation of the key findings from the structural model analysis, addressing the primary objective (RO1) and secondary objective (RO2) of the research.

The study contributes to the existing theoretical framework, particularly DeLone and McLean's model, by incorporating additional factors and validating their

significance. The study also emphasizes the interplay between customer trust, customer use, and customer service.

Methodologically, the study employs structural equation modelling (SEM) to analyse the relationships between variables. Descriptive analysis, reliability assessment, and exploratory factor analysis were conducted to refine the data. The study offers practical insights for organizations looking to enhance decision-making regarding digital channels and customer service in the telecommunications industry. It underscores the importance of understanding customer use and satisfaction to improve the overall customer experience.

Future research should explore these areas within other industries, as well as the mediating role of customer trust. Additionally, investigating the seasonal pattern of the relationship between system quality and customer use, and the factors influencing system knowledge and customer innovation, would be beneficial.

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Appendix A – Participant Letter

Dear Participant,

My name is Jason Kiezer, student number: 416577. I am a student at the University of the Witwatersrand studying towards a Master of Management in the field of Digital Business.

You are kindly invited to participate in an online research study project titled: The use of Digital Channels to Serve Customers in the Telecommunications Industry. The purpose of this online survey is to collect data related to the use of digital channels to serve customers in the telecommunications industry.

Participation in this online research study is completely voluntary and you may refuse or withdraw your participation at any time with no consequences. This online survey will take you about 15 minutes to complete and consists of multiple-choice questions which you can complete on your mobile phone.

The responses to the survey will be kept confidential and safe to protect the identities of all respondents as will be published in professional journals and presented at national and international conferences. Neither the researcher nor the University of the Witwatersrand has any conflict of interest in the results of the research study.

Should you have any questions or wish to know about research findings, you are most welcome to contact Jason Kiezer telephonically on 0829949460 or email 416577@students.wits.ac.za.

Your assistance will be greatly appreciated.

Kind Regards,

Appendix B – Research Instrument

The use of Digital Channels to Serve Customers in the Telecommunications Industry

1. Section A:

This section captures the participant's details and demographics.

Demography based questions

1) Please select your current age category.

- ☐ 18-24
- ☐ 25-34
- ☐ 35-44
- ☐ 45-54
- ☐ 55-64
- ☐ 65 and over

2) Please select your gender:

- ☐ Male
- ☐ Female
- ☐ Prefer not to say

3) In which province do you live?

- ☐ Eastern Cape
- ☐ Free State
- ☐ Gauteng
- ☐ KwaZulu-Natal
- ☐ Limpopo
- ☐ Mpumalanga
- ☐ Northern Cape
- ☐ North West
- ☐ Western Cape

- 4) Have you used digital self-service channels in the past 24 months?
- ☐ Yes
 - ☐ No

- 5) Which digital channels have you used?
- ☐ USSD
 - ☐ SMS
 - ☐ Online
 - ☐ App
 - ☐ Whatsapp

- 6) How often do you use digital channels for self-services?
- ☐ Daily
 - ☐ Weekly
 - ☐ 2-3 times a month
 - ☐ Once a month
 - ☐ Every 2 -3 months
 - ☐ 2 - 3 times a year

- 7) Do you belong to the telecommunication industry?
- ☐ Yes
 - ☐ No

2. Section B: Perception and use of Digital channel

The purpose of this section is to obtain your perceptions about your digital channel use.

Please indicate the extent in which you agree with each of the following statements related to the digital channel that you currently use as a customer.

