

SELF SERVICE TECHNOLOGIES AT AIRPORTS

Evaluating Passengers' Perceived Service Quality Towards  
Self-Service Luggage Check-In Technologies at Airports Using SSTQUAL Scale

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## ABSTRACT

The focus of this study is on evaluating the perceived service quality of a passenger using Self Service Technologies (SST) based service delivery systems at airports. Previously, studies have been conducted to evaluate the benefits of these service delivery systems for the service providers and in theory, the benefits the passengers or customers may receive from using these SSTs. However, not much research has been done comparing the benefits passengers perceive from the SSTs and how the same compares with the benefits perceived by passengers while using a conventional service-employee based service delivery system, for example, manned check-in desks at airports. The data for the study was collected by surveying passengers using the scale questionnaire designed by Lin and Hsieh in 2011, named SSTQUAL (Self Service Technologies Quality), to evaluate service quality delivered by SST based service delivery systems in terms of perceived functionality, enjoyment, design-assurance-convenience, security/privacy and customization. These different dimensions were compared among passengers who utilized Self Service Kiosks (SSKs) and passengers who used check-in-desks to check their luggage in. The data derived from the responses was analyzed using Multivariate Analysis of Variance (MANOVA) to compare the between-subject effects of the dimensions as well as the overall multivariate significance in the difference between the service quality perceived between the two check-in methods. It was found that though the cumulative perceived service quality was not influenced by the method of check-in, individual service quality dimensions like Enjoyment, Design, Convenience and Assurance were influenced by the check-in method. Positive correlation was also established between the method of check-in and

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customer behavioral intentions of recommending and using the respective airline's service again as well as going through the process of using the respective airline's SST again.

Keywords: Self-Service Technologies, SSTQUAL, service-quality parameters, self check-in kiosks, manned check-in desks, technological readiness, customer behavioral intentions, MANOVA.

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## **Introduction**

Self-Service Technologies (SST) are devices with technological interfaces that enable customers to have service independent of direct service employee involvement (Meuter, 2000). SST has been around since the 1960s with its inception in the banking industry through Automatic Teller Machines (ATM) starting in 1967. This technology helps the customers by-pass the requirement of an employee-interaction and gives them control of their transactions to a greater extent. Realizing the benefits of self-service technologies by the banking industry, SST, with time, was implemented in other industries relating to monetary transactions such as gas-stations, cinema ticketing, and later with airline ticketing (Ambrus, 2006). The Self-Service Technology within itself consists of two crucial components: Self-Service Kiosks (SSK) and SST. In context of aviation, the traditional method of passenger processing was through the use of dedicated check-in, baggage-drop, and ticketing counters which later evolved into centralized Common Use Terminal Equipment (CUTE) for checking in passengers and their luggage. CUTE can be used by different service providers at any given time. It is currently the primary method of passenger processing at airports around the world. Some airlines have, however, pushed towards greater utilization of SST by increasing the number of SSKs and reducing the number of manned check-in desks. Self-Service Technology, when used by different entities over the same equipment, like CUTE but with the absence of airline employees, makes the system a Common Use Self-Service System (Abdelaziz, 2010). The first Common Use Self Service kiosks were put in place by Continental Airlines (now United Airlines) in 1995 (Miller, 2003). According to Beatson (2007), 80% of the passengers world-wide were using CUTE for checking in, 15% passengers were using

