The impact of Self-Service Technology (SST) on Passenger Satisfaction - a study for Indian Metropolitan City Airports

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ABSTRACT

Introduction - Airports and airlines are currently integrating self-service technology (SST) into their procedures to provide quick and hassle-free services to passengers. Passenger satisfaction is explained, to some degree, by the level of service quality being offered in airports which includes their SST offering. Therefore, it is essential to empirically understand how SST service quality factors contribute to passenger satisfaction.

Objective - The primary objective of this research is to investigate the impact of service quality of SST on passenger satisfaction levels across Indian Metropolitan City Airports (Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata, and Mumbai). The factors associated with the service quality of SST include functionality, enjoyment, design, security /privacy, assurance, convenience and customization as well as additional factors including shorter waiting time, prompt assistance and passenger traffic management (value addition). Additionally, this research focuses on the safety factor associated with SST in driving satisfaction since the outbreak of COVID-19.

Method - The study employs a cross-sectional research design and follows a quantitative approach. The questionnaire comprises socio-demographic variables, a measure of SST service quality called SSTQUAL developed by Lin and Hsieh (2011), and a measure of passenger satisfaction as a key dependent variable. It was distributed electronically via social media platforms and emails. The research took 18 days to record a total of 300 valid responses out of which 210 met the criteria of using SST in any one of the sample airports over the last 1.5 years. 210 responses were used to analyse the SST service quality while all 300 responses were used for the remaining analysis. Convenience and snowball sampling technique was used to distribute the survey. Statistical analysis included normality test, reliability test, univariate test (Mann-Whitney Test, Kruskal-Wallis Test, Spearman correlation test). The testing of the proposed hypothesis was undertaken through the use of binary logistic regression employing a hierarchical approach.

Result - The primary model included the following independent explanatory variables: the 7 dimensions of SSTQUAL in the first hierarchy and additional constructs (shorter waiting time, prompt assistance and value addition) in the second hierarchy. The dependent variable was passenger satisfaction. Factors significantly associated with higher levels of passenger satisfaction were customization [OR= 1.62, CI = 95%, 1.23 – 2.14], design [OR= 1.54, CI=95%, 1.02 – 2.32], functionality [OR = 1.35, CI = 95%, 1.13-1.61] (hierarchy 1) and the ability of SST to manage passenger traffic (value addition) [OR = 2.02, CI = 95%, 1.02 - 4] from hierarchy 2. This model explained 65% of the variation in passenger satisfaction. Thereby, service quality of SST demonstrates positive significant association with passenger satisfaction. Further, through binary logistic regression

analysis, it was noted that ‘safety factor’ of SST during COVID-19 was a predictor of passenger satisfaction [OR = 1.48, CI = 95%, 1.21 – 1.82]. It accounted for over 5% of variance in satisfaction levels.

Conclusion - This research proposes an understanding of the influence of SST service quality on passenger satisfaction in the Indian Airport context. The findings of the research have helped to identify the key contributors to passenger satisfaction in the Indian Airport context. It also gives valuable contribution to the service quality literature that deals with technology and satisfaction. Finally, it gives meaningful implications to airport management to concentrate on effectively addressing SST malfunctions, safety concerns concerning COVID-19 and appropriately design the SST for sustaining the satisfaction of their passengers.

Keywords**:** *service quality, airport, technology, self-service technology, satisfaction, SSTQUAL, prompt assistance, waiting time, passenger traffic management, COVID-19*

DECLARATION

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(Thesis/Author Declaration Form)

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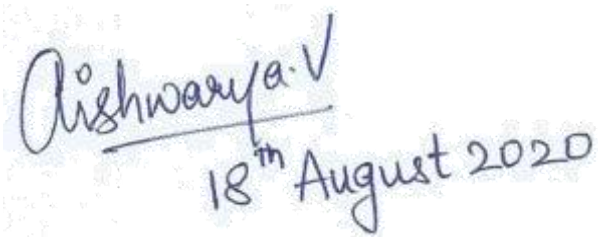

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TABLE OF CONTENTS

ABSTRACT **1**

DECLARATION **3**

ACKNOWLEDGEMENTS **4**

LIST OF TABLES **7**

LIST OF FIGURES **8**

LIST OF ABBREVIATIONS **9**

CHAPTER 1: INTRODUCTION **10**

1.1 INTRODUCTION **10**

1.2 RESEARCH AIM **12**

1.3 DISSERTATION STRUCTURE **13**

CHAPTER 2: LITERATURE REVIEW **15**

2.1 INTRODUCTION **15**

2.2 AIRPORT INDUSTRY GROWTH **15**

2.3 SERVICE QUALITY **16**

2.3.1 SERVICE QUALITY MEASUREMENT MODELS **18**

2.4 CUSTOMER SATISFACTION AND ITS MEASUREMENT MODELS **24**

2.4.1 CUSTOMER SATISFACTION IN AIRPORT ENVIRONMENT **26**

CHAPTER 3: METHODOLOGY **28**

3.1 INTRODUCTION **28**

3.2 RESEARCH PHILOSOPHY **28**

3.3 RESEARCH FRAMEWORK **30**

3.4 HYPOTHESIS **31**

3.5 RESEARCH APPROACH **32**

3.6 RESEARCH STRATEGY AND DESIGN **33**

3.7 POPULATION AND SAMPLING **35**

3.8 DATA COLLECTION **40**

3.9 QUESTIONNAIRE DESIGN **43**

3.10 PILOT TEST **51**

3.11 ETHICAL CONSIDERATION **52**

3.12 RESEARCH DESIGN LIMITATIONS **53**

3.13 CONCLUSION **54**

CHAPTER 4: STATISTICAL ANALYSIS **55**

4.1 NORMALITY TEST **55**

4.2 RELIABILITY TEST **55**

4.3 MANN-WHITNEY TEST **55**

4.4 KRUSKAL-WALLIS TEST **56**

4.5 SPEARMAN TEST **56**

4.6 REGRESSION **57**
CHAPTER 5: RESULTS **58**
5.1 INTRODUCTION **58**
5.2 DESCRIPTIVE STATISTICS **58**
5.3 RELIABILITY TEST **61**
5.4 NORMALITY TEST **62**
5.5 UNIVARIATE TESTS **63**
5.5.1 PASSENGER SATISFACTION AND DEMOGRAPHIC VARIABLES **63**
5.5.2 PASSENGER SATISFACTION AND CONTINOUS INDEPENDENT VARIABLE **66**
5.6 LOGISTIC REGRESSION ANALYSIS: **67**
5.6.1 MODEL 1: HIERARCHICAL BINARY LOGISTIC REGRESSION **68**
5.6.2 MODEL 2: BINARY LOGISTIC REGRESSION **70**
5.6.3 MODEL 3: BINARY LOGISTIC REGRESSION **71**
CHAPTER 6: DISCUSSION AND IMPLICATIONS **72**
6.1 INTRODUCTION **72**
6.2 DISCUSSION ON MODEL 1 – HIERARCHICAL LOGISTIC REGRESSION **72**
6.3 DISCUSSION ON MODEL 2 – BINARY LOGISITC REGRESSION **77**
6.4 INSIGHTS FROM THE OPEN-END QUESTION 'Would you like SST **78**
to be introduced in any other sections of the airport?' **78**
6.5 MANGERIAL IMPLICATIONS **79**
6.6 LITERATURE IMPLICATIONS **81**
CHAPTER 7: CONCLUSION **84**
7.1 LIMITATION AND FUTURE SCOPE: **84**
7.2 CONCLUSION **86**
REFERENCES **88**
APPENDIX A: DESCRIPTIVE STATISTICS **106**
APPENDIX B: RELIABILITY TEST **109**
APPENDIX C: NORMALITY TEST **111**
APPENDIX D: MANN-WHITNEY TEST **113**
APPENDIX E: KRUSKAL-WALLIS TEST **114**
APPENDIX F: SPEARMAN CORRELATION TEST **117**
APPENDIX G : HIERARCHICAL LOGISTIC REGRESION MODEL **122**
APPENDIX H: LOGISTIC REGRESION (COVID-19) **127**
APPENDIX I: LOGISTIC REGRESION (FUTURE USE) **130**
APPENDIX J: SURVEY QUESTIONNAIRE **132**

LIST OF TABLES

Table 1: List of Hypotheses in this study 31
Table 2: Sample Size Calculations 37
Table 3: Scoring Structure 46
Table 4: Questionnaire items and their response scale 50
Table 5: Descriptive Statistics for demographic variables 59
Table 6: Descriptive Statistics for continuous dependent variable 60
Table 7: Descriptive Statistics for SSTQUAL dimension.....60
Table 8: Reliability Coefficient.....61
Table 9: Item-Total statistics.....62
Table 10: Test of Normality for passenger satisfaction 63
Table 11: Mann Whitney U test for Passenger Satisfaction and Gender 64
Table 12: Kruskal Wallis test for Passenger Satisfaction and Age 64
Table 13: Kruskal Wallis test for Passenger Satisfaction and Education Levels.....65
Table 14: Kruskal Wallis test for Passenger Satisfaction and Indian City Airports 66
Table 15: Spearman Correlation Test for passenger satisfaction and continuous independent variable 67
Table 16: Hierarchical Logistic Regression Summary.....69
Table 17: Binary Logistic Regression Summary 70

LIST OF FIGURES

Figure 1 : SSTQUAL Model 22
Figure 2: Research Onion 30
Figure 3: Deductive Study..... 33
Figure 4: Data Collection Method 42
Figure 5: Flow of Questionnaire 44
Figure 6: Spearman Correlation Scale 56

LIST OF ABBREVIATIONS

SST: Self-service technology

CSAT: Customer satisfaction

ISQ: Internal service quality

ESQ: External service quality

ACSI: American Customer Satisfaction Index

SCSB: Swedish Customer Satisfaction Barometer

GCSB: German Customer Satisfaction Barometer

ECSI: European Customer Satisfaction Index

CHAPTER 1: INTRODUCTION

1.1 INTRODUCTION

The rapid growth of integrating technologies and services gives way to new methods of doing business and altering the communication between the organization and the consumers (Ku and Chen, 2013). This has resulted in the transformation of service delivery from the traditional style to a self-service style (Campbell *et al*., 2011). Observing this gradual shift towards technological-based self-service channels like self-service technology (SST), the present study concentrates on SST qualities that influence passenger satisfaction in the Indian Airport context.

Meuter *et al*. (2000) defines SST as a technological interface that enables consumers to get their services without any involvement of the firm's employee. Yang and Klassen (2008) suggest that SSTs are beneficial to various business sectors as it helps them to serve their customers with a small number of resources. The substitution of SST for employees has also resulted in cost reduction in business. Kelly, Lawor and Mulvey (2017) claim that firms have started to implement SST due to its increased productivity, competence and potency in service process. Thus, industries like banks, healthcare, airports and retail have integrated SSTs into their operations in the form of ATM, online banking service, kiosks to access health records, and kiosks for check-in and boarding pass printing and self-checkout systems. By allowing customers to access such convenient services, the firms can get a better understanding of the demands and satisfaction requisites of the customers (McGrath and Astell, 2017; Ganguli and Roy, 2011) and thus, can cater to the same in a better way.

Victorino *et al*. (2005) highlights the advantages of SSTs from the customer's view. SSTs are beneficial in terms of their extended working hours, responsiveness and user-friendly interfaces. On the other hand, SSTs has certain disadvantages like no inter-personal interactions, system breakdowns leading to discomfort towards SST and insecurity of personal data resulting in trust issues with SST.

Due to the impact of SST on businesses and their related consumers, it is noteworthy to study the effect of SST on the satisfaction levels of customers, which is the aim of this research.

A key subject in the service literature is service quality. The understanding of service quality is essential for delivering superior service quality that is aligned with the customer's expectations (Gilbert and Wong, 2003). Given that the customer's trend is gradually shifting from traditional distribution channels to SST, the notion of SST service quality becomes critical to comprehend (Radomir and Nistor, 2012).

Cronin, Brady and Hult (2000) describes customer satisfaction as the feeling that a customer experiences after receiving a service. The feeling of satisfaction or dissatisfaction depends on whether the services match their expectation. Chen (2008), believes that higher service quality results in greater customer satisfaction. Further, similar results are shown for service quality of SST and customer satisfaction (Sureshchander *et al.,* 2003; Brady and Cronin, 2001). Hence, service sectors like airports should pay close attention to the identification of service quality attributes that impact passenger satisfaction. Thus, this study aims to comprehend the impact of SST service quality traits on passenger satisfaction in the Indian airport context.

Reviewing the service quality measurement literature, the present study uses SSTQUAL model developed by Lin and Hsieh (2011) for the measurement of SST service quality. Additionally, this research includes four extra variables namely provision of prompt assistance, waiting time spent in queues and ability of SST to manage passenger traffic. All these attributes have been evaluated for their association with passenger satisfaction. Past researches like Mattila *et al.* (2011) and Wittmer (2011) have modelled these variables individually to measure its impact on satisfaction. There is an absence of previous research that combines all these variables to evaluate the passenger satisfaction levels regarding SST service quality in the airport environment. This research aims to create a model that integrates all these variables to measure satisfaction. Additionally, this field of study in the Indian Airport environment is still under research and would be

interesting to draw inferences. Thus, this research finds the relation between the variables in the Indian airport context only.

Further, due to COVID-19, there are changes in the air-travel (Sillers, 2020) since there is an emphasis on social distancing. This research examines if the passengers consider the use of SST to be a safe option during their travel and if this 'safety' factor drives passenger satisfaction during this period of COVID-19.

The relationship between SST service quality and satisfaction is investigated through quantitative analysis using an online survey for data collection. This research aims to test whether technological developments like SSTs genuinely provide better experience and satisfaction to the passengers, or does it remain as a presumption.

1.2 RESEARCH AIM

This research aims to evaluate the impact of self-service technology (SST) on passenger satisfaction across 7 Indian metropolitan city airports. The past researches like Radomir and Nistor (2012) and Orel and Kara (2014) have been predominantly focused on SST service quality and customer satisfaction in the banking and retail setting. Further, several studies (Kratudnak and Tippayawong, 2018; Hussain *et al.,* 2015) have been concentrating on overall airport and airline service quality and its correlation with passenger satisfaction. There are few researches in the literature (Jarssi and Winston, 2019; Agus, 2018) that show empirical observations on the impact of technology-based services like SST on customer satisfaction in airports. The testing of this relationship is still under research for Indian Airports, which to the researcher's knowledge, this study will be the first one to report the findings.

Past researches by Orel and Kara (2014) and Shahid *et al.* (2018) have used only 7 dimensions of SSTQUAL model developed by Lin and Hsieh (2011) as the core tool for the measurement of the service quality and its connection with satisfaction. Also, researches by Mattilla *et al.* (2011) and Zhou *et al.* (2013) have identified the correlation between staff assistance and satisfaction. The study by Wittmer (2011) states that shorter waiting time is a driver of satisfaction in the airport

context. However, no research combines all the above-mentioned variables along with passenger traffic management attribute of SST into a single model to identify which among them are the key predictors of satisfaction. The current study aims to investigate the same.

Also, considering the scenario of COVID-19 and new air-travel norms, SST can play an important role in maintaining social distance, but it is unknown if the passengers would consider the use of SST as a safe option. This research also aims to capture if this safety factor provided by SST would cause satisfaction to passengers moving into the future of air-travel post-COVID-19. This can be a start point for future research in the context of service quality and passenger satisfaction in airports.

Given that many airports are now adopting SST to improve their service quality, it is worthwhile to answer the research question '*The impact of self-service technology (SST) on passenger satisfaction in the Indian Metropolitan City Airports*'.

1.3 DISSERTATION STRUCTURE

Chapter 1 presents a brief introduction about the underlying linkages about service quality of self-service technology (SST) and satisfaction. It also outlines the motivations and purpose to conduct the research that aims to investigate the impact of self-service technology (SST) on passenger satisfaction in the Indian airport context.

Chapter 2 describes the fundamental concepts like service quality, service quality measurement tools, Self-service technology (SST) and customer satisfaction and its measurement scales present in the existing literature which is valuable for the present study.

Chapter 3 gives a detailed discussion about the research methodology being adopted by the current study. It consists of research framework, philosophy research instrument used to collect the data and hypothesis developed concerning research topic. It also justifies for the selection of the approach for answering the

research question. Further, the chapter also highlights the limitations of the chosen approach.

Chapter 4 provides a concise explanation about the several statistical tests being conducted on the collected data such that it helps the reader to understand the objective of the test and meaning of the results.

Chapter 5 presents the results obtained from descriptive and exploratory statistical tests that have been performed on the data collected from the survey. Further the results of univariate analysis and the regression models are highlighted depending on which conclusions regarding the hypothesis were drawn.

Chapter 6 reviews the key findings obtained from the analysis. It is also referenced back to past researches to find comparisons and differences in the results. Managerial and theoretical implications will also be addressed.

Chapter 7 provides conclusions drawn from the observations of the present study along with limitations and recommendations for future study as a potential extension.

CHAPTER 2: LITERATURE REVIEW

2.1 INTRODUCTION

The objective of this chapter is to assess the different theoretical frameworks involved in the area of study. The first section will be a brief review of the growth in the Airport industry, following which the concept of service quality is explored and a detailed discussion about its associated measurement tools is done. The final section of the literature review will focus on customer satisfaction and describe various factors impacting it with respect to self- service technology (SST).

Understanding the core concepts and models from literature, it will be a foundation for this study which aims to evaluate the impact of self-service technology on passenger satisfaction in Indian Metropolitan City airports.

2.2 AIRPORT INDUSTRY GROWTH

Airports have opened up many opportunities globally with the aim of an economic boost, investments, trade and tourism. According to Pin, Chao and Sopadang, (2013) air transport industry due to globalisation will tend to align towards modern economics and will thus experience increased demand. Over the next few decades, this trend would be noticed in Asia- Pacific regions.

In today's dynamic environment, airports must consciously integrate new practices to elevate the service quality as this corporate-level strategy will provide a competitive advantage (Lin and Hong, 2006). Consistent with the above statement, Sopadang and Suwanwong (2016) state that with the increased number of air-travellers and airlines, airports have started to focus their service delivery. In short, airports now emphasize on the perceived service quality of their users (Pantouvakis and Renzi, 2016).

The Aviation sector in India has seen accelerated growth in terms of connectivity and wide geographic coverage (Satpathy, Patnaik and Kumar, 2017). From the reports by IBEF (2018), it is noted that the third-largest aviation market by 2020

would potentially be India. It is also predicted that the flow of passenger traffic is expected to cross over a hundred million. A notable contribution to the Indian Economy is air transportation. It contributes to about $ 30 million to the Indian GDP annually (IBEF, 2018).

Ovaci (2017) forecasts that huge investments would be in favour of technology making it an imperative part of the adaptation process. Technology is a strong force that converges the markets towards commonality. It has become an irreplaceable part of every industry/sector (Levitt, 1985). According to Rostworowski (2012), technological advancements have been complementary support to the airports in terms of developing IT platforms and building a "Smart Airport" in the coming future. Similarly from research, it is noted that the concept of "Smart Airport" is still evolving with a target of achieving 'machine-man' interactions. Technology being an integral part of the travel sector, air travel has started to use resources like biometrics, automated baggage drop, check-in kiosks and other self-services. Now the passengers expect to avail self-service options in the airport apart from prompt staff assistance, precise online information, etc. This suggests that self-service operations will be predominantly implemented in many airports (Fodness and Murray, 2007; Noronen-Juhola, 2012).

Overall, it is critical to evaluate if technological advancements like SST's improve the customer/passenger experience and satisfaction, or is it only a conception. This evaluation is the aim of this research.

2.3 SERVICE QUALITY

Service quality has evolved from different perspectives through research. It is a result of the comparison between the expectations of the consumers and the service delivered to them (Parasuraman, Zeithaml and Berry, 1985). Grönroos (1984) argues that the perceived service quality is the outcome of the evaluation of the service after its consumption which leads to this comparison with the expectation. Thus, it can be observed that service quality has two dependent components, expected service and perceived service.

As mentioned by Parasuraman *et al*, (1985), the acknowledgment of complete service quality depends on three main characteristics of services: intangibility, heterogeneity and inseparability. Service quality being intangible, the service provider may find it difficult to comprehend how the customer perceives and evaluate the service quality. Assurance of uniform service quality is difficult as it differs from consumer to consumer. The service personnel's service delivery may not match the expectations of the consumers as there lacks global uniformity among the service providers. Thus, exhibiting heterogeneity in service quality (Booms, Bernard and Bitner, 1981). Production and consumption of service quality are inseparable due to which there is no input of the service quality from the consumer at an initial stage. Hence consumers' input becomes critical for the service quality. The quality is not integrated at the initial stage rather it becomes evident during the delivery stage (Regan and William, 1963).

The total quality perception depends on both technical and functional dimensions of the service. The technical service quality indicates the result of the interaction between the service and the customer, in short, the 'what' aspect of the service. While the functional service quality refers to how the functions of the services are delivered, addressing the 'how' aspect of the service (Schneider and White, 2004). However, Grönroos (1984) highlights that true perception of the service is captured when the technological quality is delivered to the consumer functionally. This means that consumers are not only interested in outcomes of the service process but also on the process itself.

Al Mohaimmeed (2019) and Latif, Baloch and Rehman (2016) categorises and defines two classes of service quality namely, Internal Service Quality (ISQ) and External Service Quality (ESQ). The quality of service delivered to the customers by the organisation refers to ESQ, while ISQ is the quality of service provided amongst the employees of different units but of the same organisation. Hence, service quality can be assessed from two standpoints; customers outside the organisation and customers (employees) within the organisation (Dauda *et al.*, 2013).

Studies and observations from various literature emphasize that service quality is an outcome of a customer focussed relationship and it is viewed in a multi-

dimensional way encompassing experience, credibility and interaction of the customers. The firms' service delivery has gradually changed from face-to-face encounters to technology-facilitated service delivery (Fitzsimmons, 2003).

Meuter *et al* (2000) defines SST as a technology-based interface that allows the service provider to produce a service that is independent of any employee intervention. Anderson *et al*, (2013) states that SST is one form of technology utilized by different firms for delivering efficient service quality. Dabholkar (2003) argues that SSTs' results in a perception of improved services as customers can finish their activities faster and easier. With the help of SST, the passengers can print their boarding pass, book tickets at the airport and can also check-in through kiosks. Therefore, organizations like the airports adopt SST in the motive to enhance the service quality of the airport and their passenger experience.

The advancements in IT has further helped SST and has transformed the service landscape enabling the firms of different sectors to adopt SST to enhance customer participation.

2.3.1 SERVICE QUALITY MEASUREMENT MODELS

Understanding the service quality characteristics, it is essential to measure the service quality to identify its impact on the customers.

The study conducted by Parasuraman *et al*, (1985) identifies 5 discrepancies that occur between expectations and perceptions of service quality.

Gap1: gap between expectation of the management and expectation of the customers.

Gap2: gap between perception of management about the customer's needs and the service quality specifications

Gap3: gap between service quality specifications and actual service delivery.

Gap4: gap between intended delivery of the service and what is being delivered to the customers via '*external communication*'

Gap5: The result of the above gaps leads to the differences in the expectation and the perception of a service by the customers.

Therefore, to address these gaps, there is a requirement of a tool to measure service quality.

Parasuraman *et al*, (1985) developed a model called 'SERVQUAL' which aimed at measurement of service quality by capturing the expectations and perception of the customers. This model analyses the external service quality provided by the firm and the use of this measurement tool helps in improving the quality of the services delivered so that the gap between the expectation and perception is narrow (Shahin, 2003). The SERVQUAL presents service quality as a multidimensional construct that attempts to assess it from the customer's standpoint.

Initially it had 10 dimensions later it was reduced to a 5-dimension scale comprising of (Zeithaml, Berry and Parasuraman, 1988) –

1. Reliability: The ability to perform the desired service quality
2. Responsiveness: The willingness of prompt assistance to customers
3. Assurance: The knowledge and courtesy of the employees
4. Empathy: Individual attention to the customers
5. Tangibles: Equipment, physical abilities and performances.

Despite of being widely used, many researchers (Asubonteng, McCleary and Swan 1996; Kang and James, 2004) have criticised this model based on of its dimensionality, different scoring systems, interdependency between the 5 parameters. It has also failed to address the technological aspect of service quality. The 5 dimensions have a high degree of intercorrelation which makes the measurement of service quality difficult. These dimensions are not universal but rather contextualised. Higgins *et al* (1991) critiques SERVQUAL based on stability of the dimensions with respect to different contexts. This model lacks to identify the effect of changing expectation over time (Buttle, 1996). On the same line Mangold, and Babakus (1991) argued that SERQUAL model was oriented only towards service delivery process and did not address its outcomes.

This led Cronin and Taylor (1992) to refine the existing model and introduce 'SERVPERF' whose objective was to identify the service quality perception. This

performance-based scale utilises only half the number of items in comparison with SERVQUAL. The rationale behind this model development was the difficulty in measurement of customer expectation level before the service delivery and also measurement of service quality expectation after the service delivery can have biases in the responses. Thus, SERVPERF addresses only the actual service performance consisting perception items from the SERVQUAL model, excluding the consideration of any expectations (Jayasundara *et al*, 2009). Cronin and Taylor (1992) tested this model in four different industries (banking, dry cleaning, pest control and fast food), observed that SERVPERF elaborated the variance between perception and expectation while measuring overall service quality in comparison with SERQUAL. SERVPERF in comparison to SERVQUAL integrates performance properties making the model an efficient service quality measurement tool.

However, from the literature both SERQUAL and SERVPERF are designed to acknowledge the relationship between customers and the employees/ firm but not customer-SST interactions thereby, not being fully representative of the different aspects of the SST service quality (Orel and Kara, 2014). This gap leads to development of models that focus on technology-based measurement scales.

'eTRANSQUAL' scale developed by Bauer, Falk and Hammerschmidt (2006) which is a '*transaction process-based*' scale for the measurement of service quality. It comprising 5 elements namely Functionality/Design, Enjoyment, Process, Reliability and Responsiveness. A quantitative study was conducted, and questionnaires were distributed to randomly selected samples. The respondents who have had sufficient online shopping experience was considered for this study. It was observed that the enjoyment factor was dominant in influencing repurchase behaviour leading to customer lifetime value. Another observation by Bauer *et al*, (2006) from the study shows powerful relation between responsiveness and other dimensions. Therefore, the responsive factor must henceforth be included on a single scale. Thus, the above stated 5 dimensions have shown a positive impact on the perceived value of the service and customer satisfaction.

Although many scales were developed for service quality measurement between customers and online platforms, it was not suited for technological-based interfaces like SST.

E-service is defined as the experience of the customer via an electronic medium like the internet without any human interference (Sousa and Voss, 2006). The concept of e-service quality was broadened by Fassnacy and Koese (2006) who state that e-services are not limited to websites rather include electronic services which can manage the consumers need effectively and efficiently. Radomir and Nistor (2014) highlight that electronic service quality is not conceptualised concerning expectations and actual performance. Rather it is analysed through the experience of using technology-based interfaces (Santos, 2003). Lin and Hsieh (2011) consistent with the statement by Fassnacy and Koese (2006) concentrated on the service quality measurement where interactions are between SST and the customers. Thus, they developed SSTQUAL model since there was no standard instrument available to measure SST service quality for various industries. Therefore, the model developed by Lin and Hsieh (2011) is being adopted to the current study which aims to measure the impact of SST on passenger satisfaction.

2.3.1.1 SSTQUAL

The 'SSTQUAL' scale was developed by Lin and Hsieh (2011). This model aims to focus on service quality measurement which involves interactions between the SST and the consumers in terms of the perceived quality of the SST. The SSTQUAL model is predominantly used in SST quality measurement in retail and banking sectors (Radomir and Nistor, 2012; Orel and Kara, 2014).

Initially, Lin and Hsieh (2011) developed the scale with 75 items. On further filtering by subject experts, the scale had 37 items. Through further refinement due to component analysis and varimax rotation, SSTQUAL model comprised of 27 items. It is noted that these items are mutually exclusive and are distributed among 7 dimensions. Bryant and Yarnold (1995) explain varimax rotation as a method by which factors/ dimensions are rotated to seek simpler structures. Here the key assumption is that the dimensions are uncorrelated.

It is essential to note that SSTQUAL resembles other scales that are concentrated on e-services like 'E-S-QUAL', 'etailQ' and 'PeSQ' (Lin and Hsieh, 2011; Mango, Muceldili and Erdil, 2017).

The scale was further refined to improvise the psychometric measurement properties of SSTQUAL. Reliability and validity of a scale are collectively referred to as psychometric measurement. So a scale must be both reliable and valid. Therefore, upon further revision, the scale was developed with 20 items and 7 dimensions. These dimensions serve as guidelines in the investigation of the service quality provided by the SST.

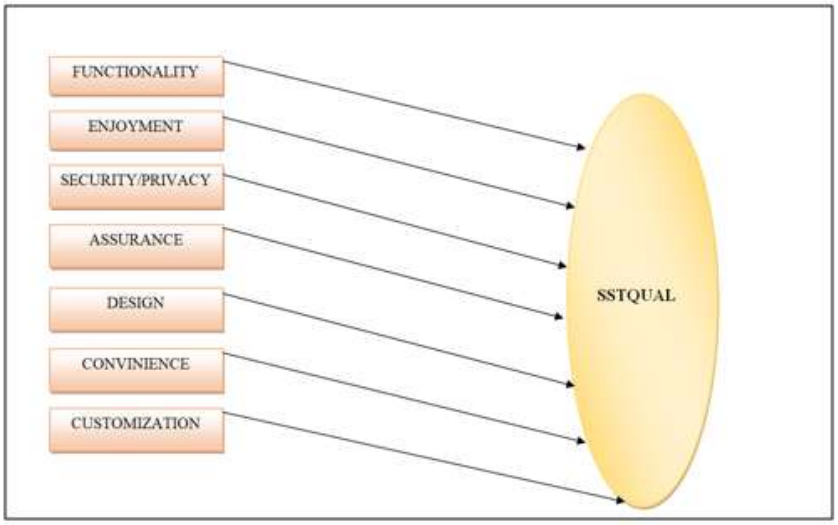

Figure 1 : SSTQUAL Model

D1- Functionality relates to responsiveness, provision of real-time information and easy usage.

D2- Enjoyment: the ability to enjoy the experience of using the SST and its delivered outcome

D3- Security/Privacy: confidentiality of personal information, secure transactions with the SST, protection against intrusion and loss of personal data

D4- Assurance refers to the service provider's confidence due to their competence and reputation

D5- Design: the aesthetical features/layout of the system

D6- Convenience: the accessibility of the SST services

D7- Customization: the magnitude to which the system can be tailored to address the specific needs of the customer

The authors conducted a validity test by distributing a questionnaire and randomly sampling customers from different industries (banking, transportation, retail, healthcare) who offer SST service and the results showed evidence of convergence and proved validity (Lin and Hsieh, 2011). The samples were divided evenly across several industries to obtain a broad representation of industry context. The average variance extracted in the 7 SSTQUAL dimensions had a value over 0.50 reflecting higher levels of convergence (Bagozzi, 1991).

The scale was also examined for generalization and reliability. It was conducted by surveying samples from different industries who utilize SST service. MacCallum *et al*., (1992) mentions that to reduce the error due to '*capitalization of chance'* the instrument must be stable across different industries and consumer behaviours. Banking and transportation industries were chosen for showing generalizability since it was observed that SST was extensively used and showed high customer acceptance in these industries (Lin and Hsieh, 2011). The samples from both the industries were randomly chosen who belonged to different branches of the bank and different transportation sectors (air-travel, subway station and train station). The responses from these samples were used to analyse their SST experiences. When the analysis was conducted, it was noted that the Cronbach Alpha coefficient was over 0.70 for the items within an individual dimension and reliabilities of the 20-items were high. Therefore, Lin and Hsieh (2011) highlight that test results show evidence of SSTQUAL model to be stable under different settings and demonstrates generalizability. The outcome indicated that this measurement scale is a diagnostic tool to examine the SST of any industry in terms of its strengths and weaknesses with respect to the 7 proposed dimensions.

Later, Radomir and Nistor (2012) adapted the SSTQUAL model in the banking sector to test the service quality effectiveness offered through SST like ATM. The authors argued that two dimensions out of the seven had to be excluded and regrouped the remaining dimensions into five (Functionality, Enjoyment, Security/Privacy, Customization and Image) to suit the banking setting. The revised SSTQUAL differs from the original scale developed by Lin and Hsieh

(2011) mainly because the application was in a different industry setting and also within the banking sector there may exist differences in banks and the customers' behavior towards SST resulting in differing statistical results (Radomir and Nistor, 2012).

Overall it can be stated that the model proposed by Lin and Hsieh (2011) is a powerful tool used for the measurement of perceived e-services quality across different industries and market settings; thereby making it strong support for the current study. Therefore, for the current study, the SSTQUAL model is used to evaluate the impact of SST on passenger satisfaction in the airport setting due to its evidence of reliability and generalizability characteristics.

2.4 CUSTOMER SATISFACTION AND ITS MEASUREMENT MODELS

The concept of customer satisfaction has been a research topic among different researchers. Sheth (1973) describes customer satisfaction as the perceived state of the customer such that each of them have an expectation following their previous experience. On a similar basis, Wilton *et al*, (1988) explains customer satisfaction as the response of the consumer to the perceived difference between their expectation and their actual performance received post-consumption of the service.

Customer satisfaction can be viewed from two facets i.e it can be seen as an outcome and a process. It is an emotional outcome that emerges after a product consumption. It is also an evaluation process of satisfaction that the customer undertakes to check if the experience matches their expectation (Yi 1990; Westbrook and Reilly, 1983). Rust *et al*. (1995) suggests that a strong indicator of customer satisfaction is the expectancy disconfirmation that arises due to the inconsistency between the perceived and the expected quality. Therefore, customer satisfaction is the degree to which the product or the service matches the customer's expectations or needs.

Meyer and Schwager (2007) expresses that the combination of customer experiences leads to their satisfaction. The author also mentions that the ultimate decision-making power lies with the customers. Hence, this forces the firms to

focus on customer preferences, habits and other factors that match their expectation.

To verify if the firm's services meet the expectations of its consumers there should be a measuring scale or tool that can evaluate customer satisfaction. At the early stages, satisfaction was measured by the confirmation and disconfirmation model which compared initial expectation and perception with actual performance (Anderson and Sullivan, 1993). Many indices have been developed by researches examining the national economies like German Customer Satisfaction Barometer (GCSB), European Customer Satisfaction Index (ECSI), Swedish Customer Satisfaction Barometer (SCSB) and American Customer Satisfaction Index (ACSI).

Fornel *et al.* (1996) introduced a model called "American Customer Satisfaction Index (ACSI)" that constitutes a system for measurement, analysis and enhancement of service or product performance delivered by the firm. This index is a medium through which satisfaction is evaluated between reality and the expectation (Fornel and Lehman, 1994). This model follows the survey structure that is being adapted from SCSB which is a correlative model that establishes a link between the customer's quality perceptions with their satisfaction (Fornel 1992). ACSI comprises three determinants: expectation, value and quality upon which three questions are framed to measure the satisfaction levels.

Q1. Overall satisfaction score

Q2. Degree to which product or service meets the expectation

Q3. Degree to which the product or service is close to the ideal one of the customer

This model has been predominantly used and validated across several firms belonging to major economic business sectors (Fornell *et al.,* 1996). ACSI is practiced to measure the customer's overall satisfaction with service delivery as the responses to the three questions examine the same construct 'overall satisfaction'. Thus, the current study uses ACSI model to evaluate passenger satisfaction which is driven by SST service quality in the airport industry.

2.4.1 CUSTOMER SATISFACTION IN AIRPORT ENVIRONMENT

The airport is a long-served notable illustration that distinguishes satisfiers and dissatisfiers (Pizam and Ellis, 2016). Wattanacharoensil *et al*. (2017) and Sakano (2016) suggests that passenger satisfaction within the airport context is associated with the service quality perceptions, demographic characteristics and process performance functions like security screening. This is consistent with the observations by like Correia *et al.,* (2008) suggesting many factors influence satisfaction in the airport context namely information, convenience, hassle-free security and safety procedures, amenities in flights and airport terminals. With intensive competition and increased attention towards service quality, there is an attempt to incorporate services in favour of the traveller's convenience (Dennett *et al*., 2000). One such service is the Self-service technology (SST).

Several factors indicate the levels of satisfaction with the SST. Research by Agus (2018) and Shahid *et al,* (2017) mentions that there is a positive relationship between SST service quality being measured by SSTQUAL framework and customer satisfaction in the airport setting. Apart from these SSTQUAL dimensions waiting time and staff assistance have also present in the literature to show their association with satisfaction.

Taylor (1994) defines waiting time as '*the period that transpires between the willingness of a customer to acquire a service and their final reception of that service*.' Waiting time is a crucial aspect to air-travellers as they consider it as a period of *'loss of control'* (Wittmer, 2011). According to Weijters *et al.* (2007) and Wittmer (2011), the effectiveness of SST in lowering waiting time results in higher levels of satisfaction. Taylor (1994) expresses that the long duration of waiting lines is related to poor services and lower satisfaction. This demonstrates that waiting time important attribute of SST service quality and is a strong predictor of satisfaction.

Any technological service is prone to malfunctions. This may lead to the creation of a negative image of SST in the minds, resulting in dissatisfaction in the entire service process of SST (Grewal and Levy, 2009). Meuter *et al*. (2000) points out

that malfunctioning of SST and system errors leads to dissatisfaction with the technology.

The research by Dixon *et al*, (2001) mentions that assistance provided on malfunctioning of SST would lead to satisfaction. The employment of personal assistance by service firms like airports and banks aids in influencing the initial adoption of SST and also govern their intention to use in the future (Zhao *et al.*, 2008). While Mattila *et al*. (2011), argues that the provision of staff assistance on SST failures is less effective than on occurrences of human failures. Hence, it becomes necessary to test the relation between assistance and satisfaction and contribute to the growing literature.

Therefore, it can be concluded that the study of passenger satisfaction in the airport setting establishes a rationale to identify and monitor the specific factors that drive satisfaction with respect to SST service quality.

CHAPTER 3: METHODOLOGY

3.1 INTRODUCTION

This chapter will discuss the research methods and approaches chosen and justification as to why it suits the current study. It begins with an overview of research philosophy and research framework, followed by an outline of the hypotheses for the study and a summary about research approaches and research strategies. There follows a discussion about the means of data collection and its analytical methods for examining the research question. The next section will focus on sampling techniques, the inclusion/exclusion criteria considered for the choice of samples and the research instrument. Further, a review of the questionnaire design and the pilot study is given. Finally, ethical considerations and limitations of the research are discussed.

3.2 RESEARCH PHILOSOPHY

Research philosophy is an essential part of any study to answer the research question. Saunders, Lewis and Thornhill (2009) relates research philosophy as the nature and development of the knowledge. The understanding of the nature of reality and the assumptions will help to mould the research questions and choose the best-suited methods for the study. There is no single best philosophy when it comes to addressing the research, there may exist more than one way to answer the research question (Saunders *et al.*, 2009).

Saunders *et al*. (2009) explains three main styles of thinking: epistemology, ontology and axiology. Epistemology reflects the theory and knowledge in a specific field of concern. While ontology refers to the realistic nature of the study, it aims to investigate relations. It revolves around various entities and classifications within the reality.

The current study is about the impact of Self Service Technology (SST) on passenger satisfaction for which ontological philosophy of research is most suited.

The subdivisions of ontology are positivism (objectivism) and interpretivism (subjectivism).

Positivism reflects the factual knowledge obtained from measurement or observations thereby following quantitative analysis (Saunders *et al*., 2009). According to Goodwin (2010), positivists claim about the existence of a single objective and an external reality which are based on observations made out of absolute certainty. Interpretivism, also referred to as constructivism, indicates the access to reality with the help of social constructions (Myers, 2019).

The current study focuses on impact of SST on passenger satisfaction and positivism approach is chosen for various reasons. Firstly, this study obtains the relation between SST and passenger satisfaction numerically and the outcome is analysed through statistical methods. Positivism deals with the objective examination of relations between different variables through figures and statistics (Quinlan, 2011). This characteristic of positivism supports the study specifications. Secondly, this research aims to capture the responses from the participants in an unbiased form by keeping minimal interaction with the participants. Positivism philosophy helps this research to be bias-free as the role of the researcher is bounded only to data collection and its interpretation (Quinlan, 2011). Thirdly, this study revolves around objectivity through structured questionnaires and with no predominant focus on personal opinions, which is one of the characteristics of positivism.

Conversely, interpretivism focuses on subjective meanings and gives high scope for reality constructed through individual perceptions (Saunders *et al*., 2009). This does not match with the objectives of the current study. Furthermore, Quinlan (2011) notes that interpretivism does not support scientific and statistical methods and is inclined towards qualitative analysis which again is not suited for the current research for objectively testing the impact of SST on passenger satisfaction. Lastly, research through interpretivism collects data from which ideas are developed. This does not help this research as it aims to test the hypothesis formed and not deduce theories.

Thus, after understanding the characteristics of different research philosophies, the best-suited choice is ontological thinking under which positivism philosophy is adopted to address this research.

3.3 RESEARCH FRAMEWORK

'Research Onion' framework proposed by Saunders *et al.* (2009) will be utilized for this study since it ensures reliability, validity and credibility to our research design and will cover all aspects of our research methodology. This model has several layers that correspond to different stages of research work. At each layer, the researcher must make a logical decision to ensure the research is credible. The inner layers refer to data collection methods that help to answer the research question. It includes elements like methodology for the study, time frame over which the study is conducted, and the strategies used for analysis for further discussion of the study. The outer layers focus on research philosophy and approach for defining and directing the style of research conduction. Thus, the outer layer parameters must be chosen before any further analysis as it guides the initial research motivation to answer the research question to its maximum potential (Saunders *et al*., 2009).

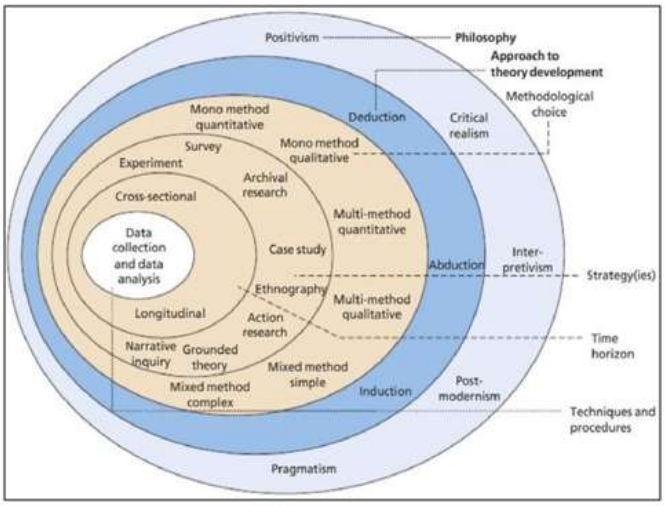

Figure 2: Research Onion

3.4 HYPOTHESIS

Reviewing the research framework, hypotheses are developed for the study of the research topic. The current research is about the impact of SST on passenger satisfaction. The hypotheses are as below:

HYPOTHESIS	NULL HYPOTHESIS	ALTERNATE HYPOTHESIS
H1.1	Higher levels of SST functionality trait is not associated with higher levels of passenger satisfaction.	Higher levels of SST functionality trait is associated with higher levels of passenger satisfaction.
H1.2	Higher levels of SST enjoyment trait is not associated with higher levels of passenger satisfaction.	Higher levels of SST enjoyment trait is associated with higher levels of passenger satisfaction.
H1.3	Higher levels of SST security trait is not associated with higher levels of passenger satisfaction.	Higher levels of SST security trait is associated with higher levels of passenger satisfaction.
H1.4	Higher levels of SST assurance trait is not associated with higher levels of passenger satisfaction.	Higher levels of SST assurance trait is associated with higher levels of passenger satisfaction.
H1.5	Higher levels of SST design trait is not associated with higher levels of passenger satisfaction	Higher levels of SST design trait is associated with higher levels of passenger satisfaction
H1.6	Higher levels of SST convenience trait is not associated with higher levels of passenger satisfaction.	Higher levels of SST convenience trait is associated with higher levels of passenger satisfaction.
H1.7	Higher levels of SST customisation trait is not associated with higher levels of passenger satisfaction.	Higher levels of SST customisation trait is associated with higher levels of passenger satisfaction.
H.2	Shorter waiting time while using SST is not associated with higher levels of passenger satisfaction.	Shorter waiting time while using SST is associated with higher levels of passenger satisfaction.
H.3	Prompt airport staff assistance offered while using SST is not associated with higher levels of passenger satisfaction.	Prompt airport staff assistance offered while using SST is associated with higher levels of passenger satisfaction.
H.4	The SST is not a value addition to the airport for passenger traffic management relating it to higher levels of passenger satisfaction.	The SST is a value addition to the airport for passenger traffic management relating it to higher levels of passenger satisfaction.
H.5	High levels of the safety factor of SST is not associated with higher levels of passenger satisfaction in the air-travel post- COVID-19.	High levels of the safety factor of SST is associated with higher levels of passenger satisfaction in the air-travel post- COVID-19.
H.6	High levels of SSTQUAL dimensions is not associated with future use of SST	High levels of SSTQUAL dimensions is associated with future use of SST

Table 1: List of Hypotheses in this study

The SST traits considered in the hypothesis H1.1 to H1.7 (Table 1) are described below:

Functionality relates to the measure of ease of use, quick responsiveness and reliability.

The enjoyment dimension deals with the customers' perception of the outcome and delivery of the SST.

Security/ Privacy dimension relates to the trust the customer shows while using the SST service. It focuses on parameters like private information protection and safe transactions.

The assurance dimension indicates the customer's confidence in the SST which is influenced by the service providers' reputation and competence.

The design dimension relates to the customers' perception of the aesthetic parameter of the SST.

Convenience dimension refers to the accessibility of the SST at a given time and also ease of reaching it (location).

Customization relates to the magnitude to which the SST meets the specific needs and preferences of an individual.

3.5 RESEARCH APPROACH

The brief discussion of research philosophy and framework leads to the approach for the research. Saunders *et al.* (2009) explains the two research approaches for the study of any subject, inductive study and deductive study.

This research implements deductive style of approach for the following reasons. Lin and Hsieh (2011) explains that the service quality of Self-Service Technology (SST) is multidimensional. The SSTQUAL model proposed by the authors is adopted in this research to measure the service quality of SST. From the literature, it is evident that this model has been extensively implemented in banking and retail industries (Radomir and Nistor, 2012; Orel and Kara, 2014). The results from these

researches show proof that there is a correlation between SST service quality and customer satisfaction. Based on the available theories, hypotheses are formed to test this relation in an airport environment. Then using quantitative methods various tests are conducted to accept or reject the hypothesis. This is consistent with deductive approach which the starts with the existing theory, forms hypothesis, collects data and analysis it and revises the existing theory (Bryman and Bell, 2006).

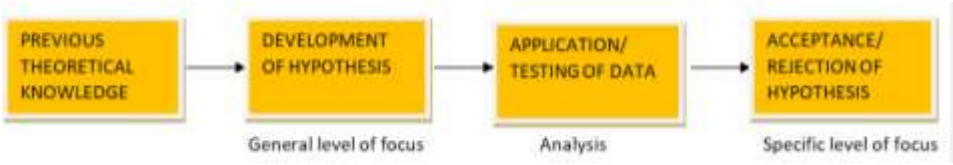

Figure 3: Deductive Study

Conversely inductive approach begins with collecting data and a theoretical structure is proposed based on analysis carried on collected data. The induction process is a judgment-based prediction where conclusions are made upon searching patterns from the data. This is not used since the aim of this research is not to form a new theory. Moreover, it is inclined towards subjective form through qualitative approach which is not suited for this study given it focuses on objective examination of relation between variables quantitatively.

Understanding objectives of the research, the best suited option for testing the relation between SST and satisfaction is deductive research approach.

3.6 RESEARCH STRATEGY AND DESIGN

Before deciding on the techniques and instrument for the research, it is essential to understand the two types of research methodology and choose the most suitable one for the study. The two types of study are quantitative and qualitative.

The current research aims to examine the relationship between SST and passenger satisfaction numerically and uses various statistical methods to test the formed

hypothesis. Quantitative approach is conducted through data collection and its verification through numerical results. It also examines the relation between given variables and outcomes (Neuman, 2006). It is mainly used to test the existing hypothesis and the research question (Zikmund, 2002).These characteristics of quantitative approach support the current research requirements. The conduction of this study is concentrated across 7 Indian Metropolitan cities, which indicates a large target population. This means that large sample size is required for the analysis. This specification is supported by quantitative design (Quinlan, 2011).

There are time and cost boundaries in conducting the research. One of the major advantages of quantitative research design is that the responses are tabulated, and numerical inferences are calculated within a short time frame with the help of software like SPSS or MS EXCEL. The testing of the relation between SST and passenger satisfaction in this study requires a bias-free method. Quantitative design exhibits researcher independence where the researcher is an uninvolved observer (Zikmund, 2002).

The current study does not employ qualitative design as firstly it does not support numerical measures and does not fulfil the requirement of reaching large sample size as it is set in an open or natural environment to capture the behavioural intentions of the participants (Neuman, 2006; Zikmund, 2002). Secondly, this approach is time-consuming as data is collected face-to-face either through interviews or surveys and thus does not help to complete this research in the given time. Thirdly, the objective of the study is to investigate the research question and test the hypothesis. But qualitative design focuses on deriving new hypotheses based on social correlations (Neuman, 2006). Lastly, this method involves close engagement of researcher and participants due to which there may arise bias in the responses, which may affect the accuracy in the results. Thereby, qualitative design is not chosen for this study.

Observing the characteristics of the two approaches and the objectives of the study, quantitative approach is the suited research design. Furthermore, since the current study employs positivism philosophy and deductive reasoning, the ideal choice would be quantitative research method (Ryan, 2018).

Saunders *et al*. (2009) branch research design into three types, Explorative, Descriptive and Explanatory. The author interprets descriptive approach as a design to create precise depiction of individuals, incidents and situations. Descriptive research is used to measure and quantify the relationship with different variables. The current research topic tests the relation between SST service quality dimensions and passenger satisfaction numerically. There is a view of the research question to be answered and there exists evidence from literature in the concerned field of study. Therefore, the most suited and often adopted design is a descriptive approach.

3.7 POPULATION AND SAMPLING

The next step is to determine the population and target the samples. The observations obtained from the sample are used to infer the behaviour or characteristics of the population. Quinlan (2011) defines population as a set of all individuals or items that are relevant for the research. The target population for this study are travellers over 18 years of age with any educational background and who have travelled through any of the seven Indian Metropolitan City Airports in the last 1.5 years. Accounting to the large population size, sampling technique is used which forms a representative group of the population. Quinlan (2011) explains that the inclusion and exclusion criteria are vital while considering the sample.

For this study, the inclusion criteria are as follows:

1. The respondents should have travelled through any of the following Indian Metropolitan City Airports (Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata and Mumbai)
2. The travel should have taken place in the last 1.5 years (2018-2020)
3. Respondents should have used the self-service technology (SST) service

The respondents who fulfil all three criteria are eligible to answer the complete survey. Nevertheless, even if the respondents only fulfil the first two conditions, they are still eligible to answer the questions relating to the passenger satisfaction, the use of SST in airports in COVID-19 times and few open-ended questions to

capture the reason for their choices. The detailed structure of the survey design is explained in the following section.

The reason for choosing the sample airports is due to the annual passenger traffic figures. The study covers seven Indian Metropolitan City Airports whose annual passenger traffic is well over ten million (statistica.com[1]). Also, since these cities are a part of the top seven developed Indian Metropolitan cities, they make a good basis for this study (Springer, 2019; CNBC, 2019). The justification for keeping the travel timeframe as 1.5 years is due to the advancements and the changing technological services in the airport. This period ensures that the present study captures the recent travel experience of the passengers. Another reason for this time frame is the sudden outbreak of pandemic COVID-19, which has restricted the travel in most months of early 2020. Fixing one year as the travel time will limit the reach of the sample; therefore, by 1.5 years the research targets a wider sample size.

Two categories of sampling techniques available are: probabilistic and non-probabilistic (Saunders *et al.*, 2009). Probabilistic sampling refers to a type of sampling technique where each individual or item has equal probability for getting selected for the study. While in non-probabilistic sampling not all individuals of the population get selected to participate in the study

Considering the current research, non-probabilistic sampling will be adopted since accessing the entire travel population over 18 years of age who have travelled in each of the seven cities in the sample period of 1.5 years, is not cost and time feasible.

Sample size identification is vital after choosing the sampling technique. Saunders *et al*. (2009) emphasizes the importance of confidence level and margin of error to guide the number of responses required for this study. Margin of error refers to the percentage of error that the research can tolerate in the results. It is the level of precision that the researcher intends to accept (Gill and Johnson, 2002). Saunders *et al*. (2009) explains confidence interval as the amount of uncertainty the research

[1] https://www.statista.com/statistics/589115/indian-airports-passenger-traffic

can tolerate. It is the degree to which the characteristics of the population are estimated accurately through the survey.

With the help of an online sample calculator (qualtrics.com[2]), a study sample size was identified. The table below shows the sample size required for an approximate population of 60 million, margin of error from 1% to 10 % and confidence interval of 95%.

POPULATION - 60,000,000	
CONFIDENCE LEVEL – 95%	
MARGIN OF ERROR	SAMPLE SIZE
1%	9602
2%	2401
3%	1067
4%	601
5%	385
6%	267
7%	196
8%	151
9%	119
10%	97

Table 2: Sample Size Calculations

The population size has been chosen as 60 million since out of the seven cities the highest number of passengers handled in the sample period is 63.7 million (staistica.com[1]).

Suppose the researcher observes 60% of respondents agree that service quality of SST was satisfactory. Considering a confidence level of 95% and margin of error to be 6%, then the percentage of respondents who agree to SST service to be satisfying will vary between 54% to 66% (60% ± 6%) in 95 out of 100 surveys conducted. These figures mean that if the survey was to be carried out 100 times the data collected would be within a certain margin of error above or below the data gathered in 95 out of 100 surveys (Taherdoost, 2017).

[2] Online Sample Size calculator https://www.qualtrics.com/blog/calculating-sample-size/

Saunders *et al.* (2009) explains that sample size and margin of error are inversely proportional. This reflects that for attaining smaller margin of error the researcher will require large sample size (Bryman and Bell, 2003). Considering the current research since there is both time and cost constraints due to which targeting a larger sample size would be difficult. Also, Bryman and Bell (2003) states that large sample size cannot guarantee precision. Therefore, a trade-off is made, and a 6 % margin of error was concurred to be satisfactory leading to a sample size of 267 which can be achieved by the researcher in the given time.

Saunders *et al.* (2009) classify non-probability sampling technique into four types namely quota, purposive, convenient and snowball. In quota sampling, the population is divided into different groups (age, gender) based on pre-decided traits so that the samples will have identical characteristic distribution like the larger population (Davis, 2005). The current research does not divide the population into homogeneous strata since it would affect the relationship between the variables in the study and impact the statistical inferences (Taherdoost, 2017). Hence quota sampling technique does not fit this study.

In purposive sampling, the researcher uses his/her judgment to select samples that would help to answer the research question to its maximum potential (Saunders *et al*., 2009). In this technique, specific event or individuals are purposefully chosen so that valuable information is obtained which cannot be gatherer through other methods (Maxwell, 1996)

This study mainly focuses on quantitative approach where the data collected is numerically analyzed, purposive sampling does not support quantitative approach and is more suited for qualitative research design (Taherdoost, 2017). The primary characteristic of purposive sampling is to choose the samples based on the personal opinion of the researcher which may lead to bias in the data interpretation which is against the requirement of this study (Sharma, 2017) Although purposive sampling is less time consuming and cost-effective (Malhotra *et al*., 2006), it lacks to support the major requirements of the current study. Thus, it is not the best-suited choice for the conduction of the study.

Convenience sampling is used when it is easy to access and convenient to engage with the participants. Here the researcher chooses the samples who show willingness to participate and are in proximity (Dörnyei, 2007). For the pilot test, participants with easy accessibility and who show willingness to participate are preferred. This specification is fulfilled by convenient sampling. The conduction of pilot study aims to gather initial feedback regarding the survey which needs to be conducted in a short period and at a low cost. Convenience sampling exhibits the advantage of quick data collection from the samples in an inexpensive way (Malhotra *et al*., 2006). Through this technique, there are chances of bias to exist. Since the initial source of samples is from the researcher's network, this leads to under-representation of population and inferences can be made only about the chosen samples. Despite this drawback, convenient sampling is the most suited choice for pilot study.

The conduction of the actual study requires a large sample size to draw statistical inferences about the relation between SST and passenger satisfaction. To achieve this specification, snowball sampling is employed which uses "chain referral" technique by which the sample size is increased. In snowball sampling technique, the researcher identifies a group of participants who meets the inclusion criteria for the study and then asks them to recommend other participants who qualify for the study which continues to form a chain (Quinlan, 2011). It is especially useful when the population is inaccessible (Saunders *et al*., 2009). The ability to reach wider audiences within a short time and in an inexpensive way is an advantage of this technique (Johnson, 2014) which serves beneficial for the current research as it needs to be completed within a specific period at less cost. Although this method shows some bias as the referrals may identify other participants who have specific characteristics like them (Valerio *et al*., 2016), yet this method is the preferred choice as the current study requires to collect responses in larger numbers in a short time.

3.8 DATA COLLECTION

The following section outlines the data collection methods.

This current study collects data through a survey strategy which consists of multiple-choice questions (MCQ) and satisfaction level type questions (Likert scale). A survey is a set of structured statements or questions distributed among the samples to measure their perceptions and experiences (Goodwin, 2010). The research aims to test the research question "impact of SST on passenger satisfaction across different Indian Metropolitan city Airports", the population size is large. Therefore, to capture the opinion of this large population, larger sample size is required, hence the survey method supports this requirement (Quinlan, 2011). Another prime reason for this choice is due to the availability of validated research instruments, tested framework and scales relevant to this study area. Also, this method is not costly helping the researcher to complete the current study in a cost-effective manner (Nardi, 2015). The researcher needs to view all the results and do the analysis at a neutral viewpoint to obtain a bias-free outcome. But survey exhibits biasing to a small extent. Thus, the researcher has taken precautionary measures to overcome this issue. The questions are kept short and clear but convey the intended message to ensure that the respondents are not misled. Most of the questions are not dichotomous rather they employ Likert scale (5-point scale) to ensure more accurate and effective answers.

Since, interviews either conducted through telephone or face-to-face are time-consuming and costly compared to surveys, thereby not helping the researcher to complete the study in the given short time frame (Nardi, 2015). However, the presence of an interviewer could be advantageous than a survey as he/she can ask questions at different levels to get the most information from the participant. This would be useful as it would give an in-depth meaning about the impact of SST on passenger satisfaction. Nevertheless, the same interviewer can introduce bias and could also misinterpret the respondent's answer and thus, may not fully support the current study to be completely accurate (Baily, 2008).

Another advantage of interview is that it has lower non-response bias in comparison to a questionnaire. Non-response bias is a type of bias in which the

participants are unable or unwilling to complete one or more questions or the entire survey (Lavrakas, 2008). This would cause errors in estimating population attributes. However, the researcher has taken steps to mitigate non-response bias to the fullest. Firstly, the design of the questionnaire is kept short and accessible to all participants. Secondly, remainders were sent to the respondents to ensure response rate is high. Thirdly, the survey follows a logical flow which helps it to be easily answered and avoid drop-outs. Lastly, respondents were made aware of the privacy and confidentiality of their responses.

Saunders *et al*. (2009) classifies questionnaires into two categories, one being self-administered and the other is interviewer-administered. The author describes self-administered questionnaires to be completed by the respondents without any intervention by the researcher. On the other hand, interviewer-administered are completed in accompany of the interviewer (Saunders *et al*. 2009).This research employs a self-administered questionnaire as it offers many advantages. Firstly, the participants have the flexibility to complete the survey as per their convenience and there is no interviewer to introduce any bias. This helps the current study to be bias-free. Secondly, in this manner the respondents do not face any time pressure and their responses will have high-quality content which is valuable for the further analysis of the study (Vehovar and Manfreda, 2008).

Saunders *et al*. (2009) states that the interviewer-administered questionnaire has certain drawbacks like access to a limited sample size. The current research topic requires to capture responses from a wider audience regarding the impact of SST on the passenger satisfaction for which the survey must reach the potential respondents. However, through interviewer-administered questionnaires reaching the potential samples in a short time frame will be not cost feasible. Thereby, not making it the suited choice for this study.

Understanding the objective of the current research and the characteristics of the two questionnaire categories, the best-suited choice is self-administered questionnaire. The self-administered questionnaire is employed through online survey. The advantage of using online survey method is that it utilizes the internet service to access respondents who would be difficult to reach face-to-face (Wellman, 1997). Thus, through this mechanism, the researcher can capture the

responses of the participants who exhibit specific interests and beliefs regarding the subject of the research. Another advantage is that the researcher can gain access to large number of samples. This is done by posting participation invitations in social media platforms like Facebook, Instagram, WhatsApp and professional platforms like LinkedIn. However, Mayr and Weller (2016) argues that though social media platform is an effective way to reach large samples, yet it has its limitations like they may not be an honest representation of the population since there could be a biased population based on gender or age. Conversely, in a personally distributed survey (traditional method), it is difficult to reach to large number of samples since the researcher needs to physically distribute the survey.

Considering the current research, the researcher would need access to the air-travel population who have travelled through the seven sample airports. Also, the researcher needs large sample size. To support this requirement, online distributed survey would be best suited. Cost saving is another benefit of online survey as electronic medium replaces the paper format. The traditional survey tends to be expensive even while reaching to a small sample. Also, transcription costs are avoided since online responses are recorded automatically (Couper, 2000; Watt, 1999; Wright, 2005).

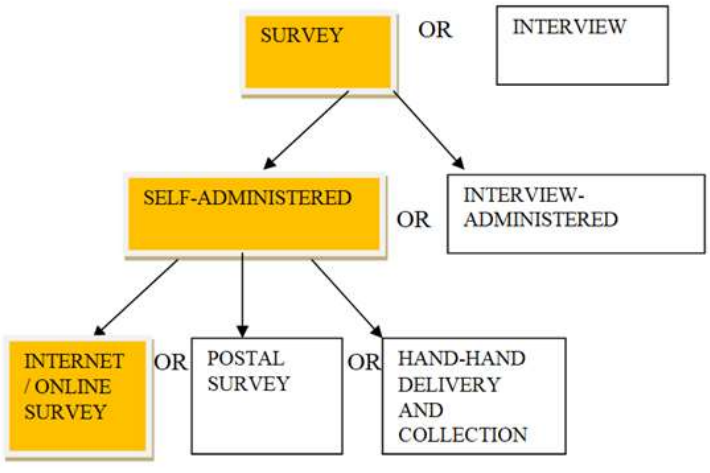

Figure 4: Data Collection Method

Consolidating the research characteristics of this study and given that the study uses convenience and snowball sampling, online distributed survey is the best-suited option. It is essential to use a time-tested platform and a standard framework. Thus, Google Forms are being employed as the survey platform for this study. It is both time-tested and compatible in devices like mobile, tablets and laptop, thus minimising non-response bias.

The public- link was distributed on the 10th of June 2020 via the entire above mentioned medium and, 300 number of responses were recorded on the closing day 28th of June 2020.

3.9 QUESTIONNAIRE DESIGN

The research instrument chosen for this study is questionnaires. The current study employs a structured questionnaire with a mixture of both open-ended and close-ended questions.

- The initial few questions are dedicated to the inclusion criteria which are mentioned in the previous section.
- Socio-demographics factors: these sets of questions that capture information on gender, age, nationality and education level of the participants.
- Service Quality of SST: A series of questions that aim to capture the service quality of SST through 20 items measuring 7 dimensions namely functionality, enjoyment, security, assurance, design, convenience and customisation.
- Questions regarding the waiting time while using employee-managed desks and also reasons for choosing or not choosing SST.
- Passenger Satisfaction: a set of 3 questions addressing the overall satisfaction regarding the use of SST.
- Additional open-ended questions regarding suggestions and improvements.

- A section dedicated to capture the passenger preferences on using SST considering the air-travel post-COVID-19.

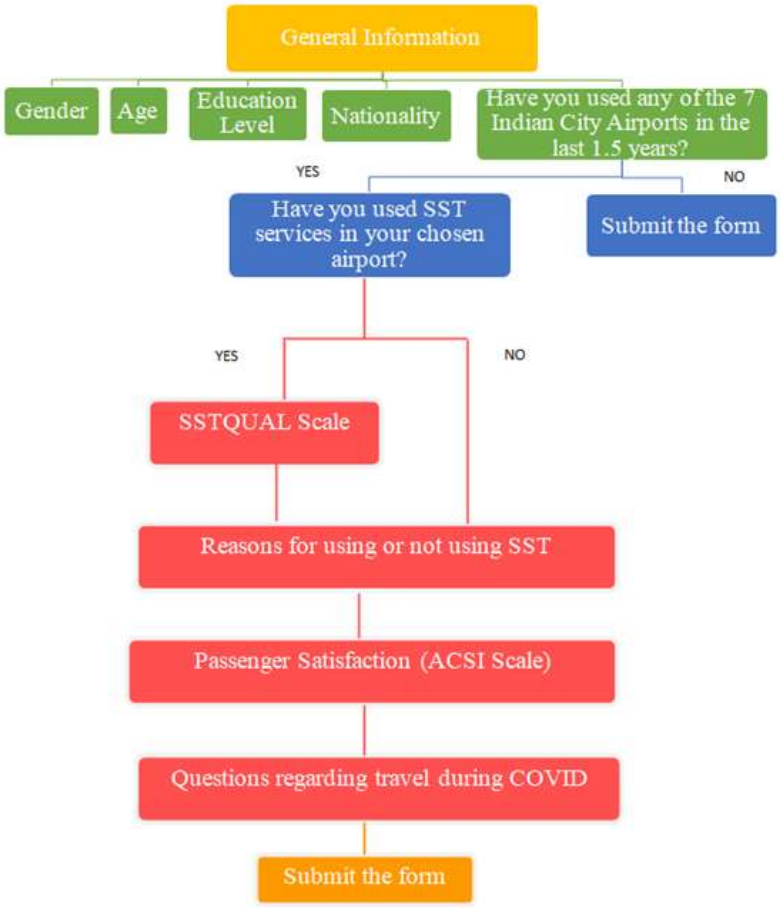

Figure 5: Flow of Questionnaire

The questionnaire was designed to have few open-ended questions to obtain a detailed answer and to capture the foremost thought in the respondent's mind (Saunders *et al.,* 2009). It also provides additional support for the numerical results obtained from the quantitative analysis. The meanings extracted from the responses will guide in deepening the discussion and also analyse the research question.

The below mentioned are the open-ended questions included in the questionnaire.

- Reason for choosing SST / Reason for not choosing SST
  This question aims to capture the reasoning as to why the respondents are either comfortable or not comfortable in using the SST service. It also helps

the researcher to analyse the difficulties that a passenger might face while using SST service which has resulted in lower satisfaction scores.

- Improvements/ Suggestions

  Through this question, the researcher attempts to focus on the factors of SST that would require improvements which in the future would result in higher levels of satisfaction among the passengers.

- Introduction of SST in other sections of the airport

  This question was designed to explore the participants' ideas of viewing SST in different sections of the airport. This can also be seen as a positive impact on the respondents as they want SST to be incorporated in other sections as they find it beneficial during their air-travel.

- SST is a safer option considering the COVID-19 situation moving in future

  Accounting to the situation of COVID-19, airports have now started to integrate SST for maintaining contact-less procedure. Through this question, the researcher will acquire the reasoning as to why or why not the respondents would find the use of SST as a safer option considering the case of COVID-19.

The following questions were developed by the researcher to acquire the respondents' perspective on the time spent on getting their services completed in the airport. The construct 'processing time' is measured through these questions.

- My waiting time has shortened while using the SST than using the employee managed check-in desk
- Waiting time to access SST service (amount of time passengers wait in queue to use the kiosks)
- Approximate waiting time while using the employee managed check-in desks

It is also observed in literature that, longer "processing time" is a factor that can cause dissatisfaction (Wittmer, 2011). So, the researcher aims to test this construct for passenger satisfaction.

The below question was developed to examine if prompt assistance by the staff while using SST is a factor influencing passenger satisfaction.

- Prompt assistance is provided by Airport support staff while using SST (in case of any difficulty faced by the passenger

The below question was designed to capture if the SST is an asset to the airport services for managing passenger traffic and relating this belief with passenger satisfaction.

- SST is a value addition to the airport (overall it helps to manage the passenger traffic effectively and enhances the standard of the airport).

The responses to the close-ended questions in this research are measured via a 5-point Likert scale. The frequently used scale for such questions is the Likert scale with different point rating scales (4-point, 5-point, 6-point, 7-point). Likert scales are generally used in questionnaires as they are psychometric scales which that quantify individual's perception or behaviour (Boslaugh, 2008). The scoring structure is based on aggregating the sum of scores for each question to calculate domain scores. Here domain refers to each of seven dimensions of SSTQUAL model. Each dimension will have a range of values that depends on the number of questions it encompasses.

For example, functionality dimension has five questions. Each of them has 5 potential responses (1-5) since a 5 point Likert scale is used. So the range would be 5-25. Similarly, for other domains, the range is indicated in the table below.

DIMENSION	NUMBER OF QUESTIONS	RANGE OF VALUES
FUNCTIONALITY	5	5 TO 25
ENJOYMENT	4	4 TO 20
SECURITY/PRIVACY	2	2 TO 10
ASSURANCE	2	2 TO 10
DESIGN	2	2 TO 10
CONVENIENCE	2	2 TO 10
CUSTOMIZATION	3	3 TO 15

Table 3: Scoring Structure

Individual dimension scores when aggregated will lead to a single SSTQUAL score. Table 3 illustrates the questionnaire items and the response scale.

LABEL	VALUES	MEASURE
Do you agree to take part in this study?	• "I am happy to take part in this study" • "I don't want to take part in this study"	Nominal
Gender	• "Male" • "Female"	Nominal
Age Bracket	• 15-18 years • 19-29 years • 30-39 years • 40-49 years • 50-59 years • 60+years	Ordinal
Highest level of education attained	• Higher Secondary Certificate • Diploma • Graduate • Postgraduate	Nominal
Nationality	Descriptive	Open-ended Question
Have you travelled through any of the following city airports in the last 1.5 years (2018-2020)? (please choose the most recent airport)	• Ahmadabad • Bangalore • Chennai • Delhi • Hyderabad • Kolkata • Mumbai • None of the above	Nominal
Have you used any SST in your chosen airport (self check –in kiosks which enables boarding pass printing/ self baggage drop which enables boarding pass and baggage tag printing)	• Yes • No	Nominal

SSTQUAL • I can get my service done with the SST in a short time • The service process of the SST is clear • Using the SST requires little effort • I can get my service done smoothly with the SSTs • Each service item/function of the SST is error free • The operation of the SST is interesting • I feel good being able to use the SSTs • The SST has interesting additional functions • The SST provides me with all relevant information • I feel safe in my transactions with the SST • A clear privacy policy is stated when I use the SST • The providing the SST is well-known • The providing the SST has a good reputation • The layout of the SST is aesthetically appealing	1.Strongly Disagree 2.Disagree 3.Neutral 4.Agree 5.Strongly Agree	Ordinal (5 POINT LIKERT SCALE)

• **The SST appears to use up-to-date technology** • **The SST has operating hours convenient to customers** • **It is easy and convenient to reach the SST** • **The SST understands my specific needs** • **The SST has my best interests at heart** • **The SST has features that are personalized for me**	**1.Strongly Disagree** **2.Disagree** **3.Neutral** **4.Agree** **5.Strongly Agree**	**Ordinal (5 POINT LIKERT SCALE)**

My waiting time has shortened while using the SST than using the employee managed check-in desk	1.Strongly Disagree 2.Disagree 3.Neutral 4.Agree 5.Strongly Agree	Ordinal (5POINT LIKERT SCALE)
Prompt assistance is provided by Airport staff while using the SST(in case of any difficulty faced by the passenger)	1.Strongly Disagree 2.Disagree 3.Neutral 4.Agree 5.Strongly Agree	Ordinal (5POINT LIKERT SCALE)
Waiting time to access SST service (amount of time passengers wait in queue to use the kiosks)	• <15 minutes • 15-30 minutes	Nominal
Approximate waiting time while using employee managed check-in desks	• <15 minutes • 15-30 minutes • >30 minutes	Nominal
Kindly state the reason for using the SST	Descriptive	Open-end question
Kindly state the reason for not using the SST	Descriptive	Open-end question

<u>Passenger satisfaction ACSI</u> • The SST matched your expectation levels • Overall, you are satisfied with the experience of SST • The service is close to your ideal one.(comparedto your previous experiences)	1.Strongly Disagree 2.Disagree 3.Neutral 4.Agree 5.Strongly Agree	Ordinal (5 POINT LIKERT SCALE)

SST is a value addition to the airport(overall it helps to manage the passenger traffic effectively and enhances the standard of the airport)	1.Strongly Disagree 2.Disagree 3.Neutral 4.Agree 5.Strongly Agree	Ordinal (5 POINT LIKERT SCALE)
Would you prefer to use the SST in future and also recommend to others	• Yes • No	Nominal
If there was a SST introduced for immigration purpose (e.g. passport scanning) would you prefer to use it?	• Yes • No • Maybe	Nominal
Would you like SST to be introduced in any other sections of the airport, if YES kindly mention	Descriptive	Open-end question
Any areas for improvement/ suggestions regarding SST services and its service quality	Descriptive	Open-end question
Have you travelled through any Indian airport during PRE-LOCKDOWN PERIOD (January, February, March 2020).	• Yes • No	Nominal
Have you travelled in any Indian Airport during POST-LOCKDOWN PERIOD	• Yes • No	Nominal
Have you used any of the SST during this travel (either of the above 2 travels)?	• Yes • No	Nominal
SST is a safer option considering the COVID-19 situation moving in future	1.Strongly Disagree 2.Disagree 3.Neutral 4.Agree 5.Strongly Agree	Ordinal (5 POINT LIKERT SCALE)
Kindly provide reasons for your above answer	Descriptive	Open –end question

Table 4: Questionnaire items and their response scale

3.10 PILOT TEST

The questions in the survey must show high levels of validity so that the responses are accurate, and the purpose of the research is fulfilled. Here validity refers to the degree to which the survey represents the fundamental construct it intends to measure (Saunders *et al*., 2009). The researcher will not be in close contact with the participants, therefore there is a requirement for conducting a pilot study (Saunders *et al*., 2009) as this would check if the respondents correctly interpret the construct it intends to measure, thereby, increasing the validity. It also helps to obtain feedback from the participants and restructure the survey to ensure easy interpretation for them.

For the pilot study, the questionnaires were distributed among five participants using convenient sampling. The frequently obtained feedback was regarding the meaning of certain terms in the following questions of SSTQUAL model.

1. The SST has interesting additional functions
2. The SST provides me with all relevant information
3. The SST appears to use up-to-date technology
4. The SST has my best interests at heart

The participants were unable to understand the meaning of phrases like "additional functions", "relevant information", "up-to-date technology" and "best interests at heart". This leads to a reduction of face validity in these questions. Face validity indicates if the "face" of the item/ construct measures what it is supposed to. If the questions do not convey the underlying meaning of its measure (face value), then participants may not respond accurately which affects the result of the research.

Therefore, to increase the face validity of the questions, a coherent explanation for each question was given within brackets to understand the terms better. The questions were modified as follows:

1. The SST has interesting additional functions (any additional functions available apart from boarding pass/ baggage tag printing)
2. The SST provides me with all relevant information (information regarding baggage restrictions, prohibited items)

3. The SST appears to use up-to-date technology (in comparison to the other SST you have used in other sectors or same sector)
4. The SST has my best interests at heart (the SST is beneficial and favourable to the passengers).

Another valuable suggestion obtained from the pilot test was that the question " Kindly state the reason for using the SST / Kindly state the reason for not using the SST " was not clear. The motive behind this question was to capture the reasons as why they prefer to use or not use the SST. But the participants felt it was two different questions combined into one and weren't sure which part to answer. So, this open-ended question was split into two sub-questions as "Kindly state the reason for using the SST" , " Kindly state the reason for not using the SST " making it more understandable.

Overall, each section was given a brief description to explain what the participants were going to be asked making the answering process easier. Therefore, the feedback received from the pilot test helped to revise and restructure the questionnaire thereby reducing the probability of any error while targeting a large population.

3.11 ETHICAL CONSIDERATION

Saunders *et al.* (2009) suggests that ethical consideration is a vital for any research conduction. The author defines it as a regard placed on the respondents participating in the study and throughout the research process. Further, the researcher must be sincere and respectful to the needs of the participants. The survey does not ask for any personal details like name, date of birth, email-id, etc. Thus, it maintains privacy and ensures the responses are submitted anonymously. The data collection structure in this study ensures that all the gathered data is stored acceptably. The aim of this research and other general information of this study are described before the start of the questionnaire to the participants.

Participation in this study is voluntary. The participants can opt to withdraw from the survey at any given point and their responses will not be recorded. If they are happy to complete this questionnaire, all responses will remain anonymous and

confidential. The data will be stored securely in a password protected file and will be accessed by the thesis guide and the researcher. All aggregated data will be analysed and discussed in the thesis. Individual responses will not be presented. It will be then deleted after the timeframe, which is a part of the NCI guidelines.

Therefore, care has been taken to abide by all the ethical guidelines provided by the National College of Ireland (NCI) and the ethics form has been filled, submitted and approved by the ethics committee of NCI. The research assures there shall be no evident ethical concerns while conducting this research study.

3.12 RESEARCH DESIGN LIMITATIONS

The current research design is mostly focussed on quantitative analysis through structured and close-ended questionnaires which can be seen as a limitation. The questionnaire has a few open-ended questions showcasing qualitative analysis. However, it lacks predominant focus on qualitative approaches like interviews with passengers which would have led to intensive comprehension of their perception of SST driving their satisfaction. Blaikie (2007) suggests that quantitative research approach lacks addressing the social reality and does not capture the interpretation of the actions or beliefs by the people. It was believed that this research would majorly follow quantitative analysis to give statistical support for the hypothesis formed and numerically measure the responses of the participants, rather than the meaning behind their responses. This would enable pattern recognition observed among the samples.

The use of online distributed questionnaires can be seen as another limitation. Though this distribution method aims to minimise the non-response bias however, it is not guaranteed that all the potential respondents will have internet access. Also, online survey would pose a challenge for physically disabled respondents. Therefore, for such participants, an interview would be a better option. There is also a possibility of the included respondents to ignore the survey which may impact the study as valuable and quality information will not be recorded. Since, the questionnaire adopts a validated framework, there is no control over the

number of questions. So, the participants may feel the survey may be lengthy and may opt-out in midway.

The use of non-probabilistic sampling method can be seen as a limitation in terms of statistical significance. The optimal method of data collection is through probability sampling by approaching a sample that is representative of the population. But the time and cost feasibility of the study does not allow to employ probability sampling. Therefore, it can be noted that statistical inferences from non-probabilistic may not representative and generalizable to the entire population (Saunders *et al.*, 2009).

Thus, the research model is chosen based on the researcher's way of conducting the study however, there may be limitations to the research. As discussed by Saunders *et al*. (2009), there is more than one way to address the research question.

3.13 CONCLUSION

The research onion framework suggested by Saunders *et al*. (2009) has guided this study to adopt the suited philosophy, approach and design for the research. Quantitative approach has been employed in the form of questionnaires to gather required information from the selected samples to meet the research specifications. The data collected is in line with the ethical considerations and will be further analysed statistically to measure the relation between SST and passenger satisfaction.

CHAPTER 4: STATISTICAL ANALYSIS

This chapter presents a brief description of all the statistical tests conducted in the study and how the results of each test are interpreted.

4.1 NORMALITY TEST

The objective of the Normality test is to verify if the data collected is evenly distributed across either side of the mean. The null hypothesis is "the data is normally distributed". The level of significance is determined by the p-value of the data. It refers to the probability below which the null hypothesis is rejected ($p \leq 0.05$).

4.2 RELIABILITY TEST

The reliability test aims is to ensure that the questionnaire items consistently show the construct that it is intended to measure. In statistical views, the individual items must yield results that are consistent with the entire survey (Field, 2013). The internal consistency is checked through the value of Cronbach Alpha (α) which is a reliable technique adopted for a multi-item questionnaire (Gliem and Gliem, 2003). An α value greater than 0.7 is an acceptable level of internal consistency.

4.3 MANN-WHITNEY TEST

The Mann-Whitney U test is a non-parametric test to check for correlation between two variables. The assumption for this test is that the dependent variable must be continuous and the independent variable must be categorical and limited to 2 groups. The null hypothesis is that the independent variable does not have any impact on the dependent variable. It can also be stated as there is no difference between the mean ranks of the 2 groups of the independent variable. Mann-Whitney U test aims to test the statistical significance of the difference between

the mean ranks. The hypothesis is accepted or rejected based on the p-value that is if $p \leq 0.05$ then the null hypothesis is rejected.

4.4 KRUSKAL-WALLIS TEST

Kruskal-Wallis H test is a rank-based non-parametric test that aims to determine the statistical significant difference across 2 or more independent groups on a dependant variable which is continuous or ordinal. It is an extension of Mann-Whitney test. The null hypothesis associated here states that the mean ranks of all groups are same. The acceptance or rejection of the null hypothesis is based on the p-value, if $p \leq 0.05$ then the null hypothesis is rejected.

4.5 SPEARMAN TEST

The Spearman Rank order test is used to measure the strength of the correlation and its direction between continuous dependent and independent variables. It determines whether there is a monotonic relationship among the two sets of variables. The correlation coefficient (ρ) is measured on a scale between -1 - 0 - +1, indicating perfectly negative correlation, no correlation and a perfectly positive correlation respectively.

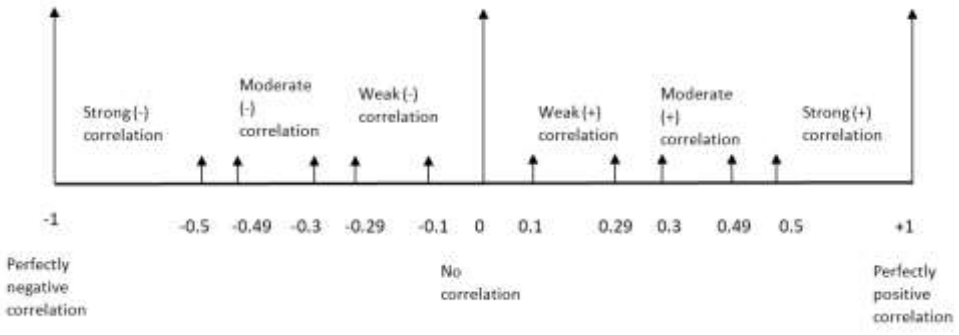

Figure 6: Spearman Correlation Scale

The null hypothesis of this test is that there is no linear relationship between the variables. The interpretation of $p \leq 0.05$, refers to rejection of the null hypothesis as there is less than 5% chance that the observed coefficient occurred by chance having a $p \leq 0.05$ also ensures statistical significance.

4.6 REGRESSION

The main objective of regression analysis is to test the hypothesis and help to estimate the effect of the covariates on the dependent variable. A logistic regression was performed where the dependent variable is recoded from scale to a dichotomous variable. The key assumptions associated with logistic regression are presence of linearity and no multi-collinearity. Linearity refers to the presence of linear relationship between any continuous predictors and the logit of the outcome variable. Multi-collinearity refers to the linear relationship between two or more independent variables of the model. The results obtained from the logistic regression are used to predict the probability of the outcome (Y) with the values of the predictors (X_i, …... X_{ni})

$$P(Y) = \frac{1}{1+e^{-(b_0+b_1X_{1i}+b_2X_{2i} \ \ldots\ldots + b_nX_{ni})}}$$

$b_0 -$ *constant*

$Y -$ *outcome variable*, $P(Y) -$ *probability of outcome variable*

$X_{1i}, X_{2i} \ldots X_{ni} -$ *predictors*

$b_1, b_2 \ldots b_n -$ *regression coefficients of predictors*

To conclude, the above mentioned tests are performed to understand the data collected from the survey in a statistic point-of-view. The univariate tests helps to identify the covariates that significantly correlate with passenger satisfaction leading to development of a model answer the research question.

CHAPTER 5: RESULTS

5.1 INTRODUCTION

This chapter presents the results of statistical tests that were performed on the data collected. First, the results of descriptive statistics of all dependent and independent variables are reported, following which the results of reliability and normality tests are illustrated. Based of normality test results, non-parametric tests were conducted for performing the univariate analysis. The univariate tests performed on the covariates that would influence satisfaction were Mann Whitney U Test, Kruskal Wallis H Test and Spearman's Correlation test. Lastly, logistic regression models were developed for testing the hypothesis formed.

5.2 DESCRIPTIVE STATISTICS

Data is either continuous relating to a measurable response or categorical which will include descriptives of the data set. Since the Likert scale type is associated with the subjective measurable (ex. strongly disagree; disagree; neutral; agree; strongly agree), it is difficult to compare the results. Therefore, these variables are taken as interval type with equal spacing between each option. As they are considered to be continuous variables, numeric descriptive like mean, variance and standard deviation. This study has 4 demographic variables of categorical nature and 10 independent and 1 dependent of continuous type. The detailed result of descriptive statistics is shown in APPENDIX A.

A total of 344 responses were recorded. The core criterion of any participant was that they must have used any of the 7 Indian City Airports. Out of 344 respondents, 44 of them did not meet the above criteria. Therefore this leads to a sample size of 300 since the 44 samples were deleted from data set.

The demographic variable statistics are shown in Table 5. It was observed that the male samples accounted for 56.7% (170 respondents) and females accounted for 43.3% (130 respondents). The majority of respondents were aged between 19-29 years constituting 30%. 49.3% of respondents were postgraduates. 40.3% of 300 responses have travelled through Bangalore airport in the last 1.5 years.

CATEGORICAL DEMOGRAPHIC VARIABLES	NUMBER	%
GENDER		
MALE	170	56.7%
FEMALE	130	43.3%
AGE		
15-18 YEARS	13	4.3%
19-29 YEARS	90	30.0%
30-39 YEARS	53	17.7%
40-49 YEARS	65	21.7%
50-59 YEARS	62	20.7%
60+ YEARS	17	5.7%
EDUCATION LEVELS		
HIGHER SECONDARY EDUCATION	28	9.3%
DIPLOMA	13	4.3%
UNDERGRADUATE	111	37.0%
POSTGRADUATE	148	49.3%
CITY AIRPORTS		
AHMEDABAD	14	4.7%
BANGALORE	121	40.3%
CHENNAI	54	18.0%
DELHI	44	14.7%
HYDERABAD	18	6.0%
KOLKATA	10	3.3%
MUMBAI	39	13.0%

Table 5: Descriptive Statistics for demographic variables

Since this research considers Likert scale variables as interval type (continuous), mean and standard deviation has been calculated for the independent variable. Similarly descriptives has been calculated for the dependent continuous variable "Passenger Satisfaction" which yielded a mean of 11.32 and a standard deviation of 2.344. These values are shown in the Table 6 below.

CONTINOUS DEPENDENT VARIABLE	MEAN	STANDARD DEVIATION	VARIANCE
PASSENGER SATISFACTION	11.32	2.34	5.49

Table 6: Descriptive Statistics for continuous dependent variable

Given the 300 responses, 90 of them did not use any form of self-service technology (SST) in the chosen airport, giving a sample size of 210 who can assess the service quality of SST. The overall SSTQUAL score had a mean of 76.56 and standard deviation of 11.478. The functionality dimension had the highest mean and standard deviation of 20.57 and 3.672 respectively. The least mean and standard deviation was shown by the Assurance dimension with a value of 5.57 and 2.34 respectively. Table 7 displays the descriptive statistics for the SSTQUAL variables.

CONTINOUS INDEPENDENT VARIABLE	MEAN	STANDARD DEVIATION	VARIANCE
SSTQUAL DIMENSIONS			
FUNCTIONALITY	20.57	3.67	13.48
ENJOYMENT	15.74	2.78	7.77
SECURITY/PRIVACY	7.86	1.52	2.33
ASSURANCE	5.57	2.34	5.48
DESIGN	7.54	1.44	2.07
CONVENIENCE	8.31	1.49	2.24
CUSTOMIZATION	10.95	2.51	6.31
OVERALL SSTQUAL SCORE	76.56	11.47	131.74

Table 7: Descriptive Statistics for SSTQUAL dimension

5.3 RELIABILITY TEST

The reliability test was conducted for all the questions of the SSTQUAL model which consisted of 20 items as proposed by Lin and Hsieh (2011). The Cronbach Alpha (α) obtained was 0.904 (Table 8). Since it is above 0.7, it exhibits to have high internal consistency. The values in the column "*Corrected Item-Total Correlation*" show the correlation between each item and a scale score excluding that specific item. It indicates the contribution of each item to the scale. Field (2013) mentions that in a reliable scale, all items must correlate with the total score. If the values are less than 0.3, it indicates weak correlation. From Table 9, it is evident that all the 18 items have a "*Corrected Item-Total Correlation"* value above 0.3, reflecting a strong correlation with the scale. However, ASU1 and ASU2 (items of Assurance dimension) have values 0.289 and 0.270 respectively, showing weak correlation and also showing lower internal consistency of the responses to that particular dimension. The last column "*Cronbach's Alpha if Item Deleted*" indicates how the obtained α would change if that particular item was deleted. Referring to the Table 9 it is evident that by the deletion of items ASU1 and ASU2, the α value is increased to 0.908 and 0.910 respectively, thereby increasing the overall internal consistency. This in line with the values obtained for "*Corrected Item-Total Correlation*".

Similarly, reliability test was performed for the 3 factors of passenger satisfaction. The α value obtained was 0.893 (> 0.7), achieving to have a high level of internal consistency (Table 8). "*Corrected Item-Total Correlation"* column from Table 8 shows that the contribution of each item to the scale is strong for all variables since values are over 0.3. Similarly the column "*Cronbach's Alpha if Item Deleted*" indicates that on removal of any variable, the α value will reduce (Table 9). Thus, both the columns show high internal consistency between satisfaction items. The detailed results are given in APPENDIX B.

QUESTIONNAIRE INSTRUMENT	NUMBER OF ITEMS	RELAIBILITY COEFFICIENTS
SSTQUAL	20	0.904
PASSENGER SATISFACTION	3	0.893

Table 8: Reliability Coefficient

ITEM	CORRECTED-ITEM TOTAL CORRELATION	CRONBACH'S ALPHA IF ITEM DELETED
FUN1	0.685	0.896
FUN2	0.636	0.898
FUN3	0.576	0.899
FUN4	0.678	0.897
FUN5	0.677	0.896
ENJ1	0.554	0.900
ENJ2	0.613	0.898
ENJ3	0.429	0.904
ENJ4	0.475	0.901
SEC1	0.575	0.899
SEC2	0.515	0.900
ASU1	0.289	0.908
ASU2	0.270	0.910
DES1	0.598	0.899
DES2	0.624	0.898
CON1	0.621	0.898
CON2	0.438	0.902
CUS1	0.692	0.896
CUS2	0.668	0.896
CUS3	0.513	0.901
ExpecLevel	0.811	0.833
OverallExpSat	0.822	0.820
CloseToIdeal	0.743	0.890

KEY
FUN - FUNCTIONALITY
ENJ - ENJOYMENT
SEC - SECURITY
ASU - ASSURANCE
DES - DESIGN
CON - CONVENIENCE
CUS - CUSTOMIZATION

Table 9: Item-Total statistics

5.4 NORMALITY TEST

Normality test is used to find if the sample data is drawn from a normally distributed population. Shapiro-Wilk test result is used for testing the hypothesis of the normal distribution.

For the current study, the normality test was conducted for the passenger satisfaction scores which is the dependent variable. From Table 10 the Shapiro-Wilk statistic showed a significant value (p) of 0.00. Since $p \leq 0.05$, this violates the assumption of normal distribution, indicating a rejection of the null hypothesis. Concluding that the dependent variable is not normally distributed.

DEPENDENT VARIABLE	SHAPIRO-WILK TEST		
	STATISTIC	df	SIG. VALUE
PASSENGER SATISFACTION	0.943	300	0.00

KEY
df - DEGREES OF FREEDOM
SIG. VALUE - SIGNIFICANCE VALUE

Table 10: Test of Normality for passenger satisfaction

Further, Histogram, Normal and Detrended Q-Q plots of passenger satisfaction shown in APPENDIX C suggests non-normal distribution. Consequently, non-parametric test was conducted.

5.5 UNIVARIATE TESTS

Exploratory univariate analysis was performed to determine the association of various demographic and continuous independent variables with passenger satisfaction.

5.5.1 PASSENGER SATISFACTION AND DEMOGRAPHIC VARIABLES

5.5.1.1 MANN WHITNEY U TEST RESULTS

It is a rank-based non-parametric test that is conducted to determine the difference in the satisfaction levels across males and females. Here the dependent variable is passenger satisfaction and gender is the independent variable. The result indicated that there is no significant difference in satisfaction levels observed between the 2 gender groups which is illustrated in Table 11. The mean ranks of males is 156.26 and females is 142.97, also the p-value is 0.18 which is greater than 0.05, reflecting that the difference in mean rank is not statistically significant. This means that the null hypothesis cannot be rejected. The test statistics table is given in APPENDIX D.

DEPENDENT VARIABLE	GENDER	N	MEAN RANK	SIG. VALUE	MANN-WHITNEY U
PASSENGER SATISFACTION	MALE	170	156.26	0.180	10070.500
	FEMALE	130	142.97		

KEY
N- NUMBER OF OBSERVATIONS
SIG. VALUE - SIGNIFICANCE VALUE

Table 11: Mann Whitney U test for Passenger Satisfaction and Gender

5.5.1.2 KRUSKAL-WALLIS TEST RESULTS

- Passenger Satisfaction and Age

The Kruskal-Wallis test was conducted to check if there was difference in passenger satisfaction across different age groups. The age variable (independent variable) has 5 distinct categories. The test results showed in Table 12 indicate that there was no difference in the passenger satisfaction scores among the different age groups, since the p-value is 0.064. Being greater than 0.05, the null hypothesis cannot be rejected. APPENDIX E shows detailed test results.

DEPENDENT VARIABLE	AGE	N	MEAN RANK	SIG. VALUE	KRUSKAL-WALLIS H
PASSENGER SATISFACTION	15-18 YEARS	13	147.81	0.064	10.418
	19-29 YEARS	90	149.48		
	30-39 YEARS	53	179.23		
	40-49 YEARS	65	129.62		
	50-59 YEARS	6	146.61		
	60 + YEARS	17	162.38		

KEY
N- NUMBER OF OBSERVATIONS
SIG. VALUE - SIGNIFICANCE VALUE

Table 12: Kruskal Wallis test for Passenger Satisfaction and Age

- Passenger Satisfaction and Education Levels

The Kruskal-Wallis test was performed between passenger satisfaction and different categories of education levels. Table13 illustrates the test results, where p=0.329 (p> 0.05), and the Kruskal-Wallis H statistic = 3.436. This shows that there no significant difference in passenger satisfaction levels between different educational groups. Thus, the null hypothesis was not rejected. APPENDIX E shows detailed test results.

DEPENDENT VARIABLE	EDUCATION LEVELS	N	MEAN RANK	SIG. VALUE	KRUSKAL-WALLIS H
PASSENGER SATISFACTION	HIGHER SECONDARY EDUCATION	28	134.91	0.329	3.436
	DIPLOMA	13	123.35		
	UNDERGRADUATE	111	159.17		
	POSTGRADUATE	148	149.33		

KEY
N- NUMBER OF OBSERVATIONS
SIG. VALUE - SIGNIFICANCE VALUE

Table 13: Kruskal Wallis test for Passenger Satisfaction and Education Levels

- Passenger Satisfaction and City Airports

A Kruskal-Wallis test was conducted for the dependent variable (passenger satisfaction) and the independent variable (Indian City Airports). The test results indicate that the null hypothesis cannot be rejected since the p-value obtained is greater than 0.05 (p= 0.455). Thus, indicating that there is no significant difference in the satisfaction levels between different Indian City airports (Table 14). APPENDIX E shows the detailed results of the test.

DEPENDENT VARIABLE	CITY AIRPORTS	N	MEAN RANK	SIG. VALUE	KRUSKAL-WALLIS H
PASSENGER SATISFACTION	AHMEDABAD	14	155.68	0.455	5.725
	BANGALORE	121	159.44		
	CHENNAI	54	147.80		
	DELHI	44	133.58		
	HYDERABAD	18	168.75		
	KOLKATA	10	159.00		
	MUMBAI	39	133.13		

KEY
N- NUMBER OF OBSERVATIONS
SIG. VALUE - SIGNIFICANCE VALUE

Table 14: Kruskal Wallis test for Passenger Satisfaction and Indian City Airports

5.5.2 PASSENGER SATISFACTION AND CONTINOUS INDEPENDENT VARIABLE

5.5.2.1 SPEARMAN TEST RESULTS

The Spearman's rank-order correlation was conducted to examine the correlation between continuous variables. This test was performed to correlate the 7 dimensions of the SSTQUAL model (independent variable) and passenger satisfaction (dependent variable). It was also run for other independent variables namely prompt assistance, waiting time, value addition and COVID safe with passenger satisfaction as the dependent variable. Table 15 illustrates the results of the Spearman test. It was observed that the Assurance dimension of SSTQUAL and COVID safe variable showed weak positive correlation 0.217 and 0.276 respectively, while the other 6 dimensions and the waiting time variable showed a strong positive correlation with passenger satisfaction in airports. The value addition attribute and prompt assistance attribute showed moderate correlation with passenger satisfaction. All the correlations between the dependent and independent variables are statistically significant since $p = 0.000$ (≤ 0.05), meaning we reject the null hypothesis in these instances.

From the scatter plot [APPENDIX F], it is evident that the plots of most independent vs dependent variables have a positive slope indicating a positive

monotonic relationship. Except for the Assurance attribute which showed a slope approximated to 0. Thereby indicating a poor association with passenger satisfaction. Hence the results from the Spearman tests are consistent with the visuals of the scatter plot.

CONTINOUS VARIABLE	INDEPENDENT VARIABLE	SIG.VALUE	CORRELATION COEFFICIENT	CORRELATION STRENGTH
PASSENGER SATISFACTION	FUNCTIONALITY	0.00	0.72	STRONG POSITIVE CORRELATION
	ENJOYMENT	0.00	0.66	STRONG POSITIVE CORRELATION
	SECURITY/PRIVACY	0.00	0.54	STRONG POSITIVE CORRELATION
	ASSURANCE	0.00	0.27	WEAK POSITIVE CORRELATION
	DESIGN	0.00	0.62	STRONG POSITIVE CORRELATION
	CONVENIENCE	0.00	0.58	STRONG POSITIVE CORRELATION
	CUSTOMIZATION	0.00	0.62	STRONG POSITIVE CORRELATION
	SHORTER WAITING TIME	0.00	0.62	STRONG POSITIVE CORRELATION
	PROMPT ASSISTANCE	0.00	0.48	MODERATE POSITIVE CORRELATION
	VALUE ADDITON	0.00	0.48	MODERATE POSITIVE CORRELATION
	SAFETY	0.00	0.27	WEAK POSITIVE CORRELATION

KEY
SIG. VALUE - SIGNIFICANCE VALUE

Table 15: Spearman Correlation Test for passenger satisfaction and continuous independent variable

Thus, it can be concluded that all the dependent variables (functionality, enjoyment, security, assurance, design, convenience, customisation, waiting time, prompt assistance, value addition and COVID safe) have a monotonic relationship with passenger satisfaction.

5.6 LOGISTIC REGRESSION ANALYSIS:

The multicollinearity assumption of logistic regression for model 1 and model 2 showed no correlation between the independent variables as the VIF values were less the 10 and tolerance values were over 0.1. These results are given in APPENDIX G, APPENDIX H and APPENDIX I

To examine the association between covariates that can predict the outcome, a binary logistic regression was conducted. The dependent variable passenger

satisfaction was recoded into a dichotomous since it was a scale variable (a requirement of logistic regression). The value above 12 was considered "satisfied" and a value below 12 was considered "dissatisfied", the cut-off value was decided based on the mean (11.32). The demographic variables were not part of the regression model since their univariate test showed insignificant results [APPENDIX D & APPENDIX E].

Since the model is not predominantly based on theory and literature, the covariates are not forced into the model, rather they are entered through Forward LR stepwise method.

5.6.1 MODEL 1: HIERARCHICAL BINARY LOGISTIC REGRESSION

Block 1 of the model consisted of 7 dimensions of SSTQUAL (Lin and Hsieh, 2011), and Block 2 included additional covariates namely 'prompt assistance', 'shorter waiting time', and 'value addition. All these independent variables were added in a Forward LR stepwise method.

Initially, prompt assistance and shorter waiting time emerged as predictors of passenger satisfaction when they were tested for correlation [APPENDIX F]. However, the inclusion of other key variables along with these two into a hierarchical regression model resulted in the removal of its association with satisfaction. This is because the other key variables have predictive power and overlap with shorter waiting time and prompt assistance.

The 'model chi-square statistic' of the final model was 133.66 with a significant value of 0.00, indicating that the model is predicting whether a passenger is satisfied or not significantly better than the null model (APPENDIX G). The final model accounted for 47.1% to 65.4 % of the variance in the satisfaction levels. Further, it had a Cox & Snell R^2 change of 1.1% and Nagelkerke R^2 change of 1.5% from the model which had functionality, design, and customization as its independent variables (block 1).These R^2 changes are from Block 1 to Block 2 (final model). The test results of Hosmer and Lemeshow exhibit that the model has strong predictors since the significance value obtained is 0.248.

Statistical significance was reached by all the variables in the final model. Specifically, higher ratings for the SST's customisation feature that relates to the

extent to which the SST is personalised and meets the specific needs of the passengers was 1.6 times more likely to be associated with higher levels of passenger satisfaction (OR= 1.62, CI = 95%, 1.23 – 2.14), while reported higher ratings for SST functionality and good design features are associated with a 1.3 (OR = 1.35, CI = 95%, 1.13-1.61) and 1.5 times (OR= 1.54, CI=95%, 1.02 – 2.32) greater likelihood of higher levels of reported passenger satisfaction . The passengers who felt that the SST is value addition in effectively managing the passenger traffic were associated with increased odds of satisfaction (OR = 2.02, CI = 95%, 1.02 - 4).

Following the inclusion of all significant predictors, the model's predictive power is 85.7%.

It can be concluded that the null hypothesis outlined in the Methods chapter concerning passenger ratings of functionality, design, customization, and value addition being associated with higher levels of passenger satisfaction has been rejected. On the other hand, the null hypothesis of enjoyment, convenience, assurance, security, shorter waiting time, and prompt assistance cannot be rejected, which indicates that there is no impact of these variables on satisfaction levels.

More detailed results on the literature process involved in the hierarchical regression are reported in APPENDIX G. A summary of the main key findings is reported in Table 16.

MODEL 1					
	β	p	OR	95% CI	
PREDICTORS					
FUNCTIONALITY	0.302	0.001	1.352	1.134	1.612
DESIGN	0.434	0.037	1.544	1.026	2.322
CUSTOMIZATION	0.486	0.001	1.626	1.235	2.141
VALUE ADDITION	0.707	0.042	2.028	1.027	4.001
COX AND SNELL R^2 = 0.471 , NAGELKERKE R^2 = 0.654					

KEY
p - SIGNIFICANCE VALUE
OR- ODDS RATIO
CI- CONFIDENCE INTERVAL

Table 16: Hierarchical Logistic Regression Summary

5.6.2 MODEL 2: BINARY LOGISTIC REGRESSION

To understand the association between SST usage in the COVID-19 situation at airports and passenger satisfaction, a logistic regression was performed. The aim here is to test if considering SST as a safe option results in higher levels of satisfaction. It is known from the Spearman test that safety has a positive correlation with satisfaction [APPENDIX F].

The 'model chi-square statistic' obtained was 15.09, indicating that the prediction regarding whether a passenger is satisfied or not is significantly better than the null model (significance value = 0.00). However, only a 4.9% to 6.6% of variance in passenger satisfaction levels was accounted. Further, the result of Hosmer and Lemeshow exhibit that the 'safety factor' while using SST is a good predictor of passenger satisfaction, since its significance value is 0.14. The higher ratings for SST as a safe service during their air-travel in the current situation of COVID-19 was associated with higher odds of passenger satisfaction (OR = 1.481, CI = 95%, 1.208 – 1.815). The predictive power of the model is 61.3%.

Thus, summarising, this analysis rejects the null hypothesis of safety factor not being associated with higher levels of satisfaction.

The key findings are tabulated in Table 17 and the detailed results are shown in APPENDIX H.

MODEL 2					
	β	p	OR	95% CI	
PREDICTORS					
SAFETY	0.393	0.000	1.481	1.208	1.815
COX AND SNELL R^2 = 0.049 , NAGELKERKE R^2 = 0.066					

KEY
p - SIGNIFICANCE VALUE
OR- ODDS RATIO
CI- CONFIDENCE INTERVAL

Table 17: Binary Logistic Regression Summary

5.6.3 MODEL 3: BINARY LOGISTIC REGRESSION

A binary logistic regression was performed to examine if the dimensions of SSTQUAL (independent variable) influence the passengers to use SST in future. The dependent variable is 'future use', which is dichotomous. The first block of the model consisted of 7 dimensions of SST which used the method of Forward LR stepwise. No variables were added into the model indicating that none of the 7 dimensions had the predictive power to explain the model. 'Variables not in the equation' table of Block 0 indicted all the excluded variables had significance values over 0.05. Also, the probability for residual chi-square was greater than 0.05 (residual chi-square = 0.9714; significance = 0.205). Both these statistics illustrates that the excluded variables did not achieve acceptable levels of statistical significance and thus not making a significant contribution to be associated with future use of SST.

Results are reported in APPENDIX I

CHAPTER 6: DISCUSSION AND IMPLICATIONS

6.1 INTRODUCTION

This chapter deals with the discussion of the key findings based on the statistical tests undertaken. Several statistical analyses were conducted whose results have been highlighted in the previous chapter 'Results'. Here, a brief discussion would be covered regarding the 2 logistic regression models. Interesting observations from the univariate tests and regression will be presented along with contrasting or comparable evidences from the literature if applicable. The final section addresses managerial and theoretical implications of this study.

6.2 DISCUSSION ON MODEL 1 – HIERARCHICAL LOGISTIC REGRESSION

The results obtained through the analysis confirm and support the hypothesis that functionality, design, customization, and value-addition attributes of SST are positively associated with the likelihood of higher passenger satisfaction. Thus, these are the predominant predictors of satisfaction in this study.

It is interesting to note that from the Spearman correlation test [APPENDIX F], out of the 7 dimensions functionality showed the highest correlation (0.721), followed by enjoyment (0.660) and design and customization displayed same correlation values (0.623). But in the regression model, only customization, design and functionality emerged to be significant predictors of satisfaction. Also when correlation test was undertaken for the other covariates [APPENDIX F], 'value addition' variable showed the least correlation with satisfaction in comparison with 'prompt assistance' and 'shorter waiting time'. However, in the final model with all covariates, 'value addition' was the strongest contributor (in terms of odds ratio) and the other two variables ('shorter waiting time' and 'prompt assistance') were not added in the model despite of having correlation.

Customization showed the highest positive odd ratio among the 7 dimensions, indicating that the SSTs are fitting the individual user preferences. It also means

that the SSTs can recognize the needs of the customer and tailor its service options. This has been supported by the literature, through studies by Shahid *et al*, (2018) where the importance of customization in different sectors like the airport, banking and supermarket has been observed. Similarly, research conducted by Agus (2018) showed that customization dimension of the SSTQUAL model was the 3rd significant predictor among the 7 dimensions. Observing the review collected from the respondents through the survey, it is noted that they expect personalized options like regional language selection, seat selection, and change of on-board meal options. These personalized features are aspects of customization of a SST. From the results, it is evident that when these expectations regarding customization are met, satisfaction is higher. The provision of personalized facets enables the users to choose the best-suited options that fulfils their needs. Customization has been ranked highest in the current study since customized features would provide a personalized service experience and create a feeling of attachment as it allows the passengers to take control over how they need their experience to be. The excerpts from Curran *et al*. (2003) and Hunter and Garnefeld (2008) also supports the notion that when the users have control over their service experience it results in their satisfaction. Design and functionality traits are more relative to the working and appearance of SST machines while customization features are relative to the operations that are being tailored to meet the users' preferences. Hence this could be the possible reason for it to be ranked the highest predictor of satisfaction among the other dimensions in this study.

The design trait of the SST is the next key predictor of passenger satisfaction ranked by the size of the odd ratio. This indicates that besides having customized features, the passengers would want the SST to be aesthetically appealing, and use up-to-date technology. Therefore, it is important to prioritize user- friendly interface design to ensure high user acceptance and satisfaction. Previous studies also emphasize that overall system design is an essential component to assess the service quality of SST, which has a positive association with satisfaction. The study by Orel and Kara (2014) observes design as the 4th significant predictor (based on β value) to measure the service quality of SST in the retail sector. Similarly, a study conducted for Zurich airport by Agus (2018) observes design attribute was the 5th key contributor of SST service quality. The potential reasons

for the difference in the position of design attribute in the current study compared to previous studies may be due to the service providers. Each service provider have their own software, layouts and varied technologies. Hence there is no universal design of SST available across all sectors.

Over 50% of the respondents agreed that the SST has good functionality characteristics. This insight reflects that SSTs can help the users to get their services done in a short period and requires minimal effort as it is easy to use. Hence they believe that SST can save time as it is an automated process and not dependent on human interaction. This research findings are parallel with Considine and Cormican (2016), which states that 50.66% of respondents are content with the functionality trait .Similarly, the importance of functionality attribute in examining the overall satisfaction has been the key finding in studies conducted by Radomir and Nistor (2012) and Shahid *et al*, (2018) in different scenarios like retail, banking and airport. The functionality feature of SST relates to ease of use, reliability and responsiveness (Lin and Hsieh, 2011). Therefore, obtaining functionality as a significant predictor of satisfaction is in line with researchers who support that the ease of use is an important determinant of the service quality of SST that determines the satisfaction levels especially for the new users (Weijters *et al*, 2007).

The security feature did not arise as a significant contributor to satisfaction in this model. This demonstrates that the passengers have the least concerns regarding security issues in comparison to the working and the layout of SST. This could potentially explain how technological advancements have increased the user's trust while transacting through SSTs. Although, it has ranked low here, it is an important factor that can impact the users' trust and satisfaction levels. It is often noticed that the technology acceptance is based on the users' concern about security and safe information management (Yang *et al*, 2004). According to Jarvenpaa *et al.,* (2000) consumer's trust towards technology is strengthened when they are convinced about the privacy of their data. Security breaches can hamper the consumer's trust towards SST. When trust is lost, then the consumers' desire to use the technological service will reduce. It is further noted that loss of trust leads to dissatisfaction (Gummerus *et al.,* 2004). Emphasizing the user data safety and aligning with best practices will help the users' not to be apprehensive while

using technologies like SST. Thus, a balance must be maintained between technology and security to enhance future use of SST with satisfaction.