Please indicate whether you Strongly disagree, Mostly disagree, Disagree, are Neutral, Agree, Mostly agree or Strongly Agree with each statement. The items will be rated using a 7-point Likert scale ranging from (1): Strongly Disagree; (2) Disagree, (3) Somewhat Disagree (4) Neither Agree Nor Disagree; (5) Somewhat Agree; (6) Agree; (7) Strongly Agree

B1	System Quality	1	2	3	4	5	6	7
SYQ1	The Digital channel is easy to use.							
SYQ2	The digital channel is always available.							
SYQ3	The digital channel is customer friendly.							
SYQ	The digital channel response time is acceptable.							
SYQ4	The digital channel is stable.							
B2	Service Quality	1	2	3	4	5	6	7
SQ1	The service I received was prompt and efficient.							
SQ2	I was satisfied with the overall quality of the service I received.							
SQ3	The service met my expectations.							
SQ4	The organisation provide support on the use of digital channel.							
SQ5	With the support that I have received I believe I can now use the digital channel with confidence							
SQ6	The organisation's digital support team respond to my request promptly.							
B3	System Knowledge	1	2	3	4	5	6	7
SK1	It was easy to learn to use the digital channel for self-service.							

SK2	It is easier to find the information I need in the self service channel.								
SK3	I know of the different channels to use self-service options from the company.								
SK4	I am familiar with how to navigate the company's self service channels.								
SK5	I know how to access the company's self-service channels.								
B4	Customer Use	1	2	3	4	5	6	7	
CU1	I would like to use the digital channel.								
CU2	I find the system to be an efficient use of my time.								
CU3	I have learnt to use the digital channel very quickly.								
CU4	I felt very confident in using the system								
B5	Customer Trust	1	2	3	4	5	6	7	
CT1	I enjoy using the digital channel.								
CT2	I would recommend the digital channel to other customers								
CT3	The digital channel works the way I want it to work								
CT4	Overall, I am satisfied with the use of digital channel								

CT5	It is pleasant to use the digital channel.							
B6	Customer Services	1	2	3	4	5	6	7
CS1	Digital channel improved and maintained cordial relationship with customers.							
CS2	Digital channel has improved my customer experience							
CS3	I would use this company's self service again in the future.							
CS4	The digital channel is fast and efficient							

B7	Service Complexity	1	2	3	4	5	6	7
SC1	The transactions that I perform is routine.							
SC2	I find the system easy to navigate and find what I need.							
SC3	The system is well-organized and logical.							
SC4	I find the system straightforward and simple to use.							

SC5	The system is easy to understand and use.								
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B8	Information Quality	1	2	3	4	5	6	7
IQ1	The information provided by the system is accurate and reliable.							
IQ2	The information provided by the system is easy to understand.							
IQ3	The information provided by the system is relevant to my needs.							
IQ4	The information provided by the system is up-to-date and current.							
B9	Customer Satisfaction	1	2	3	4	5	6	7
CN1	I am satisfied with the functionality of the system.							
CN2	The system meets my needs and expectations.							

CN3	I am satisfied with the speed and performance of the system.							
CN4	I am satisfied with the overall experience of using the system.							
CN5	I am satisfied with the user-friendliness of the system.							
B10	Customer Innovativeness	1	2	3	4	5	6	7
CT1	I felt comfortable trying new things with the system.							
CT2	I am open to trying new ways to use the digital channel.							
CT3	I am open to new ideas and ways of doing things.							
CT4	I am willing to take risks to try new things.							

Appendix C – Ethics Clearance

Graduate School of Business Administration
University of the Witwatersrand, Johannesburg



Wits Business School Ethics Committee
Constituted under the University Human Research Ethics Committee (Non-Medical)

Ethics Clearance Certificate

Ethics protocol number: WBS/DB416577/536

This certificate is only valid with a legitimate ethics protocol number and signed by the Researcher (below).

Project title	Strategies of mobile operators to deliver content to the South African market
Investigator / Researcher	Mr Jason Kiezer
Nature of Project	MM (Digital Business)
Decision of the Committee	Approved, provided stakeholders and participants are guaranteed anonymity and confidentiality.
Issue Date of Certificate	2023-01-25
Expiry date	Date of submission of the project / research report
Chairperson	Dr Pius Oba ☎ +27 11 717 3976 ✉ +27 82 733 6587 ✉ pius.oba@wits.ac.za

Declaration by Researcher

One copy must be signed by the Researcher and returned to the Chairperson of the Wits Business School Ethics Committee.

I fully understand the conditions under which I am authorized to carry out the abovementioned research and I guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I undertake to resubmit the protocol to the Committee.

Signature

26 January 2023

Date: