

Sustainable Innovation: Self-Service Technology Adoption on Customer Satisfaction and Loyalty in Ghana's International Airport

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ABSTRACT

Research background: Self-Service Technologies (SSTs) have become a transformative force in the aviation industry, revolutionizing how airlines and airports interact with passengers. These technologies, including self-check-in kiosks, automated bag drops, and mobile boarding systems, enhance operational efficiency while empowering customers with greater control over their travel experience. As global competition intensifies, the adoption of SSTs has become a strategic imperative for improving service quality, customer satisfaction, and long-term loyalty.

Purpose of the article: This study's main goal is to examine how Ghana's International Airport, popularly known as Kotoka International Airport (KIA), has used self-service technology and how that has affected consumer loyalty and happiness.

Methods: The study followed quantitative methodology and used a descriptive research design. An electronic survey was disseminated through social media sites, emails, and QR codes that could be scanned. After distribution at KIA, 309 of 385 replies were found to be legitimate, and those results, along with all 317, were utilized to analyse their satisfaction with the new technology. The statistical methods, such as descriptive statistics, correlation analysis, and multiple regression analysis, were used in the evaluation of the data sample.

Findings & Value added: A convenience sample strategy was used to disperse the survey. A descriptive analysis was done on the sociodemographic details of the respondents and the link with SST usage. Standard multiple regression was used to measure the amount of satisfaction and loyalty. The outcome showed that customers are happy with the functionality, ease, and personalization of SST at the airport, and customers are more inclined to use SST there again if its functionality is of better calibre.

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INTRODUCTION

The travel and tourism sector, which offers passengers essential or desirable goods and services, includes a

sizable collection of businesses known as the hospitality sector. One of the largest and fastest-growing industries in the world is the hospitality and tourist sector (Ghosh,

2022). According to Business Tourism and Hospitality data from 2020, the sector was anticipated to generate 328 million jobs and sustain 10% of the global labour force by 2022, significantly boosting the economies of various countries across the world. The hospitality and tourism industry is divided into five segments: lodging (hotels, motels, camps, and cruise ships), transportation (ships, airplanes, vehicles, and trains), food and beverage operations (restaurants, bars, taverns, catering), retail stores (gifts, souvenir, arts/crafts shops), and activities (recreation, business trips, festivals, sporting events), (Hargitai et al., 2024; Ammachathram & Anderson 2018).

Airports are one of the key components of the transportation sector, which considerably boosts a nation's economy by welcoming millions of travellers each year from all over the world. Airports all over the world are striving hard to become the preferred transit hub for travellers and airlines in an effort to take advantage of this significant and lucrative opportunity (Kosiba et al., 2020). The arrival of foreign tourists (overnight stays) in January decreased by 85% in comparison to May 2021, the same period before the 2019 COVID-19 pandemic, or by 65% due to the travel ban in 2020. This is according to official data from the International Air Transport Association (IATA) (2019), which demonstrates that the aviation industry growth rate has been greater than 5% per year for the years 2010 to 2019. Additionally, according to IATA predictions, there will be 8.2 billion passengers flown by airlines in 2037, up from 4.3 billion in 2018.

According to the statistics report from Ghana Airport Company Limited, the domestic airport at Kotoka International Airport (KIA) in 2021 reported 362,569 arrivals and 360,152 departures. International arrivals totalled 632,163 and exits totalled 637,735. Accra is connected to other major cities in the sub-regions by a number of daily flights, and travellers can fly directly or indirectly between Ghana and other countries around the world using inter-continental flights. The Kotoka International Airport has been working hard to provide high-quality service to its patrons in order to guarantee their complete satisfaction.

New opportunities are being created by the current convergence of information and communication technology (ICT). Redistributing personnel, restructuring organisations, exchanging information, and investing in technology are a few of these (Ahmed et al., 2023). For hotels, technology is a key source of competitive advantage. Technology advancements increase customer satisfaction, boost worker efficiency, and cut down on overhead costs (Kumar & Aithal, 2024). Self-Service Technologies (SSTs) emerge as an alternative to or as a replacement for human-based service interactions in much the same way that technical advancements have a major impact on business and marketing strategy (Mason et al., 2022). With the development of artificial intelligence (Ai), the deployment of self-service technologies (SSTs) has significantly increased in the hospitality sector in recent years. To cut costs, boost customer enjoyment, contentment, and loyalty, and reach out to new consumer seg-

ments, the majority of hospitality organisations have been introducing self-service channels (Pai et al., 2022).

According to Ghosh (2021), self-service technology (SST) is a technology-based interface in which customers receive services by interacting with technology rather than with service professionals directly. Additionally, SST offers significant perceived advantages to service providers and clients alike. Airport self-service technology (SST) comes in a variety of forms, such as information kiosks (standalone terminals that provide information, goods, and services), ticketing kiosks (buy airline tickets, check bags, and monitor flight status), Common Use Self Service (CUSS) kiosks (ease congestion and help reduce long lines, shared terminals with multiple airlines), and retail kiosks (customers can purchase goods and services before or after a flight, such as food and beverages). SST is now a trusted service for meeting the needs of both passengers and airlines.

Service quality needs to be understood in order to provide superior service quality in order to match the demands of customers when they transition from traditional distribution channels to SST (Liu & Hung, 2021). The concept of service quality is a crucial issue as clients switch from traditional channels to SST in light of the trend towards SST (Iqbal et al., 2018). Customer satisfaction refers to how a customer feels about a service after receiving it. It mostly has to do with whether or not the service lived up to expectations. Most airports include excellent customer satisfaction and subsequent customer loyalty in their mission and strategic goals by focusing on service effectiveness and quality. The most recent airport upgrades include investments in innovations that simplify the check-in, luggage drop, and gate location procedures for travellers. By enhancing navigation, decreasing line wait times, and offering flight information, these technologies enhance the airport experience. The nature of services, the nature of service delivery, and the practices of service innovation and management are all evolving as a result of technology (Gallo et al., 2024; Kardos et al., 2024). The International Air Transport Association's (2018) passenger survey showed that 82% of travellers worldwide wished to utilise as many digital flight-related products as feasible.

Customer satisfaction and loyalty are two entirely different things. Customer satisfaction is measured as a function of the customer's most recent engagement with a company. Even though the consumer was happy with the service, this does not ensure future business. Contrarily, client loyalty is well-established and every company strives towards it (Rane et al., 2023). Loyal clients and a company have developed a relationship over time- possibly generations. Because the client has been using their products or services for a while, there is a steady stream of revenue and customer confidence in the company. They are also more inclined to tell their friends and family about the business as a sign of support. According to Pai et al. (2020), the more organisations prioritise service quality, the more likely it is that customers will be satisfied, which encourages customer loyalty. Additiona-

lly, similar outcomes are demonstrated for SST service quality and client satisfaction (Tahanisaz, 2020).

Customer satisfaction is a crucial metric for determining how well a business understands and caters to its client's demands. It serves as a hinge connecting the decision-making process prior to purchase with the response following use (Bezerra & Gomes, 2019). Furthermore, 68% of passengers self-tagged their luggage and 72% prefer self-service boarding. These self-service solutions are one of the ways to create value, according to Bezerra & Gomes (2019). By investing in SST, businesses may increase the quality and efficiency of their services for airports, airlines, and passengers while also operating more cost-effectively. Additionally, these technologies help airports cut down on long lines and client wait times. In short, airport SST gives customers better control over their experiences while providing faster service.

Not only have practitioners acknowledged the importance of SSTs on customer happiness and loyalty, but many scholars have also emphasised the importance of convenient service. A substantial amount of prior research (Iqbal et al., 2018; Kuo et al., 2013; Kearse et al., 2012; Arts et al., 2011;) including air transport industry (Kim & Park, 2021; Feng et al., 2019; Majid et al., 2019; Wang et al., 2017) has focused upon the significance of service quality and adoption of SSTs on customer satisfaction, and loyalty using recognized measurement scales i.e., SSTQUAL (Lin & Hsieh, 2011). However, a small amount of research efforts has been made to examine the dimensions of SST service quality and its impact on customer satisfaction and loyalty in Ghana's International Airport. This study attempts to examine the adoption of Self-Service Technology in Kotoka International Airport and understand its influence on customer satisfaction and loyalty.

The management of Kotoka International Airport will greatly benefit from this research, which will help them understand how SST adoption in the various airlines at the airports will increase operational productivity and efficiency, such as enhancing service quality, standardizing service delivery, reaching new customer segments, and improving customer satisfaction, loyalty, and retention. This study will contribute to the body of knowledge regarding self-service technology (SST)..

THEORETICAL BACKGROUND

Self-Service Technologies (SST)

According to Iqbal et al. (2018), self-service technology (SST) is an interface technology that enables customers to access services without the assistance of staff. In addition, self-service technology is any digitally mediated interaction or transaction with a business in which the only people taking part are the customers themselves (Kim & Choi, 2024). SSTs, conversely, are "technology interfaces that enable consumers to provide a service independent of direct service personnel interaction." Iqbal et al. (2018). Personalized services, cost savings,

increased productivity, improved competitiveness, increased market share, and improved brand image are other benefits of SSTs (Li, 2020). According to his intended use, SST is divided into three categories: self-help services (such as hotel SMART concierge systems) and transaction services (such as mobile hotel check-in and check-out and online flight check-in). Customer services are also included in this category.

Technology advancements have shifted focus to new service delivery approaches through the internet, online applications, and handheld devices in the service industries, upending the traditional relationships between the service provider, service personnel, and customer. In particular, the use of self-service delivery systems has grown significantly over the past several years in the service industry (Feng et al., 2019; Wang et al., 2017).

Numerous studies have examined the determinants of users' acceptance of SSTs (Othman et al., 2020; Park, 2020) including: (1) features of SSTs, such as perceived usefulness (Antwi et al., 2021; Kosiba et al., 2020), enjoyment (Park et al., 2021), and perceived risks (Jeon et al., 2021; Le et al., 2020), (2) characteristics of users, such as technological readiness (Suwannakul, 2021; Pooya et al., 2020; Kim & Park, 2019), need for interaction (Antwi et al., 2021) habit (Wang et al., 2017), and sense of power (Othman et al., 2020); and (3) situational factors, such as the presence of employees (Kelly et al., 2019).

According to Li et al. (2021), SST has the potential to increase service quality, as well as speed up, simplify, and accurately complete service transactions. They can also offer cost-effective advantages. Customers may now utilize SST with simplicity and convenience, and they can save time thanks to quicker transactions and shorter lineups. According to Shin & Dai (2022), SST is starting to have an impact on the customer experience and is doing so by lessening the personal connection that was once made possible by the direct engagement between the consumer and the service representative. Studies demonstrate that businesses cannot exist without repeat consumers, thus understanding how SST affects customers is crucial. Such technology lessens in-person interactions between staff and clients, which may have a long-term impact on client retention.

Adoption of SST in Hospitality and Tourism Industry

The rapid development of SST in the hotel and tourist industry has a significant impact on organisations by presenting new opportunities and challenges for clients and staff (Shin & Perdue, 2019). Major hotel chains like Hyatt, Hilton, Marriott, Carlson, and Starwood have implemented self-service kiosks to speed up their check-in procedures in order to follow the example established by airlines (Yau & Tang, 2018; Kim et al., 2012). By offering goods and services through self-service interfaces, for example, hospitality and tourism service providers can boost revenues through SST facilities without increasing labour expenses (Tan & Netessine, 2020). To provide customers with improved service, these advances have

become required. This involves having the ability to give clients the resources they need to service themselves. Additionally, it engages personnel by enabling them to focus on building actual connections with visitors rather than just doing transactions (Le et al., 2020). SSTs, however, give businesses the chance to benefit from both the positive aspects of technology and personalized service. As a result, businesses are better able to respond to client questions and problems and offer quick, precise, and customised service.

Suwannakul (2021) claims that the majority of top airlines have given passengers access to a variety of SSTs via electronic devices, including mobile apps, self-service kiosks, and internet portals. Passengers can now complete particular duties that are often handled by service workers, including flight booking, check-in, boarding card printing, and information requests, thanks to airline SST. More than 50% of airline passengers globally, according to Strother et al. (2010), believe that adopting SST is advantageous since it gives them a sense of control and saves them time. Customers are more likely to think well of an airline company that provides a variety of SST channels for their convenience (Masran & Adis, 2019). They are also likely to enjoy the benefits of cost saving, greater control over service delivery, flexibility and service customisation (Aheleroff et al., 2021; Anshari et al., 2019).

Firms and customers gain several direct and indirect post-adoption benefits from the effective implementation of SSTs (Gummerus et al., 2019). According to Ueda & Kurahashi (2018), direct advantages, on the one hand, correspond to increases in internal efficiency, including lower labour and transaction costs. The relationship between a firm and its clients and rivals can be improved, and a company's competitive advantage can be increased, thanks to SSTs. Ticket kiosks and self-check-in facilities are only two examples of where SSTs can be used to give better services at lower operational costs than more conventional approaches. In addition to increasing service effectiveness and customer happiness, SST facilities have been established (Taillon & Huhmann, 2019). According to recent research (Gummerua et al, 2019), regular use of SSTs also yields stronger returns on the company's original investment in the technology.

Customer satisfaction and loyalty

The core of all marketing initiatives is seen as being customer satisfaction. The primary goal of marketing in the services industry, according to Ali et al. (2021), is to fulfill the requirements and desires of the consumer. In the service sector, the ability to satisfy customers is crucial since happy customers will reward businesses with beneficial conduct. In the literature on services and marketing, customer happiness is always utilized to forecast consumers' intentions to revisit and future purchases (Zhang et al., 2021). Customers who are more satisfied with their purchases are more inclined to do so in the future and to promote the good or service to others. More specifically, when customer satisfaction is increased,

repurchases will occur more frequently (Iqbal et al., 2018).

According to Pai et al. (2020), customer satisfaction is positively related to recommendation. Due to the uncertainty around purchases and the challenges in evaluating the service, recommendations are crucial in the restaurant industry. Pai et al.'s (2020) research also revealed that customer satisfaction positively impacts customer loyalty. A restaurant's success is greatly influenced by the devotion of its patrons. To the study's conclusions, businesses must work to boost customer happiness because it causes more good behaviour intentions (Baloch & Jamshed, 2017).

Customer loyalty was described as "concerning word-of-mouth endorsement, the increased probability of purchase, and frequent buying of firm's offerings" by Sweeney et al. (2020). Customer loyalty, according to Alcock & Millard (2007), is the "mindset of customers who has favourable approaches towards the company, promises to frequently purchase the company's product/service, and recommends the product/service to others." Psychological attachment and behavioural consistency are the two fundamental elements of the loyalty construct (Le et al., 2020). The former is linked to parts of cognition, emotion, and conative experience, whilst the latter is linked to customer behaviours, such as repurchasing (Bezerra & Gomes, 2020).

According to Ahmed et al. (2023), customer loyalty is predicated on the idea that devoted patrons are those who support the business per its business strategy. It is a behavioural notion, according to Majid et al. (2019), that involves customers making recurrent purchases of goods and services. However, Antwi et al. (2021) emphasized the need to make it a strategic goal. According to Hemdi et al. (2016), customer loyalty may be summed up as the desire of customers to develop a long-term relationship with a company. From a theoretical perspective, it is obvious that clients who are happy with a company's services or products would stick with it.

According to Shin & Dai (2022), customer loyalty has a substantial impact on the accomplishment of business profitability. By examining the relationship between service quality, value, and customer loyalty in the context of electronic service delivery, Suhartanto et al. (2019) predicted that customer loyalty rises with service company value.

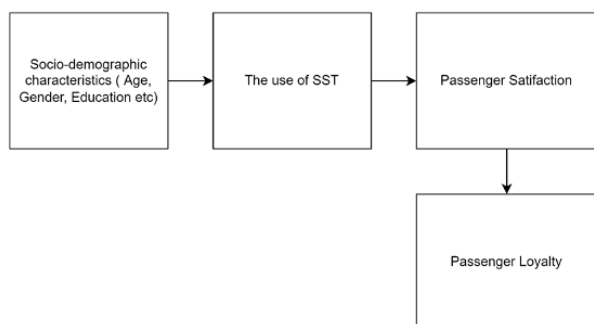
Conceptual Framework

A conceptual framework is a tool used to help researchers become more aware of and comprehend the situation they are studying. The linkage between related ideas, such as the dependent and independent variables, is made clearer by this. The purpose of this study is to determine the link between the dependent variables (passenger happiness and loyalty) and the independent variables (socio-demographic characteristics of passengers-age, education, and income).

In previous research, it was attempted to compare the sociodemographic traits of passengers in relation to the use of SST. Males are more enthusiastic than females to accept new technical devices, according to Hallikaine et al. (2019), while Sobieraj & Krämer (2020) contends that young men use new technology with better levels of self-confidence than women of similar age. Socio-demographic factors affect travellers' attitudes toward utilising SST at airports and their acceptance of new technologies (Yau & Tang, 2018).

According to both theoretical and empirical marketing research, customer satisfaction is a key factor in determining customer loyalty (Omar et al., 2013). Numerous studies have attempted to identify the key factors that influence the formation of customer loyalty. Customers' happiness at the air-port segment predicts their propensity to reorder and buy specific goods and services (Wang et al., 2017). Lin & Hsieh (2011) investigated how users' behavioural intentions to use self-service technologies are influenced by the quality of those technologies. The study also discovered that customers are more likely to return and recommend an airport when they are pleased with the standard of SST offered by a service provider, which includes airports (Kim & Park, 2019). Therefore, in relation to the use of SST with passengers' sociodemographic factors like age, gender, and level of education, customer happiness and loyalty would be included in the framework.

Figure 1: Conceptual framework of the research



Source: own research

RESEARCH OBJECTIVE, METHODOLOGY AND DATA

Research Design

The descriptive research approach was used in this study. A scientific method called descriptive study includes watching and describing a subject's behaviour without in any way changing it. According to Feng et al. (2019), using this design gives the researchers the chance to fully characterise the phenomenon they are studying as well as determine and describe the characteristics of the variables of interest. The descriptive approach was chosen by the researcher because it paints a relevant picture of the events and behaviours. The study used a quantitative methodology for data collection and analysis.

The Kotoka International Airport, which is situated in Ghana's capital city of the Greater Accra Region, was the

sole subject of this study. Kotoka International Airport is located about 10 kilometres outside of the city centre and spans 1610 acres (651 hectares), according to the Ghana Airport Company Limited. The reference point is located at 05° 35' 47" latitude and 000° 10' 12" longitude in the west. Height is 63.5 metres (205 feet). K.I.A. may be reached from everywhere in the world due to its strategic location (on the Greenwich Meridian and near the Equator).

KIA is outfitted with cutting-edge convenience that can accommodate 1,250 people per hour and five million passengers annually. Six (6) boarding bridges and a sizable shop space measuring over 7000 square metres are included, providing comfort and safety for the increasing number of passengers. Accra is connected to other major cities in the sub-regions by some daily flights, and travellers can fly directly or indirectly between Ghana and other countries around the world using intercontinental flights. Twenty or more airlines operate out of the airport. 7,780 travellers per day on average use the airport.

Data and sample size determination

In order to gather the necessary material for this study, the researcher used both primary and secondary sources of information. Primary data is information that is completely original and one-of-a-kind and was gathered by the researchers from the source or study item in question. To achieve this, KIA passengers served as the major source of data. When necessary, the researcher used questionnaires and interviews. Secondary data was obtained by other scholars from the internet, books, papers, journals, and similar works.

Population refers to the total group of participants the researcher plans to use for the investigation or from which to conclude. The target population is referred to by Etikan & Bala (2017) as the collection of individuals, things, or institutions that define the investigation's study objects. Passengers leaving or arriving at Accra Kotoka International Airport are the study's target audience. Because they are directly related to the self-service technology at the airport, this study focuses on travellers.

The study used a minimum of 385 passengers as a sample because the population's size is uncertain and it is a moving population. This total sample size was established that, in order to have a 95% confidence level that the real value was within 5% of the measured or surveyed value, a minimum of 385 samples were required.

Sample procedure

A convenient sample was chosen since it was affordable, simple, and had easily available subjects given that the primary goal of this research was to investigate passengers' happiness and loyalty with SST adoption in Kotoka International Airport. Convenience sampling's primary goal is to get data from readily available participants (Etikan & Bala, 2016). Members of the target population who meet specific practical requirements, such as being easily accessible, nearby geographically, or available at the

specified time, are included in convenience sampling, a sort of nonprobability sampling.

This study uses the SSTQUAL scale developed by Lin & Hsieh (2011), the satisfaction scale developed by the American Customer Satisfaction Index (ACSI), the self-service technology performance and loyalty developed by SST performance and loyalty (Abd Majid et al., 2018), and forms of SST developed by to examine the effects of SST's service quality and adoptions. The first-hand information was gathered using a semi-structured questionnaire. Because questionnaires are a cheap approach to collecting data from a potentially large number of respondents, this form of data gathering was chosen. The questionnaires provide a higher level of anonymity and confidentiality protection. This research tool was selected under the presumption that the majority of respondents could read and write. Semi-structured questionnaires are a more affordable way than other instruments to collect information from lots of respondents so that the results can be statistically analysed.

The questionnaires also provide a higher level of anonymity assurance. Even if they have their benefits, surveys have certain drawbacks. It is challenging to clarify any detail in the questions that respondents might misinterpret due to the standardised character of surveys (Cohen et al., 2011). The closed-ended and Likert-style items in the semi-structured questionnaire allowed for speedy responses and little to no writing. 49 questions made up the questionnaire. There were five (5) sections in the questionnaire. Seven (7) questions made up Section A, which examined the respondents' socio-demographic details such as age, gender, and educational attainment (Researcher Construct, 2023).

Participants were asked to name the various SST accessible at KIA in five (5) questions in Section B, which focused on the Self-Service Technology offered at the Kotoka International Airport. With the use of twenty-eight questions, Section C evaluated how self-service technology (SST) was used at the airport to ascertain how it operated, if users found it entertaining to use, and whether their security was guaranteed (Lin & Hsieh, 2011). Six (6) questions in Section D, including "the SST baggage drops were helpful" and "the self-check-in kiosk was appropriately designed," examined the effectiveness of the SST. The American Customer Satisfaction Index (ACSI) used three (3) questions, such as "Overall, I am satisfied with the SST offered at the airport" and "I intend to continue using SST at the airport," to measure the performance of the self-service technology and its effects on the loyalty level of passengers towards the use of SST. To further the goals of the study, these questions were altered.

To expedite data input and display, the primary data gathered through the use of a questionnaire was statistically analysed using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS Version 23.0). According to the responses from the administered questionnaire, the results were tallied. Statistical tables and

charts were used to present the collected data. The sociodemographic traits of the interviewees and the SST accessibility at Kotoka International Airport were assessed using descriptive analysis. To investigate the relationship between respondents' sociodemographic traits and SST use, a correlational analysis was conducted. The SPSS statistical software was used to conduct standard multiple regression analyses to examine the relationships between SST performance, which served as the independent variable, and the dependent variables of satisfaction, loyalty, and SST use.

RESULTS AND DISCUSSION

Socio-Demographic Characteristics

The sociodemographic details of KIA SST users are shown on Table 1. 134 women and 183 men, or 58% and 42% respectively. According to the respondents' ages, 2.5% of SST users were minors and so under the age of 18, 93.9% were in the 18–44 age range, and 3.53% were over the age of 45. Table 1 shows that 40% of respondents who utilize SST at Kotoka International Airport earn GHC3001 or more per month, compared to 27%, 17%, and 16% who earn GHC1000 to GHC2000 and GHC2001 to GHC3000 per month, respectively. Only 3% of the total respondents to the study had no educational background, while the bulk of respondents (87%) had completed their university degree. 10% had only completed high school. 95 respondents, or 30% of the total responses, work in the private sector, compared to 17.4% who are public employees, 27.4% who are self-employed, 1.9% who are retired employees, 21.1% who are students, and 2.2% who fall into another category of employment. At the Kotoka International Airport, 62% of respondents who utilize the SST were leaving the country, while 38% were entering it.

Table 1: Socio-demographic characteristics

DIVISION		ABSOLUTE FREQUENCY (n)	RELATIVE FREQUENCY (%)
GENDER	Male	183	58.0
	Female	134	42.0
AGE	Below 18yrs	8	2.5
	18 – 24yrs	64	20.2
	25 – 34yrs	156	49.2
	35 – 44yrs	58	18.5
	45 – 54yrs	19	6.0
	55 – 64yrs	11	3.5
	65yrs or more	1	0.3
	Less than Ghc1000	85	27.0
MONTHLY INCOME	Ghc1000 – Ghc2000	54	17.0
	Ghc2001 – Ghc3000	51	16.0
	Ghc3001 or more	127	40.0

DIVISION		ABSOLUTE FREQUENCY (n)	RELATIVE FREQUENCY (%)
EDUCATIONAL STATUS	No formal Education	9	3.0
	High School and Below	32	10.0
	Tertiary	276	87.0
EMPLOYMENT STATUS	Private Sector	95	30.0
	Public Servant	55	17.4
	Self Employed	87	27.4
	Retired	6	1.9
	Student	67	21.1
	Other	7	2.2
TRAVELLING STATUS	Arrival	124	39.0
	Departure	193	61.0

Source: own research

Available Self-Service technology at the Kotoka International airport

The results of the survey from Table 2 indicate that, 26.2% of passengers in the airport use information kiosk, 12.3% make use of ticketing kiosk, 6.6% use common use self-service, 6.3% use retail kiosk while 48.6% believes that internet bookings and through the use of smartphones and mobile services are the, most usable SST at KIA.

Table 2: Evaluation of Available SST at the KIA

INDICATOR VARIABLE	ABSOLUTE FREQUENCY (n)	RELATIVE FREQUENCY (%)
Information Kiosk (Standard Terminal That Provides Information, Goods and Services)	83	26.2
Ticketing Kiosk	39	12.3
Common Use Self-Service (Ease Congestion and Help Reduce Lines, Shared Terminals with Multiple Airlines)	21	6.6
Retail Kiosk (Customers Can Purchase Goods and Services Before the Flight)	20	6.3
Internet Bookings and Through The Use Of Smart Phones and Mobile Services	154	48.6
Total	317	100

Source: own research

Socio-Demographic Characteristics of Respondents and Usage of SSTs

According to Hair et al. (2010), there is no correlation between the dependent and independent variables when

the correlation value is equal to 0, but there is a perfect correlation when the correlation value is equal to 1.0. They claim that correlations (r) between 0.10 and 0.29 suggest a small correlation, whereas correlations (r) between 0.30 and 0.49 indicate a medium correlation. In addition to the foregoing, when the correlation value exceeds 0.50, a strong correlation relationship develops. The Pearson product-moment correlation coefficient was used to calculate the correlation values. To confirm that the assumptions of normality, linearity, and homoscedasticity analysis were not violated, preliminary studies were carried out.

The empirical results of dependences between variables are presented in table 3.

Table 3: Socio-Demographic Characteristics of Respondents and Usage of SST's

	1	2	3	4	5	6	7	8	9
1	1								
2	-.077	1							
3	.031	.038	1						
4	-.234**	.127*	.081	1					
5	-.180**	.138*	.036	.844**	1				
6	-.149**	.202**	.113*	.786**	.806**	1			
7	-.133*	.161**	.050	.817**	.794**	.806**	1		
8	-.140*	.129*	.050	.809**	.801**	.782**	.840**	1	
9	-.166**	.094	.050	.833**	.795**	.783**	.820**	.832**	1
10	-.134*	.113*	-.134*	.113*	.001	.785**	.793**	.749**	.776**

Note: 1 – Gender of respondents, 2 – Age of respondents, 3 – Education status, 4 – Functionality, 5 – Enjoyment, 6 – Security, 7 – Assurance, 8 – Design, 9 – Convenience, 10 – Customisation, Correlation is significant at the 0.01 level (2-tailed). **, Correlation is significant at the 0.05 level (2-tailed). * Source: own research

As depicted in Table 3, the relationship between Gender and SST usage shows a negative correlation with functionality being more significant ($r = -.234$, $n = 317$, $p < 0.01$).

There was a positive correlation between Age and SST usage with security being more significant ($r = .202$, $n = 317$, $p < 0.01$). So, it can be stated that as the level of security increases, the level of passengers' usage of SST increases. Educational status and usage of SST depicted both positive and negative values with customization showing the negative significant ($r = -.134$, $n = 317$, $p < 0.05$). This means that, there is a relationship between the socio-demographic characteristics of respondents and usage of SSTs generally except that when the individual items are considered, functionality, enjoyment, assurance, design, and convenience do not have any relationship with educational status. Likewise, convenience does not correlate with Age.

According to the study results, the functionality of SST was found as an important antecedent of actual usage of SST (Gures et al., 2018; Lin & Hsieh, 2006, 2011). This study rather considers security as the most antecedent of SST usage. Meaning passengers are willing to use SST when they know their personal information is safe. So, if

Table 4: Effectiveness of SST's as adopted by Kotoka international airport

VARIABLES	(n)	TYPE OF ANSWER (%)					M	SD
		SD	D	N	A	SA		
SST effectiveness	317	4.4	12	16.1	46.1	21.5	3.68	1.07
The self-check-in kiosks were appropriately designed	317	5.7	11.4	18.9	41.6	22.4	3.66	1.10
The self-security check kiosks were appropriately designed	317	4.4	11.6	21.5	38.5	24	3.64	1.12
The self-service baggage drops were helpful to me	317	7.6	9.8	14.2	40.4	28.1	3.72	1.19
The self-service boarding kiosk was helpful to me	317	6	12.6	17.4	45.1	18.9	3.58	1.11
Touch screen information kiosks were helpful to me.	317	6	12.6	16.4	41	24	3.64	1.15
Kotoka International Airport offers a wide range of SSTs such as check-in kiosks, internet base online check-in, website, and emails, mobile commence etc.	317	8.2	10.1	18.3	46.7	16.7	3.54	1.13

Note: n – total number of respondents, M – Mean, SD – Standard Deviation.

Source: own research

airports want to increase the passengers' usage of SST, they should enhance the security of SST. For this reason, airports should keep passengers' personal information secret and provide secure systems that let the passengers do their preflight procedures safely.

The results presented on Table 4 suggest that the SSTs available at KIA are effective (mean=3.68). Looking at the individual responses, 64%, 62.5%, 68.5%, 64% 65% and 63.4% agreed or strongly agreed that the self-check-in kiosks were appropriately designed (M=3.66, SD1.10), the self-security check kiosks were appropriately designed (M=3.64, SD1.12), the self-service baggage drops were helpful to them (M=3.72, SD1.19). The self-service boarding kiosk was helpful to them (M=3.58, SD 1.11), touch screen information kiosks were helpful to them (M=3.64, SD1.15), and Kotoka International Airport offers a wide range of SST's such as check-in kiosks, internet base online check-in, website, and emails, mobile commence (M=3.54, SD1.13) respectively.

SST Performance on Satisfaction and Loyalty

The empirical results of multiple regression between selected variables are presented in table 5.

The results presented on table 5 suggest that performance of SSTs explains 76.9% of the total variance in satisfaction. The variance explained was sufficient by ANOVA results ($F(7, 309) = 147.043, p < 0.01$). The individual items presented under Satisfaction however suggest that design of the SST made statistically significant contribution towards the variance explained in satisfaction ($\beta = 0.232, t = 3.733, p = 0.000$). The t-value presented is positive which suggest a direct effect of satisfaction on SST performance. This means that if airport provide user-friendly, customized, and excellent SST services, passengers who consider the design of the SST as a priority will have their satisfaction level increase. Likewise, if there is poor design and slow system of the SST at the airport, the passenger's satisfaction level might decrease.

The variables of satisfaction can vary from industry to industry and from service to service. In this research, the performance of self-services technology is considered as one of the factors influencing customer satisfaction, and many studies have supported (Antwi et al., 2021; Wang et al., 2018). Improving the performance of SST increases the likelihood of satisfaction, leading to behavioural

Table 5: Standard Multiple Regression on the effect of performance on satisfaction and loyalty

Variable	Beta	t	Sig.	Part correlation	Tolerance	VIF
DV = Satisfaction ($F(7, 309) = 147.043, p < 0.01, r = .877, r^2 = .769$)						
Functionality	.051	.834	.405	.023	.197	5.074
Enjoyment	.177	2.959	.003	.081	.210	4.764
Security	-.060	-1.112	.267	-.030	.258	3.875
Assurance	.151	2.518	.012	.069	.207	4.837
Design	.232	3.733	.000	.102	.194	5.160
Convenience	.213	3.472	.001	.095	.198	5.046
Customization	.183	3.281	.001	.090	.240	4.173
DV = Loyalty ($F(7, 309) = 82.951, p < 0.01, r = .808, r^2 = .653$)						
Functionality	.248	3.288	.001	.110	.197	5.074
Enjoyment	.153	2.090	.037	.070	.210	4.764
Security	.002	.036	.971	.001	.258	3.875
Assurance	.153	2.073	.039	.069	.207	4.837
Design	.126	1.658	.098	.056	.194	5.160
Convenience	.172	2.282	.023	.077	.198	5.046
Customization	.019	.277	.782	.009	.240	4.173

Note: p – p-value, r – coefficient of correlation, r^2 – coefficient of determination, F – F-ratio, VIF – Variance Inflation Factor, t – t-test, Beta – regression coefficient, Sig. – Significance.

Source: own research

outcomes such as commitment, willingness to stay, the creation of a two-sided link between service provider and customer, better customer tolerance toward service delivery (Lin & Hsieh, 2011).

In addition, tables 5 indicate that 65.3% of loyalty variance can be attributed to SST performance. The variance explained was significant as indicated by ANOVA results ($F(7, 309) = 82.951, p < 0.01$). Performance, on the other hand, suggests that functionality also contributed statistically significantly to loyalty variances ($\beta = 0.248, t = 3.288, p = 0.001$). T-values indicate a direct relation between the loyalty state of customers and the functionality of SST, such that the more functional the firm's SST is, the higher the loyalty state of customers. The less functionality that the KIA exhibits at SST, the lower the level of customer loyalty.

The findings of these studies imply that within the context of SST performance, to keep the existing passengers loyal, the SST service providers may position or reposition their service strategies from personalized services to well-functioning technology at the airport to increase passenger loyalty. These studies endorsed the results (Ayodeji & Rjoub, 2021; Bezerra & Gomes, 2020; Bezerra & Gomes, 2019; UI Hassan et al., 2020).

CONCLUSION

This study set out to investigate how firmographic characteristics affect passenger happiness and loyalty. The findings on the seven fundamental SST service quality dimensions show that a wider range of first order SST usage in the new KIA landscape can be found across all seven of these characteristics (enjoyment, functionality, assurance, security, customisation, design, and convenience). The investigation of how and why SSTs affect passenger happiness and loyalty, both directly and through the performance of technology, makes the study special. The results of the common multiple regression model highlight the fact that not all SSTQUAL factors significantly influence the prediction of airport passenger pleasure and loyalty. The findings of this study deviate slightly from previous findings that emphasize that all SSTQUAL aspects are important contributors to satisfaction, as suggested by several researchers (Suwannakul, 2021). This might be caused by the different sample sizes and distributions, as well as the different industries that were studied.

From a managerial and practical perspective, the study's findings offer Kotoka International Airport some valuable and insightful information. The primary finding of the present study is that the characteristics of self-service technology (SST) affect passenger happiness and loyalty levels. Only a small number of characteristics, nevertheless, were discovered to be significantly and favourably related to satisfaction and loyalty. Many passengers are in support of the SST because they find it convenient, secure, functional, and well-designed, it was discovered when gathering the respondents' perspectives on why they favour or do not prefer to utilise the SST.

However, passengers have also said that if the SST does not function to their satisfaction, they will not be ready to use it. This indicates that they will favour using employee-managed workstations at airports. Two alternative conclusions can be drawn from this information. The first is that employee-managed workstations are effectively run, functional, and have amiable personnel. Secondly, demonstrating the SST's subpar performance. As a managerial implication, it implies that airports can spend money on both employee-managed desks and SST to provide excellent services to all passengers and so boost loyalty. However, when seen from the perspective of company costs, it results in additional costs for hiring more people and installing SSTs. Furthermore, the likelihood of faults or breakdowns in any technical gadget cannot be dismissed. Considering that this study demonstrates a link between SST functionality, fulfilment, and loyalty.

This study found no evidence of a group effect of socio-demographic factors on SST passenger usage. However, the research that has already been done has indicated that socio-demographic factors are a significant predictor. For instance, Suhartanto et al. (2019) research demonstrates that different age and educational groups used SST to varying degrees at the airport. Similar to Feng et al. (2019), demonstrates that SST usability varies between the two genders. The choice of sampling technique and a lack of statistical power in the analysis may be the likely causes of the group socio-demographic variable's lack of influence on SST consumption. Future strategies that leverage probabilistic sampling using simple random sampling based on a complete population list and an adequate sample frame are presented.

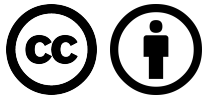
Despite this, the study's huge sample size of 317 respondents and the fact that the majority of them (61%) were leaving the country raise the possibility that some of them were unable to utilise all of the SST before answering the questionnaire. Additionally, several respondents could not wait to answer the questions as they should have been asked since they were in such a rush to check in. As passengers wait to board in the future, data can be gathered at the boarding gate to ensure that responders provide accurate answers.

Last but not least, when the study looked at the impact that SST performance has on passengers' loyalty and satisfaction, the results indicated 76.9% and 65.3%, respectively. This means that in addition to the SST performance characteristics, there are additional elements (such as brand trust, brand loyalty, etc.) that affect passengers' happiness and loyalty levels. These factors can be researched in the future.

Researchers can examine the various age groups most likely to utilise SST at the airport for upcoming studies. Additionally, it is possible to evaluate how passengers' behaviour in relation to the effectiveness of SST is affected by their sociodemographic factors, such as age, gender, and educational attainment. It is possible to investi-

gate additional elements that impact SST usage at the airport.

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