Likewise, assurance too was not a major predictor in this model highlighting that the passengers do not judge the brand image and the reputation of the firm providing SST. This is consistent with the results obtained from the Spearman tests [APPENDIX F].

The present research finding illustrates that only functionality, design and customisation out of 7 dimensions of SSTQUAL are the main covariates of passenger satisfaction. This is different from the findings by Shahid *et al,* (2018) and Mango *et al.* (2017) which state that all 7 attributes have emerged as key predictors of satisfaction in various sectors.

The study conducted by Shahid *et al*, (2018) used online surveys and purposive sampling to measure satisfaction in Pakistan service sectors like banking, airport (only 3% of the respondents out of the total sample) and retail. The quantitative study by Mango *et al.* (2017) used an online survey to measure satisfaction among customers of a Turkish bank.

The research by Darzentas and Darzentas (2014) discusses that security is a key variable in the self service banking context. The self-service kiosks like the ATM involves money exchanges and usage of confidential like account number and card pin number. Similarly, in retail sectors, self-checkout system involves the usage of money and card pin number. Protection of such sensitive data is a must in both these sectors (Günay *et al*. 2014). Thus loss of personal information due to data security vulnerabilities leads to lower satisfaction (Bitner *et al.* 1990)
However, in the current research, security did not appear as a significant predictor of satisfaction, may be because the SST in the airports used for baggage tag and boarding pass printing does not involve any transactions with money. This could be a probable reason that the aspect of security was not as significant as functionality, design and customization to drive satisfaction for the passengers.
Customization is a factor that is a significant contributor of satisfaction in retail, banking and in the airport sector. The possible reason for this could be the need of specific and personalized features in ATM's and in kiosks at airports to help the users complete their entire service. The air travellers expect particular features in

the SST like change of meal, seat etc. as mentioned earlier. Similarly, in banking, customers require few features like selection of different accounts and languages that will add to their satisfaction. Factors like functionality which determine the ease of use, responsiveness and entire working of the SST, are primary requisites of any customer and are hence associated with satisfaction in all the sectors.

These reasons for difference in dimensions that influence satisfaction are just opinions which have scope to be explored in the future. Another reason for the difference in the results in comparison with the other researches could be due to the study being conducted in a different market setting, contrasting sample size and varying statistical analysis (Radomir and Nistor, 2012).

80% of respondents agreed that the waiting time to access SST was less than 15 minutes. On the other hand 49% of participants indicated that they spend around 15-30 minutes in long queues while using employee- managed desks. This indicates that the waiting time in queues have reduced with the use of SST. According to Wittmer (2011) new technology drives towards faster check-in procedures thereby shortening the waiting time which is in line with the current study observations. Considering air travel, waiting time is critical as the customer relates it to a period '*loss of control*' thus creating dissatisfaction. However, in this study this attribute did not emerge as a predominant predictor of satisfaction. Nevertheless, it cannot be denied that SST has reduced the time spent in queues.

The final key predictor of this model is 'value addition'. It showed the highest positive odds ratio among all the predictors. This demonstrates that passengers get satisfied when check-in processes are finished quickly i.e. both processing time of SST and waiting time to access the SST is reduced. Over 45% of respondents in this study felt that SST is an asset to the airport in terms of passenger traffic management. This means that the use of SST has facilitated an efficient management of passengers within the airport, which is similar to Protus and Govender (2016) observation. Abdelaziz *et al*., (2010) state that SST is a valuable tool in reducing the queues at the airport which support the observations of this study. Empirical figures from Abdelaziz *et al*., (2010) highlight that 93% of the respondent's believed that the SST would be quicker and reduce the presence of long queues. Also 60% thought that SST would be '*queue-free*'. Hence, it is important to prioritize different ways to improve the passenger processing to avoid

long queues in various procedures at the airport as it leads to greater levels of satisfaction.

Thus, concerning the Indian airport context, functionality, design, customization, and value-addition covariates were the significant predictors to measure the probability of satisfaction.

6.3 DISCUSSION ON MODEL 2 – BINARY LOGISITC REGRESSION

The research hypothesizes that the use of self-service technology (SST) is a safe option in the situation of COVID-19 and it exhibits a positive association with passenger satisfaction from the analysis conducted. This research has empirically obtained that safety initiatives in favour of the passengers considering COVID-19 will more likely increase satisfaction (β= 0.393, safety is associated with 0.393 times greater likelihood of higher levels of reported satisfaction).

The reports by IATA (2020) suggest that SST is beneficial to maintain social distancing as passengers are processed in a faster way with limited employee – passenger interaction and thus, must be utilized for baggage drop, check-in and boarding procedures in the nearing future. They also mention that this technology is especially useful when there is an increase in passenger flow. It is probably due to these reasons that over 55% of participants of this study have used SST after the reopening of airports post the COVID-19 lockdown period. Thereby, demonstrating that SST is a safe option during air-travel in COVID-19.

However, the effectiveness of SST during this crisis is subject to condition. The respondents believe that it must be made completely 'touch-free' by incorporating technologies like QR code scanning, biometrics (facial scanning) etc. or regular sanitization must be provided. Nevertheless the sample airports of this study have made arrangements for contact-less kiosk operations. Boarding pass and baggage tag can be obtained by scanning the QR code through their smart-phones displayed on the kiosk screen (Loiwal, 2020; Kumar, 2020).

Thus, airports must ensure that the kiosks are safe and clean and should gradually adjust to the new travel norms to instill satisfaction among the passengers.

6.4 INSIGHTS FROM THE OPEN-END QUESTION 'Would you like SST to be introduced in any other sections of the airport?'

The respondents have mentioned their desire to install SST in various sections of the airport, like airport taxi services, parking areas, restaurants inside the terminals.

The customers felt the need of SST to be installed for airport taxi/cab booking. The kiosks must be able to allocate the type of cab based on the number of luggage. There should also be provision for payment through card (credit/debit/forex) and apps like Google Pay. Both these operations will result in a successful booking of a taxi. To achieve these operations effectively, the kiosks must have good functionality features like user-friendly interface and quick processing. Since, there is an involvement of money transactions, security dimension of SST must be prioritized (Günay *et al*., 2014). The SSTs' must be operating at all times and must be placed at convenient locations thereby ensuring that it is convenient to the passengers. On fulfilling these conditions, the passengers would be satisfied.

SST enabled parking services at the airport would check for vacant parking slots and generate a ticket on allocation of a specific slot to the car. Such SSTs would help passengers to save time on searching for a vacant parking slot. In this case, for successful operations, the SSTs must be equipped with up-to-date technology (design trait), be under operation at all times (convenience trait) and must have quick responses to the requests to result in satisfaction amongst the users.

Many respondents have also expressed their desire to have SSTs in restaurants inside the airports. This will help them to order and pay the bill without any interaction with the staff. This would be especially beneficial in the times of COVID-19 where there must be minimal physical contact between humans. Visual representation of the menu can be a key factor of satisfaction (Cobanoglu *et al*., 2011). Customers get attracted towards innovative presentation of menus (Issa, 2018). Thus, the SST must employ latest technology to enhance the visual representation of menu items and also provide aesthetically appealing system design that are user-interactive which can make the experience enjoyable and satisfactory. Customization is an important factor in such SSTs as the customers must be able to modify their menu and get additional information on the items like

nutritional values. Provision of these needs will drive their satisfaction (Beldona, Buchanan and Miller, 2014).

Given that the present study finds positive association between 'safety factor' by use of SST and satisfaction, implementing SSTs in the above mentioned areas will be an effective measure for manintaing social-distancing and safety moving into the future after COVID-19.

6.5 MANGERIAL IMPLICATIONS

The results acquired from the study provide some worthwhile insights for the airport organization from a practical and managerial standpoint. Primarily, the results of the current study highlight that the features of self-service technology (SST) have an impact on satisfaction levels among passengers. However, only few features were found to have a significant and positive relationship with satisfaction.

While acquiring the respondents' perspective as to why they prefer or not prefer to use the SST, it was observed that many passengers are in favour of SST as they find it convenient and time-saving. On the other hand, passengers have also stated that they are not ready to use the SST due to the lack of acceptance or readiness towards technology and still prefer to use employee- managed desks at airports. This information indicates two possible remarks, firstly that employee managed desks are efficiently managed and well-functioning with user-friendly staff. Secondly, showcasing poor functionality of SST. As a managerial implication, it suggests that airports can invest in both employee-managed desks and SST to deliver satisfactory services to all passengers. However, when seen from business cost viewpoint, it leads to extra expense of employing more staff and installing SSTs. Also, it cannot be denied that any technological device is prone to errors/failures. Given that this study shows a strong association between SST functionality and satisfaction. On instances of malfunctioning, passenger satisfaction would be negatively impacted. Zhou *et al,* (2013) and Dixon *et al,* (2001) suggest that prompt assistance by the staff at an encounter of failure is preferred by customers. Thus, managers must ensure to assist such that the

passengers can satisfactorily complete their activities. Supportive staff assistance would be also useful for both senior citizens and first-time users who may find difficulty to adapt and any time delays encountered would be controlled immediately (Taufik and Hanafiah, 2019).

Furthermore, the results showed that design of SST was an impactful attribute of satisfaction. Thus, the management must assure that the SST uses latest technology and also must attempt to improve the overall design of the SST. A good design would allow passengers to exploit the full capacity of the service. Importance to graphical visuals must be integrated into the SST to make it attractive and user-friendly. One of the difficulties in terms of SST usability is for visually impaired and physically challenged passengers (Petrie *et al*., 2014). To help these categories of passengers, the airport management must employ support staff to help them to use the SST service smoothly (Abdelaziz, 2010). Specific for visually impaired passengers, Braille technology can be embedded into the SST model. Additionally, Sandnes *et al* (2011), suggest having audio connectors and text-to-speech output for passengers with vision and mobility constraints will be helpful. Thereby, incorporating these design features would enhance the levels of satisfaction.

Viewing the situation of COVID-19, apart from the SST attributes, safety factor of SST is another driver of satisfaction. Since the air travel procedures are no longer the same due to COVID-19, the management must take precautionary steps to maintain cleanliness and safety against the spread of the virus. Airports must consider 'contact-less', autonomous SST practices for passengers to maintain social distancing. Technologies like iris and facial recognition and QR code scanning must be utilized for faster passenger processing leading to limited time spent in queues. Such arrangements have become important for the managers to address since the outbreak of COVID-19. Additionally, the respondents also emphasized the provision of temperature checks embedded within the SST. This has been recently implemented by the international airlines Etihad through "Elenium Automation" service provider (Etihad.com[3]). Henceforth, SSTs will now aid in serving medical health associations for tracing the spread of the virus.

[3] https://www.etihad.com/en-in/news/etihad-airways-to-test-airport-technology-to-help-identify-medically-at-risk-travellers

This data would be beneficial for airport authorities, co-travellers and the country to be aware of the number of COVID-19 cases.

Majority of the respondents felt that SST's must be installed for money exchange and baggage drop. While incorporating SST for baggage drops, the airport managers must assure provision of 'fragile' stickers and should also process payment for extra luggage rather than passengers being directed to another counter. The security attribute is most important in case of money exchange and excess baggage payment as the users provide confidential data (Günay *et al.*, 2014). The SSTs must be authenticated and secure for sensitive data management. These measures would lead to enhanced satisfaction amongst the passengers as these were the expectations that were raised by respondents in this study (in open-end question).

Summarizing the above implications drawn from this study, airport managerial staff must prioritize to provide assistance to deal with SST malfunctions. Additionally, appropriate design features should be included to make the SST experience friendly and interactive for all users including physically challenged passengers. Lastly, the airport management must embed features like iris, facial recognition and temperature checks within the SST which ensures safety of passengers against COVID-19 and will ultimately aid in controlling the spread of the virus.

6.6 LITERATURE IMPLICATIONS

The results acquired from this research have made valuable contribution in the existing literature in the field of Airport service industry.

To begin with the study evaluates features of self-service technology (SST) that measure service quality and its influence on satisfaction. It adds to the existing literature (Shahid *et al*, 2018; Mango *et al.*, 2017) to analyse the impact of service quality on satisfaction. The outcomes from the primary regression model draw attention that not all dimensions of SSTQUAL significantly contribute to predict passenger satisfaction in the airport. Our results are slightly different from the existing results that emphasize all dimensions of SSTQUAL being a significant

contributor of satisfaction as posited by various researchers (Shahid Iqbal, Hassan and Habibah, 2018; Mango *et al.*, 2017). This could be due to the difference in the sample size and their distribution and also the type of industry taken into study.

This study also demonstrates that correlation of satisfaction levels is not limited to the dimensions of SSTQUAL but additional constructs like prompt assistance, shorter waiting time and effective methods of passenger traffic management. From the primary model it is noted that satisfaction is associated with the SST being able to handle large volumes of passenger traffic. To our best knowledge, at present, this is the only study which views SST as a value addition that enhances satisfaction due to its faster passenger processing.

The present study finds a relation between waiting time and satisfaction. However, it does not emerge as a significant predictor in comparison to other variables. Satisfaction within the airport context is strengthened by the SST as it affects the waiting time. The current study deduced that use of SST for check-in procedures allows the passengers to limit their time spent in comparison of their experience of using employee-managed check-in desks. These findings corroborate the understanding of new technology driving towards faster check-in procedures by shortening the waiting time and thus result in the positive impact of shorter waiting time on satisfaction (Wittmer, 2011).

Similarly, provision of prompt assistance did not emerge as a significant contributor of satisfaction in the present study. The existing literature deals with positive association of facilitating conditions (helpdesk support, specialized guidance given to users) and the behavioural intention to use the SST (Yoo *et al.*, 2012). Study conducted by Mattila and Cho (2011) examine whether a human recovery provided (assistance) when SST failure occurs leads to satisfaction and found that it was not very effective. However, in this research there is no clarity whether provision of assistance would result in higher/lower satisfaction. This allows for further exploration.

The study also examined if socio-demographic variables like age can be a predictor of satisfaction with the use of SST. Through correlation tests (Kruskal- Wallis Test –APPENDIX E) it was noted that there is no difference in satisfaction levels across different age groups. This is not consistent with the findings of other researches by

(Cohen, 1990; Radvansky *et al*., 1991), which argue that older generations may find adaptions to new technology difficult in comparison to younger generations. Witmer (2011) highlights that this difference may be due to the trust towards modern technological procedures while Taufik and Hanafiah (2019) suggests that older age groups prefer to interact with staff rather than to use the SST. The differences in the observations of the current and past researches may be because in the present research respondents over 60 + of age constitute only 5.7% of the total sample which has restricted to the explanatory power of the results.

The final observation of this study addresses the air-travel scenario due to COVID-19. The results acquired suggest that the safety factor is an additional predictor of satisfaction. It also focuses on certain pre-requisites (sanitization, 'contact-free' kiosks) that the respondents have stressed on, that would result in their satisfaction of using SST in such situations. This 'safety' aspect is yet to be researched for more insightful results. Thereby, giving an opportunity for deep exploration and expansion of the literature in the concerned subject of technology, COVID-19 and satisfaction. Further researches can contemplate other technological and non-technological aspects whose inclusion in airport operations would result in passenger satisfaction post the outbreak of COVID-19.

Thus, the identification of significant sources of satisfaction is vital for an organization like the airports for focusing on the passengers' convenience and to enhance their overall satisfaction. This will also be a guidance for the organizations to channelize their investments in appropriate areas of greater magnitude of satisfaction

CHAPTER 7: CONCLUSION

7.1 LIMITATION AND FUTURE SCOPE:

Like any research, this study too has certain limitation which has been addressed in the following section. This section also proposes recommendation for the future study to be conducted.

The current study did not observe any influence of socio-demographic variables on passenger satisfaction. However the existing researches have showed socio-demographic variables as an important predictor. For instance Wittmer (2011) shows that different age groups exhibited different levels of satisfaction. Similarly research by Ab Halim (2012) shows satisfaction is varied across the two genders. The probable reason for socio-demographic variable not exhibiting any influence on satisfaction could be due to the choice of sampling technique and a lack of statistical power in the analysis. As a suggested future approach, probabilistic sampling can be employed through simple random sampling based on a full population list and an appropriate sampling frame. Though it may be time and effort consuming, the findings about the population could be potentially more representative. The data is also cross-sectional and this limits the inferential nature of the results. As a result, only association between the independent and dependent variables can be inferred, but a larger longitudinal study over time would be necessary to infer causation between independent and dependent variables in the model.

The usage of non-probability sampling has another limitation regarding lack of representation of the entire population which leads to lower levels of generalizable results. Nevertheless, the current study has obtained a large sample size of 300 and majority of respondents used Bangalore Airport (40.3%) among the 7 Indian city airports. These figures shows a moderate level of representativeness and the results can be generalised regarding the passengers' satisfaction levels to a certain extent. Though this study used non-probabilistic sampling, it managed to record a large

sample size of 300, this minimised the margin of error (Table 2) to 6% with 95% confidence interval indicating high level of precision in results.

The current study aimed to capture the satisfaction of self-service technology (SST) present in 7 Indian Metropolitan Cities only. Kankaraš and Moors (2010) claims that same construct is evaluated differently across different cultures, suggesting that nationalities and cultures could provide different views on satisfaction caused by the use of SST. The present research however lacked variability in capturing nationality since the majority of respondents were Indians. In the future researches, to broaden the scope of the study, more diverse samples under varied national consumer environments could be considered.

The 'safety factor' of SST in COVID-19 condition deserves greater study in the future. The present study accounted for only 5-7 % of variance in satisfaction. Therefore, there is a large degree of unexplained variance, so additional constructs relating to technology (e.g. degree of automation, quick functionality of the sensors like temperature and oxygen level sensors embedded into the SST) that would provide safety and satisfaction to users in COVID-19 must be explored to extend scope of the study and improve the exploratory power of the model.

The present research does not include participants with physical challenges. Targeting to include this category of samples, an interview or a paper based survey facilitated with a transcriber (can be researcher) could be employed to acquire their satisfaction about the SST. Following which a quantitative analysis can be performed to obtain numerical results. This section of participants could be an additional feature of the future studies.

Lastly, when the study examined if SSTQUAL dimensions influenced the passengers to use SST in future, the results did not support the relationship between the two variables. This means that apart from the dimensions of SSTQUAL there are other factors (e.g. brand trust and brand loyalty) that determine the use of SST in future which the current study was unable to identify. Nevertheless, the current study was able to quantify the percentage of passengers who would use SST in their future (93%), but, could not recognise the reason for this statistical figure. Thus, this could be a potential area for further researches to discover.

The service quality dimensions of SST utilised in this study is applicable only to Indian Airport Industry. As part of future scope, the dimensions can be applied to various service sectors like healthcare, education, and telecommunications for examining the consumer's satisfaction levels on the usage of technology based interfaces like SST. This will help to expand the literature of the concerned subject.

7.2 CONCLUSION

The objective of this thesis was to investigate the relationship between self-service technology (SST) and passenger satisfaction in Indian Airport context.

The logistic regression results indicated that functionality, design, customisation and passenger traffic management (value addition) traits of SST were significantly associated with passenger satisfaction levels. The ability of SST manage passenger traffic had the highest coefficient (0.707) thereby being ranked the important predictor of satisfaction. Translating these findings into managerial practice, the airport management must ensure that the SST has an aesthetic appearance supported by an easy-to-use interface that meets the personal needs of the users to enhance passenger satisfaction across Indian airports.

It is also important to note that many respondents have observed the use of SST has reduced their waiting time in queues. This is an indication that the SST has the ability to manage and clear large volumes of passenger in a quickly and efficiently. The faster the SST processes the passengers, the quicker is the passenger flow management, which is associated with higher passenger satisfaction. Therefore, airports must invest in technology that helps in saving passengers' time spent in procedures as in the long run this would help to sustain their satisfaction and enhance their business performance.

The results showed that over 93 % of respondents have remarked that they would use SST in the future and would also recommend the use of SST in airports to others. Similarly above 75% of passengers have agreed that they would use SST if installed in the immigration section. This suggests that adapting new

technological procedures has the potential and scope to enhance passenger airport experience yet further. This could be due to their satisfaction with the service quality of the SST.

This research also considers the effectiveness of SST in airports in the current situation of COVID-19. It is noted passengers associated the 'safety factor' linked with the use of SST to their satisfaction. With the use of SST, the objective of minimal exposure and minimal physical contact can be achieved thus increasing their satisfaction levels. This technology has offered the passenger to experience a smooth airport journey along with increased safety and caution against COVID-19. This association could be a potential foundation to further explore the role of technology in situations like COVID-19 in the airport setting as well as other service sectors.

The passengers have expressed their desire for the introduction of SST in various areas such as currency exchange tills and cab booking services at the airport. Thus the factors examining the quality of service delivered by the SST in areas over and above check-ins and its impact on satisfaction of the users would be a fruitful area to expand the scope of the current study.

It is important for the airport management to understand how their passengers experience the efficiency of SST and identify the key factors that play a role in driving their satisfaction/dissatisfaction with this service, hence their overall passenger experience. With this information, airports can take initiatives in improving the service delivery of SST or plan for alternatives to address the issues in SST service delivery. The present study sheds light on key findings in this area and should aid in informing managerial decisions across the sampled airports that support the achievement of these objectives.

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APPENDIX A: DESCRIPTIVE STATISTICS

1. Demographic Variables :

- GENDER

Frequencies

Statistics

Gender

N	Valid	300
	Missing	0

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	170	56.7	56.7	56.7
	Female	130	43.3	43.3	100.0
	Total	300	100.0	100.0	

- AGE

Frequencies

Statistics

Age

N	Valid	300
	Missing	0

Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	15-18 y	13	4.3	4.3	4.3
	19-29 y	90	30.0	30.0	34.3
	30-39 y	53	17.7	17.7	52.0
	40-49 y	65	21.7	21.7	73.7
	50-59 y	62	20.7	20.7	94.3
	60+ y	17	5.7	5.7	100.0
	Total	300	100.0	100.0	

- EDUCATION

Frequencies

Statistics

Edu

N	Valid	300
	Missing	0

Edu

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	HSE	28	9.3	9.3	9.3
	Diploma	13	4.3	4.3	13.7
	UG	111	37.0	37.0	50.7
	PG	148	49.3	49.3	100.0
	Total	300	100.0	100.0	

- INDIAN CITY AIRPORTS

Frequencies

Statistics

Airport

N	Valid	300
	Missing	0

Airport

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	AHM	14	4.7	4.7	4.7
	BLR	121	40.3	40.3	45.0
	CHN	54	18.0	18.0	63.0
	DEL	44	14.7	14.7	77.7
	HYD	18	6.0	6.0	83.7
	KOL	10	3.3	3.3	87.0
	MUM	39	13.0	13.0	100.0
	Total	300	100.0	100.0	

2. Continuous Variables:

- 7 DIMENSIONS OF SST

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
Functionality	210	6	25	20.57	3.672	13.481
Enjoyment	210	7	20	15.74	2.788	7.771
Security	210	3	10	7.86	1.526	2.330
Assurance	210	0	10	5.57	2.341	5.481
Design	210	4	10	7.54	1.441	2.077
Convenience	210	3	10	8.31	1.498	2.245
Customization	210	4	15	10.95	2.513	6.314
Valid N (listwise)	210					

- PASSENGER SATISFACTION

Descriptives

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
PassengerSat	300	3	15	11.32	2.344	5.496
Valid N (listwise)	300					

- SSTQUAL (overall score)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation	Variance
SSTQUAL_score	210	47	100	76.56	11.478	131.741
Valid N (listwise)	210					

APPENDIX B: RELIABILITY TEST

1. SSTQUAL Scale :

Case Processing Summary

		N	%
Cases	Valid	210	61.0
	Excluded[a]	134	39.0
	Total	344	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.904	.913	20

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
FUN1	72.27	118.158	.685	.626	.896
FUN2	72.39	119.043	.636	.587	.898
FUN3	72.38	120.121	.576	.578	.899
FUN4	72.29	118.465	.678	.700	.897
FUN5	72.89	115.141	.677	.518	.896
ENJ1	72.51	120.730	.554	.515	.900
ENJ2	72.27	120.036	.613	.658	.898
ENJ3	73.19	119.109	.429	.318	.904
ENJ4	72.52	120.414	.475	.405	.901
SEC1	72.38	120.772	.575	.502	.899
SEC2	72.88	119.898	.515	.393	.900
ASU1	73.80	122.474	.289	.620	.908
ASU2	73.74	122.548	.270	.636	.910
DES1	72.70	120.075	.598	.460	.899
DES2	72.87	119.858	.624	.493	.898
CON1	72.47	118.671	.621	.491	.898
CON2	72.33	122.845	.438	.390	.902
CUS1	72.94	116.125	.692	.600	.896
CUS2	72.76	117.304	.668	.590	.896
CUS3	73.02	118.109	.513	.494	.901

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.828	2.752	4.290	1.538	1.559	.204	20
Item Variances	.928	.666	1.613	.947	2.423	.088	20

2. Passenger Satisfaction:

Case Processing Summary

		N	%
Cases	Valid	300	87.2
	Excluded[a]	44	12.8
	Total	344	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.893	.894	3

Inter-Item Correlation Matrix

	ExptnLevel	OverallExpSat	CloseToIdeal
ExptnLevel	1.000	.804	.697
OverallExpSat	.804	1.000	.714
CloseToIdeal	.697	.714	1.000

Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
ExptnLevel	7.39	2.821	.811	.677	.833
OverallExpSat	7.32	2.621	.822	.692	.820
CloseToIdeal	7.51	2.766	.743	.552	.890

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	3.703	3.603	3.787	.183	1.051	.009	3
Item Variances	.788	.717	.829	.111	1.155	.004	3

APPENDIX C: NORMALITY TEST

- Passenger Satisfaction

Case Processing Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
PassengerSat	300	100.0%	0	0.0%	300	100.0%

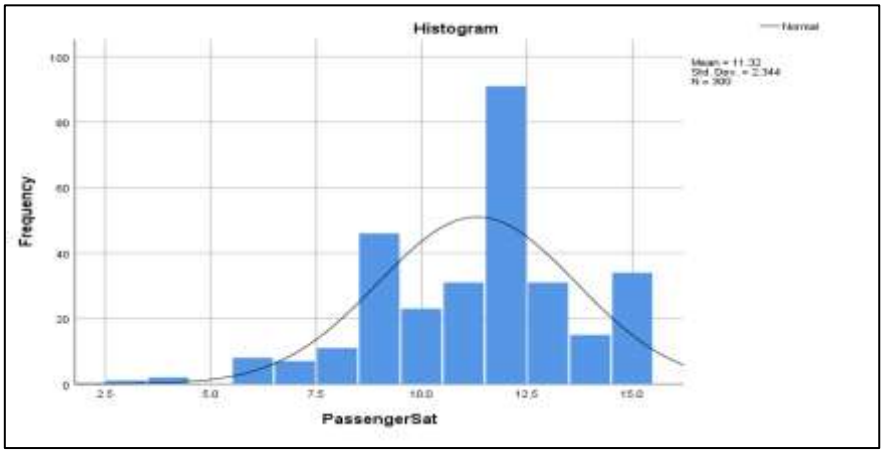
Descriptives

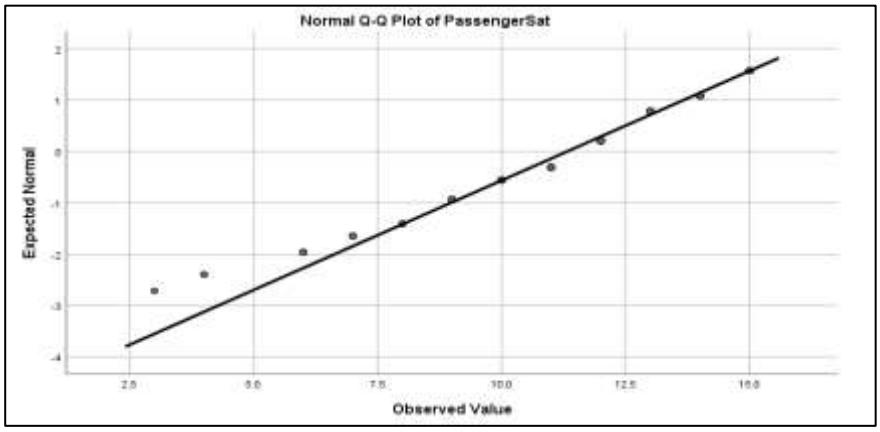
			Statistic	Std. Error
PassengerSat	Mean		11.32	.135
	95% Confidence Interval for Mean	Lower Bound	11.05	
		Upper Bound	11.59	
	5% Trimmed Mean		11.42	
	Median		12.00	
	Variance		5.496	
	Std. Deviation		2.344	
	Minimum		3	
	Maximum		15	
	Range		12	
	Interquartile Range		4	
	Skewness		-.523	.141
	Kurtosis		.290	.281

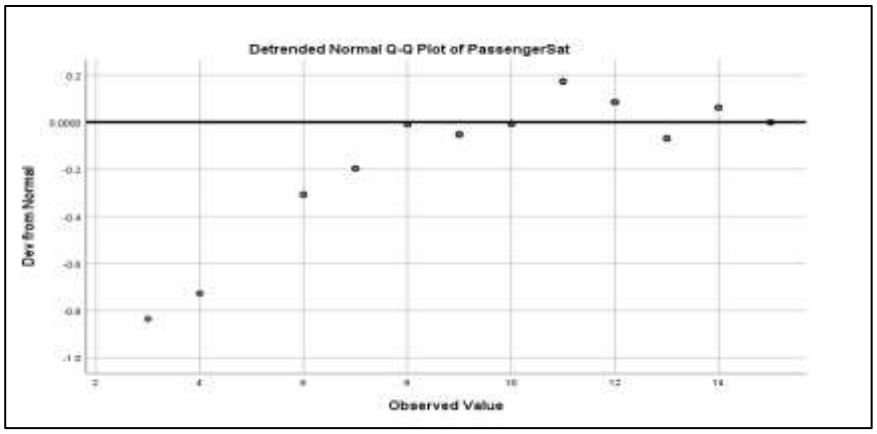
Tests of Normality

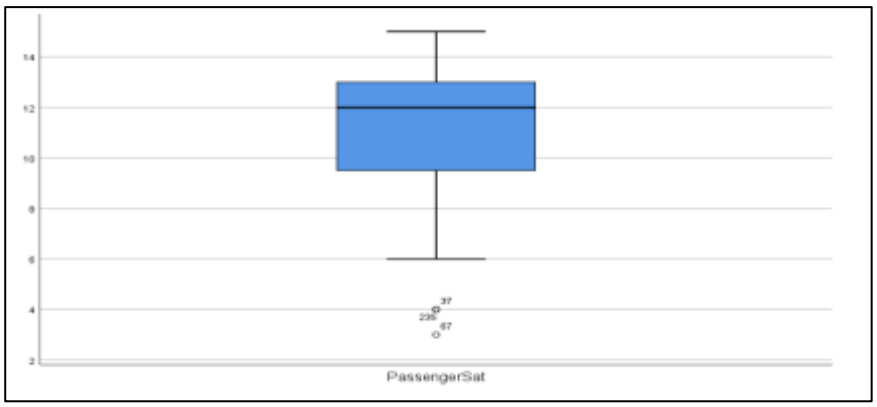
	Kolmogorov-Smirnov[a]			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
PassengerSat	.184	300	.000	.943	300	.000

a. Lilliefors Significance Correction




Normal Q-Q Plot of PassengerSat
Expected Normal
Observed Value


Detrended Normal Q-Q Plot of PassengerSat
Dev from Normal
Observed Value


PassengerSat

APPENDIX D: MANN-WHITNEY TEST

- Gender and Passenger Satisfaction:

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PassengerSat	300	11.32	2.344	3	15
Gender	300	.43	.496	0	1

Mann-Whitney Test

Ranks

	Gender	N	Mean Rank	Sum of Ranks
PassengerSat	Male	170	156.26	26564.50
	Female	130	142.97	18585.50
	Total	300		

Test Statistics[a]

	PassengerSat
Mann-Whitney U	10070.500
Wilcoxon W	18585.500
Z	-1.340
Asymp. Sig. (2-tailed)	.180

a. Grouping Variable: Gender

APPENDIX E: KRUSKAL-WALLIS TEST

1. Age categories and Passenger Satisfaction:

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PassengerSat	300	11.32	2.344	3	15
Age	300	2.41	1.365	0	5

Kruskal-Wallis Test

Ranks

	Age	N	Mean Rank
PassengerSat	15-18 y	13	147.81
	19-29 y	90	149.48
	30-39 y	53	179.23
	40-49 y	65	129.62
	50-59 y	62	146.61
	60+ y	17	162.38
	Total	300	

Test Statistics[a,b]

	PassengerSat
Kruskal-Wallis H	10.418
df	5
Asymp. Sig.	.064

a. Kruskal Wallis Test

b. Grouping Variable: Age

2. Education levels and Passenger Satisfaction:

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PassengerSat	300	11.32	2.344	3	15
Edu	300	2.26	.918	0	3

Kruskal-Wallis Test

Ranks

	Edu	N	Mean Rank
PassengerSat	HSE	28	134.91
	Diploma	13	123.35
	UG	111	159.17
	PG	148	149.33
	Total	300	

Test Statistics[a,b]

	PassengerSat
Kruskal-Wallis H	3.436
df	3
Asymp. Sig.	.329

a. Kruskal Wallis Test

b. Grouping Variable: Edu

3. Indian City Airports and Passenger Satisfaction:

Descriptive Statistics

	N	Mean	Std. Deviation	Minimum	Maximum
PassengerSat	300	11.32	2.344	3	15
Airport	300	2.39	1.793	0	6

Kruskal-Wallis Test

Ranks

	Airport	N	Mean Rank
PassengerSat	AHM	14	155.68
	BLR	121	159.44
	CHN	54	147.80
	DEL	44	133.58
	HYD	18	168.75
	KOL	10	159.00
	MUM	39	133.13
	Total	300	

Test Statistics[a,b]

	PassengerSat
Kruskal-Wallis H	5.724
df	6
Asymp. Sig.	.455

a. Kruskal Wallis Test

b. Grouping Variable: Airport

APPENDIX F: SPEARMAN CORRELATION TEST

1. SSTQUAL Dimensions:

			PassengerSat	Functionality	Enjoyment	Security	Assurance	Design	Convenience	Customization
Spearman's rho	PassengerSat	Correlation Coefficient	1.000	.721**	.660**	.535**	.217**	.623**	.582**	.623**
		Sig. (2-tailed)	.	.000	.000	.000	.002	.000	.000	.000
		N	300	210	210	210	210	210	210	210
	Functionality	Correlation Coefficient	.721**	1.000	.606**	.579**	.267**	.601**	.615**	.613**
		Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000	.000
		N	210	210	210	210	210	210	210	210
	Enjoyment	Correlation Coefficient	.660**	.606**	1.000	.511**	.183**	.481**	.446**	.531**
		Sig. (2-tailed)	.000	.000	.	.000	.008	.000	.000	.000
		N	210	210	210	210	210	210	210	210
	Security	Correlation Coefficient	.535**	.579**	.511**	1.000	.263**	.512**	.460**	.572**
		Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000	.000
		N	210	210	210	210	210	210	210	210
	Assurance	Correlation Coefficient	.217**	.267**	.183**	.263**	1.000	.359**	.095	.285**
		Sig. (2-tailed)	.002	.000	.008	.000	.	.000	.170	.000
		N	210	210	210	210	210	210	210	210
	Design	Correlation Coefficient	.623**	.601**	.481**	.512**	.359**	1.000	.467**	.597**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.000	.000
		N	210	210	210	210	210	210	210	210
	Convenience	Correlation Coefficient	.582**	.615**	.446**	.460**	.095	.467**	1.000	.530**
		Sig. (2-tailed)	.000	.000	.000	.000	.170	.000	.	.000
		N	210	210	210	210	210	210	210	210
	Customization	Correlation Coefficient	.623**	.613**	.531**	.572**	.285**	.597**	.530**	1.000
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000	.
		N	210	210	210	210	210	210	210	210

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

2. Prompt Assistance and Passenger Satisfaction:

Correlations

			PassengerSat	PromptAsst
Spearman's rho	PassengerSat	Correlation Coefficient	1.000	.481**
		Sig. (2-tailed)	.	.000
		N	300	210
	PromptAsst	Correlation Coefficient	.481**	1.000
		Sig. (2-tailed)	.000	.
		N	210	210

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

3. Shorter Waiting time and Passenger Satisfaction:

Correlations

			PassengerSat	ShortWTsst
Spearman's rho	PassengerSat	Correlation Coefficient	1.000	.621**
		Sig. (2-tailed)	.	.000
		N	300	210
	ShortWTsst	Correlation Coefficient	.621**	1.000
		Sig. (2-tailed)	.000	.
		N	210	210

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

4. Value Addition and Passenger Satisfaction

Correlations

			PassengerSat	ValueADDTN
Spearman's rho	PassengerSat	Correlation Coefficient	1.000	.476**
		Sig. (2-tailed)	.	.000
		N	300	300
	ValueADDTN	Correlation Coefficient	.476**	1.000
		Sig. (2-tailed)	.000	.
		N	300	300

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

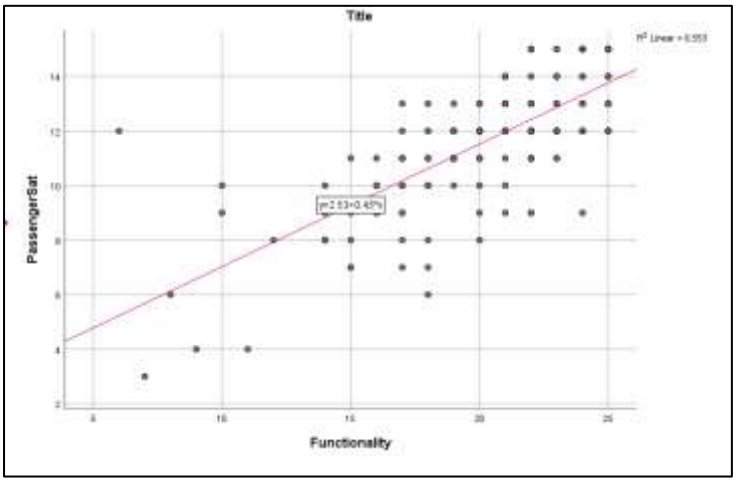
5. Safety and Passenger Satisfaction:

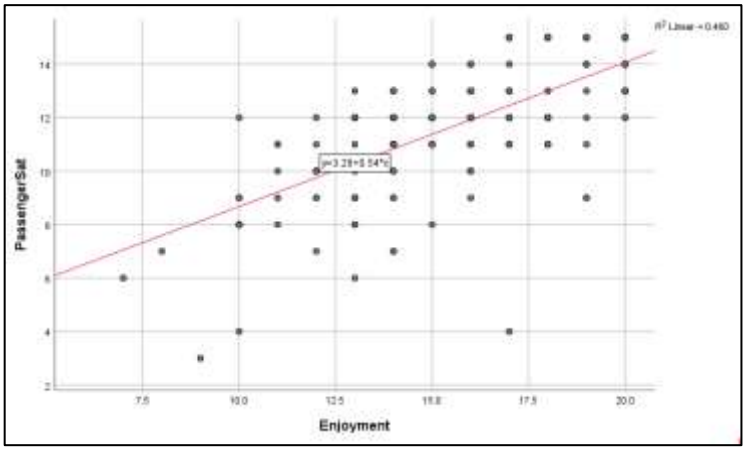
Correlations

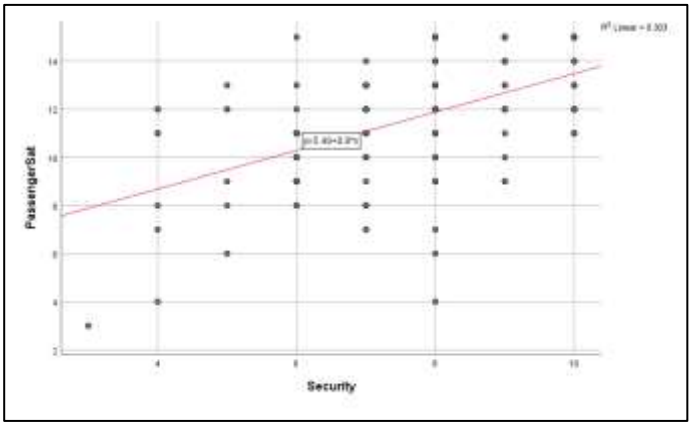
			PassengerSat	covidSAFEsst
Spearman's rho	PassengerSat	Correlation Coefficient	1.000	.276**
		Sig. (2-tailed)	.	.000
		N	300	300
	covidSAFEsst	Correlation Coefficient	.276**	1.000
		Sig. (2-tailed)	.000	.
		N	300	300

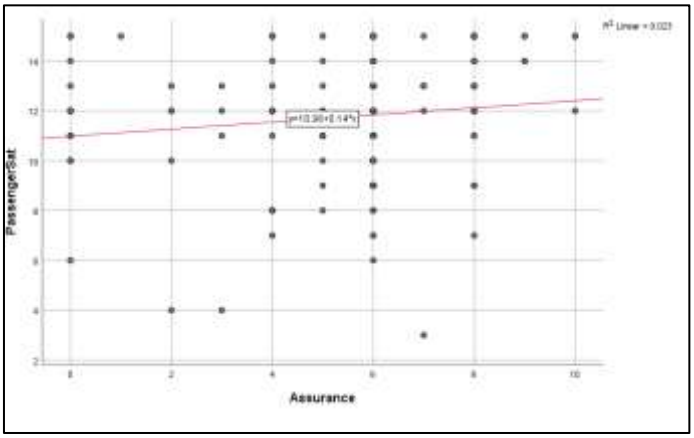
**. Correlation is significant at the 0.01 level (2-tailed).

- SCATTER PLOTS






PassengerSat
Security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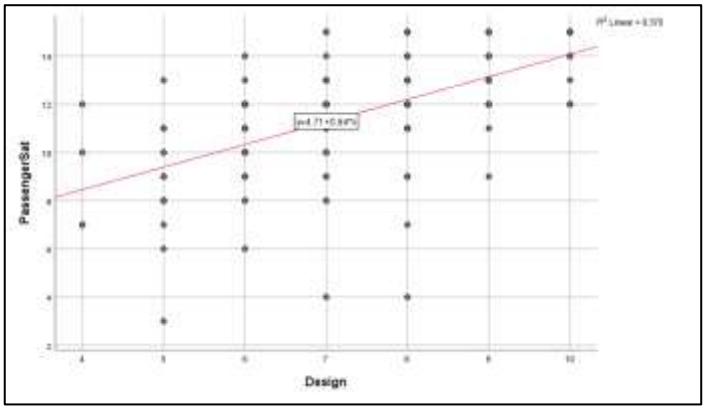
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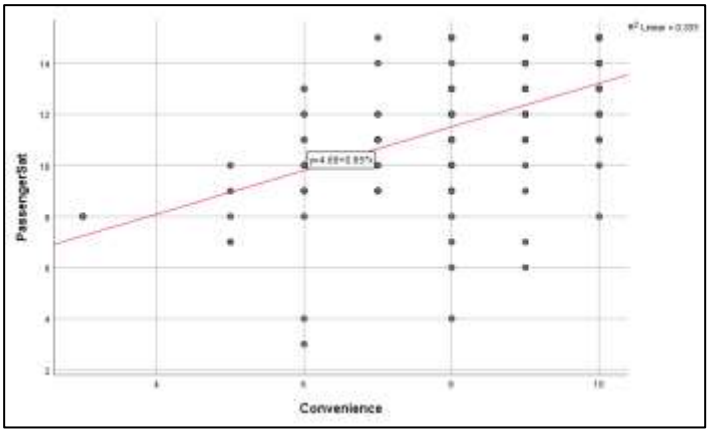
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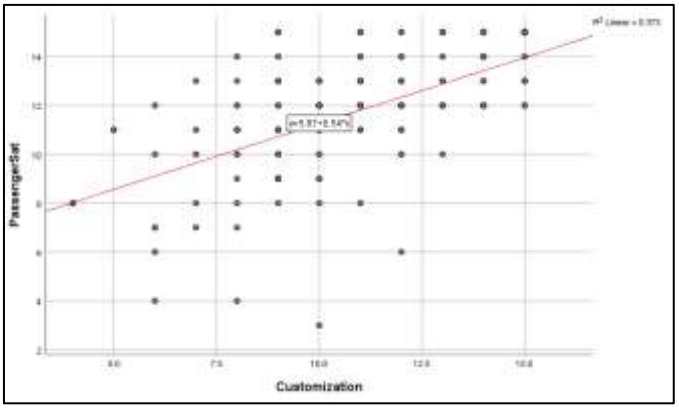
Convenience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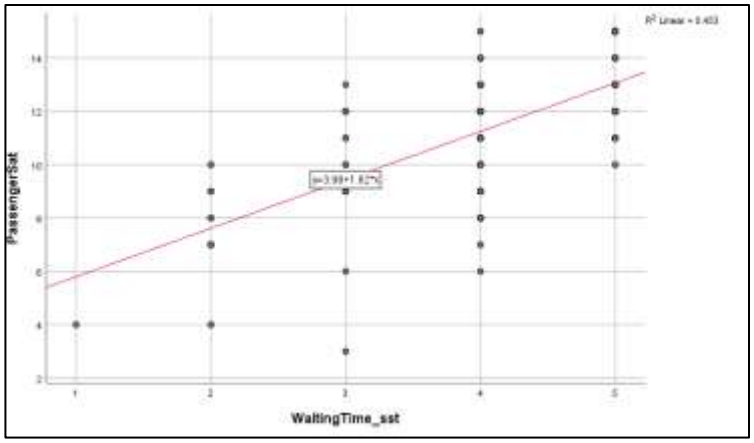
Customization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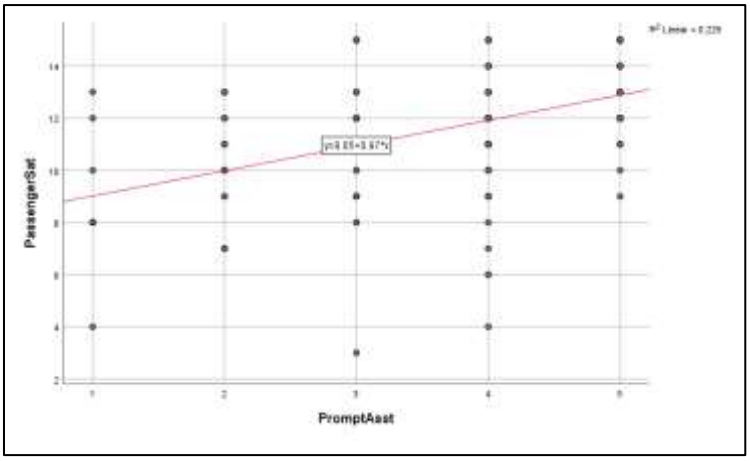
WaitingTime_sst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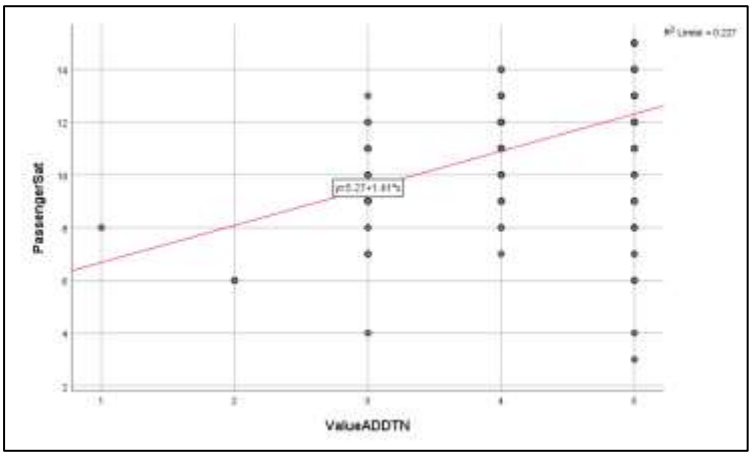
PromptAsst


PassengerSat
ValueADDTN

APPENDIX G : HIERARCHICAL LOGISTIC REGRESION MODEL

MODEL 1

- ASSUMPTIONS VERIFICATION:

1. Linearity

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Functionality	-4.532	2.041	4.930	1	.026	.011
	Enjoyment	1.802	4.387	.169	1	.681	6.060
	Security	3.474	3.900	.793	1	.373	32.252
	Assurance	-5.313	3.127	2.885	1	.089	.005
	Design	-4.760	7.778	.375	1	.541	.009
	Convenience	2.980	7.071	.178	1	.673	19.691
	Customization	-6.132	4.655	1.735	1	.188	.002
	ShortWTsst	12.075	9.507	1.613	1	.204	175397.046
	PromptAsst	.027	3.846	.000	1	.994	1.027
	ValueADDTN	9.737	12.208	.636	1	.425	16927.797
	Functionality by Log_FUN	1.244	.547	5.174	1	.023	3.470
	Enjoyment by Log_ENJ	-.402	1.178	.116	1	.733	.669
	Log_SEC by Security	-1.272	1.323	.924	1	.336	.280
	Assurance by Log_ASU	2.083	1.184	3.094	1	.079	8.031
	Design by Log_DES	1.803	2.650	.463	1	.496	6.070
	Convenience by Log_CON	-.891	2.311	.149	1	.700	.410
	Customization by Log_CUS	2.002	1.413	2.007	1	.157	7.405
	Log_PMP_AST by PromptAsst	.143	1.788	.006	1	.936	1.153
	Log_SWT by ShortWTsst	-5.372	4.035	1.772	1	.183	.005
	Log_VADD by ValueADDTN	-3.621	5.042	.516	1	.473	.027
	Constant	-15.197	33.564	.205	1	.651	.000

2. Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	-1.588	.185		-8.568	.000		
	Functionality	.033	.010	.257	3.268	.001	.397	2.517
	Enjoyment	.009	.012	.053	.750	.454	.499	2.005
	Security	.015	.020	.048	.741	.460	.582	1.717
	Assurance	.001	.011	.003	.050	.961	.908	1.101
	Design	.031	.023	.094	1.326	.186	.490	2.039
	Convenience	.023	.022	.073	1.066	.288	.519	1.927
	Customization	.044	.015	.235	3.028	.003	.408	2.449
	ShortNTsst	.003	.043	.005	.072	.943	.430	2.323
	PromptAsst	.011	.028	.026	.392	.696	.561	1.782
	ValueADDTN	.079	.039	.126	2.024	.044	.638	1.569

a. Dependent Variable: Dicot_PSAT

- MODEL 1

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	267.369	.667
	2	267.336	.693
	3	267.336	.693

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 267.336

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted		
			Dicot_PSAT		Percentage Correct
			Dissatisfied	Satisfied	
Step 0	Dicot_PSAT	Dissatisfied	0	70	.0
		Satisfied	0	140	100.0
	Overall Percentage				66.7

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.693	.146	22.421	1	.000	2.000

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Functionality	80.858	1	.000
		Enjoyment	55.085	1	.000
		Security	45.710	1	.000
		Assurance	4.542	1	.033
		Design	58.308	1	.000
		Convenience	56.857	1	.000
		Customization	78.447	1	.000
	Overall Statistics		104.420	7	.000

Block 1: Method = Forward Stepwise (Likelihood Ratio)

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	97.874	1	.000
	Block	97.874	1	.000
	Model	97.874	1	.000
Step 2	Step	27.278	1	.000
	Block	125.152	2	.000
	Model	125.152	2	.000
Step 3	Step	4.232	1	.040
	Block	129.384	3	.000
	Model	129.384	3	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	169.462[a]	.373	.517
2	142.184[a]	.449	.624
3	137.952[a]	.460	.639

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	4.841	7	.679
2	13.391	8	.099
3	21.207	8	.007

Classification Table[a]

Observed			Predicted: Dicot_PSAT Dissatisfied	Predicted: Dicot_PSAT Satisfied	Percentage Correct
Step 1	Dicot_PSAT	Dissatisfied	51	19	72.9
		Satisfied	13	127	90.7
	Overall Percentage				84.8
Step 2	Dicot_PSAT	Dissatisfied	51	19	72.9
		Satisfied	13	127	90.7
	Overall Percentage				84.8
Step 3	Dicot_PSAT	Dissatisfied	53	17	75.7
		Satisfied	10	130	92.9
	Overall Percentage				87.1

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	95% C.I.for EXP(B) Upper
Step 1[a]	Functionality	.593	.065	48.415	1	.000	1.809	1.531	2.138
	Constant	-11.300	1.725	42.893	1	.000	.000		
Step 2[b]	Functionality	.401	.088	20.759	1	.000	1.494	1.257	1.775
	Customization	.608	.133	20.878	1	.000	1.837	1.415	2.384
	Constant	-13.743	2.054	44.758	1	.000	.000		
Step 3[c]	Functionality	.357	.090	15.719	1	.000	1.429	1.198	1.704
	Design	.415	.206	4.075	1	.044	1.515	1.012	2.267
	Customization	.533	.140	14.559	1	.000	1.704	1.296	2.240
	Constant	-15.056	2.232	45.491	1	.000	.000		

a. Variable(s) entered on step 1: Functionality.

b. Variable(s) entered on step 2: Customization.

c. Variable(s) entered on step 3: Design.

Model if Term Removed

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1	Functionality	-133.668	97.874	1	.000
Step 2	Functionality	-86.110	30.036	1	.000
	Customization	-84.731	27.278	1	.000
Step 3	Functionality	-79.897	21.841	1	.000
	Design	-71.092	4.232	1	.040
	Customization	-77.626	17.299	1	.000

Block 2: Method = Forward Stepwise (Likelihood Ratio)

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	4.283	1	.039
	Block	4.283	1	.039
	Model	133.667	4	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	133.669[a]	.471	.654

a. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	10.255	8	.248

Classification Table[a]

			Predicted		
			Dicot_PSAT		Percentage Correct
	Observed		Dissatisfied	Satisfied	
Step 1	Dicot_PSAT	Dissatisfied	52	18	74.3
		Satisfied	12	128	91.4
	Overall Percentage				85.7

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Functionality	.302	.090	11.326	1	.001	1.352	1.134	1.612
	Design	.434	.208	4.339	1	.037	1.544	1.026	2.322
	Customization	.486	.140	11.988	1	.001	1.626	1.235	2.141
	ValueADDTN	.707	.347	4.154	1	.042	2.028	1.027	4.001
	Constant	-16.593	2.449	45.899	1	.000	.000		

a. Variable(s) entered on step 1: ValueADDTN.

Model if Term Removed

Variable		Model Log Likelihood	Change in -2 Log Likelihood	df	Sig. of the Change
Step 1	ValueADDTN	-68.976	4.283	1	.039

APPENDIX H: LOGISTIC REGRESION (COVID-19)

MODEL 2

- ASSUMPTIONS VERIFICATION:

1. Linearity

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	covidSAFEsst	-1.384	1.089	1.615	1	.204	.250
	Log_Safe by covidSAFEsst	.813	.498	2.668	1	.102	2.255
	Constant	1.136	1.536	.547	1	.460	3.116

a. Variable(s) entered on step 1: covidSAFEsst, Log_Safe * covidSAFEsst.

2. Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.188	.100		1.874	.062		
	covidSAFEsst	.094	.024	.224	3.964	.000	1.000	1.000

a. Dependent Variable: Dicot_PSAT

- MODEL

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	409.989	.280
	2	409.989	.282
	3	409.989	.282

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 409.989

c. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted Dicot_PSAT		Percentage Correct
			Dissatisfied	Satisfied	
Step 0	Dicot_PSAT	Dissatisfied	0	129	.0
		Satisfied	0	171	100.0
	Overall Percentage				57.0

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.282	.117	5.841	1	.016	1.326

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	covidSAFEsst	15.029	1	.000
	Overall Statistics		15.029	1	.000

Block 1: Method = Forward Stepwise (Likelihood Ratio)

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	15.090	1	.000
	Block	15.090	1	.000
	Model	15.090	1	.000

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	394.899[a]	.049	.066

a. Estimation terminated at iteration number 3 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	3.846	2	.146

Classification Table[a]

			Predicted		
			Dicot_PSAT		
	Observed		Dissatisfied	Satisfied	Percentage Correct
Step 1	Dicot_PSAT	Dissatisfied	51	78	39.5
		Satisfied	38	133	77.8
	Overall Percentage				61.3

a. The cut value is .500

APPENDIX I: LOGISTIC REGRESION (FUTURE USE)

MODEL 3

- ASSUMPTIONS VERIFICATION:

1. Linearity

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Functionality	1.134	1	.287
		Enjoyment	.290	1	.590
		Security	.572	1	.449
		Assurance	.088	1	.766
		Design	1.388	1	.239
		Convenience	2.180	1	.140
		Customization	.687	1	.407
		Functionality by Log_FUN	1.303	1	.254
		Enjoyment by Log_ENJ	.287	1	.592
		Log_SEC by Security	.433	1	.510
		Assurance by Log_ASU	.066	1	.798
		Design by Log_DES	1.480	1	.224
		Convenience by Log_CON	2.071	1	.150
		Customization by Log_CUS	.686	1	.408
	Overall Statistics		21.687	14	.085

2. Multicollinearity

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			Collinearity Statistics	
		B	Std. Error	Beta	t	Sig.	Tolerance	VIF
1	(Constant)	.882	.111		7.976	.000		
	Functionality	.006	.006	.096	.940	.348	.451	2.215
	Enjoyment	.001	.008	.011	.121	.904	.527	1.899
	Security	.002	.013	.017	.193	.847	.603	1.660
	Assurance	.001	.007	.012	.166	.869	.913	1.096
	Design	-.041	.015	-.266	-2.741	.007	.501	1.996
	Convenience	.017	.014	.114	1.254	.211	.570	1.756
	Customization	.007	.009	.076	.738	.461	.444	2.254

a. Dependent Variable: Future_use

- MODEL

Block 0: Beginning Block

Iteration History[a,b,c]

Iteration		-2 Log likelihood	Coefficients Constant
Step 0	1	104.211	1.790
	2	87.851	2.530
	3	86.325	2.843
	4	86.296	2.894
	5	86.296	2.895
	6	86.296	2.895

a. Constant is included in the model.

b. Initial -2 Log Likelihood: 86.296

c. Estimation terminated at iteration number 6 because parameter estimates changed by less than .001.

Classification Table[a,b]

Observed			Predicted Future_use No	Predicted Future_use Yes	Percentage Correct
Step 0	Future_use	No	0	11	.0
		Yes	0	199	100.0
	Overall Percentage				94.8

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	2.895	.310	87.387	1	.000	18.091

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Functionality	1.262	1	.261
		Enjoyment	.332	1	.565
		Security	.255	1	.614
		Assurance	.052	1	.820
		Design	1.687	1	.194
		Convenience	1.790	1	.181
		Customization	.458	1	.499
	Overall Statistics		9.714	7	.205

APPENDIX J: SURVEY QUESTIONNAIRE

Passenger Satisfaction on using Self-Service Technology (SST) in Indian Airports (self check-in kiosks/ self baggage drop kiosks)

Greetings !!

This page provides you with detailed information regarding the present study. Please read it fully prior to completing the questionnaire.

Who is conducting this study?
I am Aishwarya Venkateswaran, a student of MSc Management from National College of Ireland (NCI).I am completing this study in part fulfilment of my dissertation work.

What is the purpose of this study?
This research focuses on the impact of Self-Service Technology (SST) on passenger satisfaction across different Indian Metropolitan city airports (Ahmedabad, Bangalore, Chennai, Delhi, Hyderabad, Kolkata and Mumbai).

Do I have to take part?
The participation is voluntary. You can opt to withdraw from the survey at any given point and your responses will not be recorded. If you are happy to complete this questionnaire, all responses will remain anonymous and confidential. The data will be stored securely in a password protected file and will be accessed by my thesis guide and myself.

What does the questionnaire involve?
The questionnaire is divided into few sections which capture general information, your experience of using the SST and overall satisfaction.The survey will not take more than 10 minutes to complete.

What will happen to the results of the research study?
All aggregated data will be analyzed and discussed in the thesis. Individual responses will not be presented.It will be then deleted after the timeframe, which is a part of the NCI guidelines.

For further queries kindly feel free to email me at (aishuthesis@gmail.com)

Thank You !!

* Required

What is Self-Service Technology (SST)? The term Self-Service Technology (SST) refers to the kiosks that allow for self-services like check-in and bag-drop at airports (ex. ATM in banks, self-checkout kiosks at supermarket).

1. This questionnaire has been sent to you by Aishwarya Venkateswaran in part of fulfilment of her dissertation study. The data collected will be used to analyze the passenger satisfaction on using Self -Service Technology(SST) in Indian Airports. Do you agree to take part in this study? *

   Mark only one oval.

   - ◯ I am happy to take part in this study
   - ◯ I do not want to take part in this study

General Information

Kindly answer in CAPITALS

2. 1. Gender *

   Mark only one oval.

   - ◯ Male
   - ◯ Female

3. 2. Age *

Mark only one oval.

- 15 -18 years
- 19 -29 years
- 30- 39 years
- 40 -49 years
- 50- 59 years
- 60 + years

4. 3.Highest level of education attained *

Mark only one oval.

- Higher Secondary Certificate
- Diploma
- Graduate
- Postgraduate

5. 4. Nationality *

_____

6. 4. Have you travelled through any of the following city airports in the last 1.5 years (2018-2020) ? (please choose the most recent airport) *

Mark only one oval.

- Ahmedabad
- Bangalore
- Chennai
- Delhi
- Hyderabad
- Kolkata
- Mumbai
- None of the above *Skip to question 42*

Kindly answer the following question(s) from the perspective of your indicated airport in Question 4 of SECTION 1

NOTE : SELF-SERVICE TECHNOLOGY is abbreviated as SST in the following question(s)

7. 1. Have you used any SST in the chosen airport (self check-in kiosks which enables boarding pass printing/self baggage drop which enables boarding pass and baggage tag printing) *

Mark only one oval.

- Yes
- No *Skip to question 31*

Self-Service Technology (SST) service quality experience

In this section there are questions relating to your experience of using the self-service technology in the chosen airport. Kindly respond as accurately as possible.

The response scale is as follows -
1= Strongly Disagree
2= Disagree
3=Neutral
4=Agree
5=Strongly Agree

Kindly answer the following question(s) from the perspective of your indicated airport in Question 4 of SECTION 1

NOTE : SELF-SERVICE TECHNOLOGY is abbreviated as SST in the following question(s)

8. 1. I can get my service done with the SST in a short time (The SST response time is quick) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

9. 2. The service process of the SST is clear (The operation instructions are clear and simple to follow) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

10. 3. Using the SST requires little effort (The SST is easy to use) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

11. 4. I can get my service done smoothly with the SSTs *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

12. 5. Each service item/function of the SST is error-free *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

13. 6. The operation of the SST is interesting *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

14. 7. I feel good being able to use the SST *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

15. 8. The SST has interesting additional functions (any additional functions available apart from boarding pass/ baggage tag printing) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

16. 9. The SST provides me with all relevant information (information regarding baggage restrictions, prohibited items) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

17. 10. I feel safe in my transactions with the SST *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

18. 11. A clear privacy policy is stated when I use the SST *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

19. 12. The firm providing the SST is well-known *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Don't know
Your choice	◯	◯	◯	◯	◯	◯

20. 13. The firm providing the SST has a good reputation *

Mark only one oval per row.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly agree	Don't know
Your choice	◯	◯	◯	◯	◯	◯

21. 14.The layout of the SST is aesthetically appealing *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

22. 15.The SST appears to use up-to-date technology (in comparison to the other SST you have used in other sectors or same sector) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

23. 16.The SST has operating hours convenient to customers (the SST is in operation at all times whenever you have travelled) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

24. 17. It is easy and convenient to reach the SST (the SST is placed at convenient locations in the airport) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

25. 18. The SST understands my specific needs *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

26. 19. The SST has my best interests at heart (the SST is beneficial and favorable to the passengers) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

27. 20.The SST has features that are personalized for me (for example the interface of the SST is available in regional languages) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

28. 21. My waiting time has shortened while using the SST than using the employee managed check-in desk *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

29. 22.Prompt assistance is provided by Airport support staff while using SST (in case of any difficulty faced by the passenger) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

30. 23. Waiting time to access SST service (amount of time passengers wait in queue to use the kiosks) *

Mark only one oval.

- ◯ <15 minutes
- ◯ 15 - 30 minutes

Kindly answer QUESTION 2 / QUESTION 3 as applicable

NOTE : SELF-SERVICE TECHNOLOGY is abbreviated as SST in the following question(s)

31. 1. Approximate waiting time while using the employee managed check-in desks *

Mark only one oval.

- ◯ < 15 minutes
- ◯ 15 - 30 minutes
- ◯ > 30 minutes

32. 2. Kindly state the reason for using the SST

_____

_____

_____

33. 3. Kindly state the reason for not using the SST

Passenger Satisfaction

The final section contains questions regarding your satisfaction with the use of the self-service technology in your chosen airport of Question 4 in SECTION 1

The response scale is as follows -
1= Strongly Disagree
2= Disagree
3=Neutral
4=Agree
5=Strongly Agree

NOTE : SELF-SERVICE TECHNOLOGY is abbreviated as SST in the following question(s)

34. 1. The SST matched your expectation level *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

35. 2. Overall, you are satisfied with the experience of the SST *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

36. 3. The service is close to your ideal one (compared to your previous experiences) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

37. 4. SST is a value addition to the airport (overall it helps to manage the passenger traffic effectively and enhances the standard of the airport) *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

38. 5. Would you prefer to use the SST in future and also recommend to others *

Mark only one oval.

- ◯ Yes
- ◯ No

39. 6.If there was a SST introduced for immigration purpose(e.g. passport scanning) would you prefer to use it? *

Mark only one oval.

- ◯ Yes
- ◯ No
- ◯ Maybe

40. 7. Would you like SST to be introduced in any other sections of the airport, if YES kindly mention *

41. 8. Any areas for improvement/ suggestions regarding SST services and its service quality *

Travel During COVID-19

This section has questions related to your travel before or after the lockdown period.

NOTE : SELF-SERVICE TECHNOLOGY is abbreviated as SST in the following question(s)

42. 1. Have you travelled through any Indian airport during PRE-LOCKDOWN PERIOD (January, February, March 2020). *

Mark only one oval.

- ◯ Yes
- ◯ No

43. 2. Have you travelled in any Indian airport during POST-LOCKDOWN PERIOD *

Mark only one oval.

- ◯ Yes
- ◯ No

44. 3. Have you used any of the SST during this travel (either of the above 2 travels) ? *

Mark only one oval.

- ◯ Yes
- ◯ No

45. 4. SST is a safer option considering the COVID-19 situation moving in future *

Mark only one oval.

	1	2	3	4	5	
Strongly Disagree	◯	◯	◯	◯	◯	Strongly Agree

46. 5. Kindly provide reasons for your above answer *