on-airport CUSS check-in kiosks while only 5% of the passengers were using off-airport SST check-in systems, like the internet and mobile check-in in 2006. Ghee (2011) readjusted these estimates to 20% of the passengers worldwide checking in through CUTE, 30% by on-airport CUSS kiosks, and 50% by off-airport check-in systems. The prime advantages of the usage of self-service technologies are increasing the efficiency, reducing costs, increasing customer retention rate, and increasing sales through virtual sales assistants (Beatson, 2007). Today, companies are providing a combination of SST based service channels to their customers to provide a seamless service delivery to the customers. For example, airlines today offer online ticketing, self-check-in kiosks, self-luggage check-in kiosks as well as online baggage tracking (Grewal & Levy, 2009). However, the challenges facing the use of SST still make it unadaptable to a much wider extent. These challenges are in the form of potential system outage (Weiss, 2006) and customer's technology readiness (Curran, 2003). While coping mechanisms for system outage have been identified and suggested, there has been no research to quantify the technological anxiety that passengers exhibit towards SSTs. TA leads to lower technological readiness (Parasuraman, 2008) and hence, less than hypothesized service quality that is being perceived and by the passengers. While previous researches, that have been discussed in the literature review of this paper, have proposed different approaches towards understanding the different factors that attribute to the lack of customers' technological readiness, these researches have not emphasized the service quality that passengers perceive and receive through the utilization of SSTs. This study attempts to focus on that perceived service quality with a precise focus on the process of luggage check-in since it requires more time and effort and more involvement of the



passengers irrespective of the method of luggage check-in. Comparing this service quality between passengers utilizing SSTs and passengers utilizing conventional check-in methods may provide a deeper insight into the areas of service quality wherein passengers value certain aspects of SSTs over the conventional method of luggage check-in. This study will help in understanding the weaknesses of SSTs in context of perceived service quality and the areas of perceived service quality where improvement may show increment in usability.

### **Thesis Description and Hypotheses**

This study aims at determining the strength and weaknesses of service delivery systems with respect to the conventional desk luggage check-in method or CUTE and kiosk check-in method or CUSS. These strengths and weaknesses were evaluated in terms of the passengers' perceived service quality dimensions (Radomir & Nistor, 2014) namely: functionality (FUN), enjoyment (ENJ), design-convenience-assurance (DESCONASU), security/privacy (SEC), and customization (CUS) using the SSTQUAL scale (Lin & Hsieh, 2011). As implicated by the developers of the original scale, the scale can be used to test service delivery systems between multiple channels within the same industry hence making it the most appropriate scale for the study. This study also aims at revalidating the correlation between customer behavioral intentions (CBI) and the service quality levels perceived by the passengers who use the two above mentioned luggage check-in systems. The passengers were surveyed through online survey platforms like Google Forms and social media. Passengers who had travelled with a check-in luggage within the past 12 months were considered eligible for participation. Additional demographic data like gender and age-group; and passenger travel data like annual

frequency of travel, general preference of check-in methods, and general purpose of travel were collected too. The hypotheses of this thesis are as follows:

- To determine the perceived service quality among passengers towards the method of luggage check-in used.

**H<sub>0</sub>**: There is no significant difference in the perceived service quality of passengers who check-in using SSKs and that of passengers using conventional check-in desks.

**H<sub>1</sub>**: Passengers who check-in using SSKs perceive higher service quality than passengers who check-in using conventional check-in desks.

- To determine the difference in the perceived service quality dimensions among passengers who checked their luggage in using SSKs and conventional check-in desks.

**H<sub>2a0</sub>**: There is no significant difference between the perceived functional service quality of passengers who check-in using SSKs and that of the passengers using conventional check-in desks.

**H<sub>2a1</sub>**: Passengers who check-in using SSKs perceive higher functional service quality than passengers who check-in using conventional check-in desks.

**H<sub>2b0</sub>**: There is no significant difference between the enjoyment perceived by passengers who checked their luggage in using SSKs and that of the passengers who used conventional check-in desks.

**H<sub>2b1</sub>**: Passengers perceive more enjoyment while checking their luggage in using SSKs than the passengers who check their luggage in using conventional check-in desks.

**H<sub>2c0</sub>**: There is no significant difference between the security and privacy perceived by passengers who check their luggage in using SSKs and conventional check-in desks.

**H<sub>2c1</sub>**: Passengers feel more security and privacy while checking their luggage in using SSKs than passengers who use conventional check-in desks.

**H<sub>2d0</sub>**: There is no significant difference in the perceived design, convenience and assurance dimension of service quality between passengers who check their luggage in using SSKs and passengers who check their luggage in using conventional check-in desks.

**H<sub>2d1</sub>**: Passengers who check their luggage in using SSKs perceive higher design, convenience and assurance dimension of service quality than passengers who check their luggage in using conventional check-in desks.

**H<sub>2e0</sub>**: There is no significant difference in the perceived customization dimension of service quality between passengers check their luggage in using SSKs and passengers who check their luggage in using conventional check-in desks.

**H<sub>2e1</sub>**: Passengers who check their luggage using SSKs perceive higher customization dimension of service quality than passengers who check their luggage in using a conventional check-in desk.

- To determine the customer behavioral intentions of passengers based on their method of check-in:

**H<sub>3a0</sub>:** There is no significant difference in the likelihood of passengers using SSKs and conventional check-in desks recommending the respective airline's services to their friends and colleagues.

**H<sub>3a1</sub>:** Passengers who checked their luggage in using SSK systems are more likely to recommend the services of the respective airline to their friends and colleagues than the passengers who checked their luggage in using conventional check-in desks.

**H<sub>3b0</sub>:** There is no significant difference in the likelihood of going through the process of using the respective airline's luggage check-in systems again between passengers who used SSKs and passengers who used conventional check-in desks.

**H<sub>3b1</sub>:** Passengers who checked their luggage in using SSKs are more likely to go through the process of using the respective airline's luggage check-in system again than passengers who checked their luggage in using conventional check-in desks.

**H<sub>3c0</sub>:** There is no significant difference in the likelihood of using the respective airline's services again between passengers who checked their luggage in using SSKs and passengers who checked their luggage in using conventional check-in desks.

**H<sub>3c1</sub>:** Passengers who checked their luggage in using SSKs are more likely to use the respective airline's services again than the passengers who checked their luggage in using conventional check-in desks.

## **Scope and Limitations**

The data for the study was collected by surveying passengers who had flown with check-in luggage over the past 12 months with a US based airline and are of at least 18 years of age. While the data could also be collected for passengers who had flown with foreign airlines, a more localized approach was preferred in order to maintain uniformity in the data collection. Also, due to the significance of familiarity in the utilization of SST (Chang, 2008) and SSKs being first introduced at US airports (Miller, 2003), the random sampling of passengers travelling through US airports ensured a higher familiarity rate among passengers. To get a data pool which encompassed multiple airports and airlines in the United State of America, in-person data collection was less viable than online data collection. Passengers who checked their luggage in at a curbside check-in desk were considered to be a part of the conventional passenger processing systems while passengers who checked their luggage in using at-home baggage tagging services were classified under passengers who checked in their luggage at the airport using SSKs.

It has been assumed that the passengers' responses to the SSTQUAL questionnaire were unbiased and were individually completed. No incentives were provided to the participants and their participation as well as their consent were completely voluntary. And since the study did not primarily focus on the influence of demographic factors on the perceived service quality, socio-economic factors like employment status and annual income had not been recorded for the study.

The study utilized the SSQTUAL scale which was originally developed by Lin and Hsieh (2011) and revised as well as refined by Radomir and Nistor (2012, 2014). As with any psychometric scale, the actual behavioral deductions of the study using such

scales may vary depending on the subjective nature of the participants involved. Also, it has been assumed that the SSTQUAL scale can be used to compare SST-based service-delivery systems with service-employee based service-delivery systems since the SSTQUAL scale was developed from the SERVQUAL (Parasuraman et. al, 1988) scale and shares the same principles in context of service quality dimensions. This has been further discussed in the following literature. Another limitation to the study is that the SSKs and the employees involved in the study differ from airline to airline and hence, the overall evaluation of the SSKs does not represent any individual service providers service quality. Another limitation to the study is that since technological readiness (TR) is subject to how familiar the passengers are to the respective technology (Chang, 2008), many prior deductions in the field of study regarding perceived service quality may not be replicated by this study given how the trend towards offering more SST based service delivery systems have changed (IATA, 2010). The data sample that was decided as the threshold for this study was only 50 participants and a larger data sample might exhibit more credible results.

### **List of Acronyms and Abbreviations**

- CBI: Customer Behavioral Intentions
- CUTE: Common Use Terminal Equipment
- CUS: Customization dimension of perceived service quality
- CUSS: Common Use Self-Service Kiosks
- DESCONASU: Design, Convenience and Assurance dimensions of perceived service quality
- ENJ: Enjoyment dimension of perceived service quality

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- ES-QUAL: Scale developed to evaluate electronic service quality
- FUN: Functional dimension of perceived service quality
- IATA: International Air Transport Association
- IMG: Image dimension of perceived service quality.
- IRSQ: Internet Retailing Service Quality
- PeSQ: Perceived e-service quality
- SE: Service Employee
- SERVQUAL: Service-quality evaluation scale
- SITA: Société Internationale de Télécommunications Aéronautiques
- SITEQUAL: Scale developed to measure perceived service quality of an internet shopping site
- SL: Service Level
- SSK: Self-Service Kiosks.
- SST: Self-Service Technologies.
- SSTQUAL: Self-Service Technologies Service Quality evaluation scale.
- SQ: Service Quality
- TA: Technological Anxiety
- TBSS: Technology-based Self-Service Systems
- TR: Technological Readiness
- TWT: Total Waiting Time

## Literature Review

### **Customer Processing Methods in CUTE and CUSS**

**Common Use Terminal Equipment (CUTE).** Currently, the dominant method of checking luggage in is through the use of manned check-in desks also known as common use terminal equipment or CUTE. The process of checking passengers and their luggage on to a flight using CUTE begins with the purchase of a ticket by the passenger through a ticketing agent at the airline's ticketing counter, the airline's website or a third-party sales agent. After a ticket has been issued to the passenger, the passenger is then checked on to the flight where a boarding pass is issued to the passenger by the airline representative (service employee) at the check-in counter inside the airport terminal. If the passenger is travelling with luggage that needs to be checked-into the aircraft's cargo-hold, the baggage is weighed by the check-in agent, the passenger's identity is verified by the agent comparing government issued documents and a unique identifier which is printed in the form of a bar-code that is attached to the luggage. The luggage is then forwarded to the baggage handlers while the customer proceeds towards security checkpoints. The passenger may then head to security and possibly immigration if the passenger's flight is international. (Abdelaziz, 2010). Beyond the security point, at the time of departure, the gate-agent manually verifies the boarding pass of the passenger at the gate before the passenger is allowed to board the aircraft. At arrival, the passengers can retrieve the luggage they checked in at baggage carousels or baggage pick up points. In the case of lost luggage, the passenger will be assisted by the respective airline's representative in filing a claim or report for the lost luggage (IATA, 2010).



**Common Use Self-Service Kiosks (CUSS).** International Air Transport Association (IATA) in its Fast Travel Program has outlined a linear process for the implementation of CUSS in passenger-processing systems specifically through six prime areas: check-in, baggage drop, flight rebooking, self-boarding, bag recovery (IATA, 2010). After a ticket is issued, the passenger can check-in with the airline for the respective flight either using internet check-in, mobile check-in or on-airport self-check-in kiosks. The passenger can self-identify using a frequent flier card, a valid government identification card or a registered credit/debit card. The boarding pass is then issued to the passenger or can be digitally sent to the passenger's cellular device with a virtual barcode (Abdelaziz, 2010). While the current legislation in many countries requires manual identification of the passenger while checking luggage in, the baggage tags can be printed at the self-check-in kiosks or in some instances depending on the airline's provision for the same, at home too. This reduces the baggage agent's activity to only verifying the baggage tags and the passenger's identity and forwarding the baggage to baggage handling. Certain airport kiosks are also designed to weigh the luggage, print the respective baggage tag, scan and verify certain types of identification cards (like passports, driver's license and other regulated photographic identifications) and hence, deplete the need for manual verification. In the instance of international travel, visa and passports can be scanned and verified by the kiosk's scanners too at the time of check-in. The passenger can simply drop the hold- luggage at designated baggage drop counters or conveyor belts (Falconer, 2009). After clearing the security check-points and immigration (if applicable), the passenger can board the aircraft by scanning the boarding pass through automatic boarding pass scanners at the gate. An airline representative may be present at

all self-service locations (ticketing, check-in, baggage drop-off and self-boarding gates) to assist the passenger if the need arises. On arrival, the passenger can track his luggage using baggage tracking services offered on the airline's information kiosk and also report missing luggage. In its Fast Travel Program 2020 vision, IATA also aims at airlines offering 80% of all the passengers worldwide self-services facilities throughout their journey by the year 2020 (IATA, 2010).

### **Comparing CUSS over CUTE**

**Shorter Passenger Processing Period.** According to Beatson (2007), one of the most significant prospects of the usage of SSKs and SSTs at airports is shorter passenger processing times. Shorter passenger processing times increases the number of passengers handled within a given period of time and also reduces the waiting time for the passengers waiting to be checked in hence improving passenger satisfaction and promoting customer retention. According to Fiorino (2005), conventional CUTE system took 3.5 minutes to check-in one passenger while a CUSS system took only 2.5 minutes to process and check-in one passenger. These figures included the time taken to verify a customer's identity, issue a boarding pass and forwarding the checked-in luggage to the baggage handler. Fishman (2004) reported that for passengers travelling on Continental Airlines in 2004, checking in without luggage took 30 seconds at a SSK while passengers flying with check-in luggage were issued their boarding passes and baggage tags in 66 seconds. In 2009, Swiss Airlines operating out of its main hub, Zurich International Airport, Zurich, Switzerland, started offering self-check-in services for passengers flying the airline and its Star Alliance partners. The management and operation of these SST equipment was undertaken by Swissport, an airport management firm. Rico Barandun,

Swissport's head of e-services, stated that this implementation had allowed the airport to increase its throughput in passenger processing by 50% (Falconer, 2009).

Reduced Costs. According to the airline cost-analysis conducted by Fishman (2004), a single SSK with initial capital requirement of anywhere between USD 6,000 and USD 10,000, replaces 2.5 ticket agents for processing the same number of passengers. Given that a SSK can be operational 24 hours of a day with a larger initial capital but comparatively minimal operating costs, the cost associated with checking in a single passenger was found to be only USD 0.16 compared to USD 3.86 for checking in the passenger using CUTE. The latter cost included the cost of leasing the CUTE station as well as the labor costs for employing the check-in agents (Weiss, 2006). Following the decline in air-traffic demand following the September 11, 2001 terrorist attacks, legacy carriers – American Airlines, Continental Airlines, Delta Airlines, United Airlines, and US Airways eliminated 37,000 airline employees within two years (Fishman, 2004). Between the year 2001 and 2007, airlines had already eliminated 34% of their on-ground employees. But even through the resurgence of air-traffic demand between 2003 and 2007, airlines further reduced their labor force and associated costs by offering self-service facilities at airports for passenger processing. According to IATA's Fast Travel Program, the costs recovered by airlines by reducing labor expenses and improving revenues by implementing SST in self-baggage-tagging facilities, self-luggage check-in facilities document verification procedures, flight rebooking facilities, self-boarding provisions, and baggage recovery to 80% of all airline passengers summed up to USD 2.136 billion per annum. If these recovered costs are coupled with expenses saved by

offering self-check-in facilities, the overall savings accumulate to USD 4.572 billion per annum (IATA, 2010).

Since the space that was first occupied by two to three check-in desks are consolidated into the space occupied by a single check-in kiosk, the costs associated with the rental of that terminal space are reduced, too. While this reduces the costs for the airline, it also provides the airport authorities additional space to rent out to concessionaires and therefore, widen their revenue bases (Falconer, 2008).

**Customer Retention.** Many researchers have suggested positive effects of the use of SST on long-term customer retention (Abdelaziz, 2010). Beatson (2007) attributed this to the reduction in queues and lesser waiting times. Also, the airlines put the power back into the hands of their passengers and allow them to perform multiple tasks that once needed the involvement of at least one airline employee (Weiss, 2006).

**Flexibility.** In discussing the benefits of SST at airports, Meuter (2000) pointed out that SSK provide the benefit of flexibility to the airlines and the airports. These kiosks are available at the convenience of the airline and can be made functional according to passenger influx. The airline also has the choice of making functional only a certain number of kiosks out of all its kiosks depending on the demand. The kiosks can also be relocated within the airport infrastructure within a short period of time and immediately made operational without any service interruption. The information provided by and to the kiosks are selectively available to the passengers and the airline employees at the same time.

### **Challenges with the usability of SSTs**

**Customer Technological Readiness and Anxiety.** While SST has allowed airlines to reduce costs and airports to increase their throughput in the past, its implementation on a grander scale is however still disputed. With the lack of interpersonal contact between the airline and the passenger through a physical entity (a service employee), customer retention is not effectively ensured to its complete potential. Customers uncomfortable with SST may be intimidated by it and also dread the loss of interaction with the airline and its employees. This might affect the airlines in the long term since airlines and organizations altogether survive on frequent and loyal passengers (Beatson, 2007). Introduction of SST cannot automatically lead to its usage (Parasuraman & Colby, 2001). One of the causes of this drawback is the lack of technology readiness of airline passengers. Technology readiness is the willingness to accept technology. It promotes or delays the customer's willingness to accept or reject technology (Parasuraman, 2001). Some customers find newer technologies intimidating either because of the 'fear of the unknown' or due to the lack of comfort with technology (Curran, 2003).

According to Parasuraman (2000), the most widely accepted contributors to a customer's technology readiness are the customer's discomfort, insecurity, optimism, and innovativeness towards technology. Discomfort is the perceived lack of control and the feeling of being overwhelmed by technology. It emphasizes on the perceived lack of ease in using technology. Insecurity is the lack of trust in technology and its ability to work properly. It is related to the expectations with the usage of technology and the realization of these expectations. The lower these expected realizations are, the lower the readiness is to the particular technology. Optimism is the positive outlook towards technology

encompassing the customer's beliefs of control, flexibility, and efficiency (Parasuraman & Colby, 2001). These beliefs are directly affected by the convenience realized by the prior use of similar SST (Meuter, Ostrom, Roundtree and Bitner., 2000). The final contributor to technology readiness is innovativeness which is the tendency to be a technological pioneer (Parasuraman & Colby, 2001). This innovativeness can either be the customer's innovativeness in general or innovativeness which is domain oriented. However, researchers have found no evident interaction between general innovativeness and TR (Liljander et al., 2006) but a direct dependency of technology readiness on domain oriented innovativeness has been established (Agarwal and Prasad, 1998). While these aspects of technology readiness vary upon the characteristics of people, research conducted to assess technology readiness did show an increasing trend towards more acceptability of SSTs with every generation (LeRouge, Slyke & Seale, 2014). While the TR of different demographics vary within a given region, it varies with the geographic setting too. According to a study conducted at Taipei Taoyuan Airport, it was observed that European and North American passengers had a higher share in CUSS kiosk usage compared to Asian passengers due to a higher familiarity with the technology. This was observed primarily because CUSS systems were implemented in the former's airport network much earlier than in the latter's network. It was hence deduced that the adaptability also increases with time as passengers gain more exposure to these systems (Chang, 2007). The study also suggested that while certain negative reinforcements like reduced waiting times are a driving force in the passenger's acceptance towards SST, certain positive reinforcements are required to encourage passengers into switching to SST. Chang (2007) also suggested that negative reinforcement can also be enhanced by

making the SSKs operations seem less complex in comparison to the check-in desks and hence encouraging the customers to use SSKs.

As described in the literature so far, SSTs, in principle, benefit passengers and airlines alike (Abdelaziz, 2010). On the other hand, the technological readiness of customers, a major challenge that the usability of SSTs encounter, has been a disputed topic among researchers. This is due to the fact that the factors attributing to a customer's technology readiness have yet not been detailed or firmly established (Lilijander, 2006). C.J. Gelderman, W.T. Paul and R. Van Damien (2011) tested the role that a customer's optimism, innovativeness, discomfort, and insecurity play towards the customer's likelihood of utilizing SST and found no significant correlation among the above-mentioned facets of customer technological anxiety and the usage of SST. This contradicted the findings of Parasuraman (2000). The researchers suggested that the current theoretical framework established for understanding TR is based on the customer's intentions towards using a SST without taking into consideration the actual usage and the benefits the customer could or could not realize from SSTs.

System Outage and Failure. Another potential challenge to the adaptability of SST is the possibility of a system outage. During an unanticipated system outage scenario, customers may be disgruntled reducing customer satisfaction and their optimism towards SST. While system outages cause a great amount of disturbance to an airline's schedule; the cancellations, re-bookings, delays and the sudden staffing of employees to manually processing passengers will result in overtime wages and compensation to passengers. This leads to additional costs and losses for the airline in terms of revenue which could pose to be much more disadvantageous to the airlines than

the benefits and cost savings realized by airlines through the implementation of SST (Conroy, 2008). In 2016, several airlines in the United States faced information technology system outages due to mechanical failures which lead to the cancellation of over 2000 flights and an eventual revenue loss to the airlines (Conley, 2017). Since, these outages are always a potent threat, airlines must have systems in place to execute strategic planning for managing their human, financial and equipment resources (Weiss, 2006). In 2004, Las Vegas McCarran International Airport (LAS) maintained a team of 13 full-time employees that were available 21 hours a day to keep the SST at the airport functioning optimally. This helped in repairing the kiosks and recovering their operations as immediately as possible and also mitigate the possible expenses during the outage (Weiss, 2006). However, such provisions do not void an airline or an airport from potential system failures. Conley (2017), suggests that airlines must have the availability of redundant technologies and back-up servers, continuous monitoring of the IT infrastructure and load-balancing between their primary system equipment and redundant system equipment which act as fallbacks towards each other, geographically diversifying their failover systems, and constantly assessing their failover systems even without the occurrence of a system failure (Conley, 2017).

**Other Factors Affecting Adaptability of SST.** A main component of technological readiness is passengers realizing the benefits received by participating in self-service technologies. This can be understood by looking into the perceived service quality of the passengers that use self-service technologies and the benefits realized from its use (Lin & Hsieh, 2011). This perceived service quality can be evaluated using the SSTQUAL scale developed by Lin and Hsieh (2011). Further literature on the



development, authentication, validation, and refinement of the SSTQUAL scale has been detailed in this report under the literature review sub-section SSTQUAL.

Multiple studies have been conducted in the field of SST by multiple researchers in the past and their conclusions have laid the theoretical ground-work for this study. For example, a study conducted by LeRouge, Slyke and Seale (2014), examining the adaptability of SST in the field of medical healthcare among different age groups concluded that there was a significant difference between adaptability of SST by baby-boomers (individuals born between 1946 and 1964) and millennials (individuals who were born between 1981). Another study with respect to SST conducted by Chang (2007) at Taiwan Taoyuan Airport suggested that the adaptability of SST will increase with the increase of familiarity of SSTs among passengers. Kokkinou and Cranage (2013) also evaluated the effect of situational factors like the rate of demand for SST, the failure rate of SSKs and the processing time of the SSKs on the service level (SL) delivered by SSTs to customers. Their findings demonstrated that SSKs and SSTs not only reduced the Total Waiting Time (TWT) of customers but increased the SL too. SSKs also reduced the waiting time for customers when service providers used service-employee based service delivery systems complemented by SST based service delivery systems. However, their research also suggested that a higher rate of demand coupled with slower SSK processing times increased the TWT and reduced the SL. Higher rate of demand when coupled with higher SSK failure rate had similar implications on TWT and SL. Another corollary finding of the research was that passengers who were frequent travelers were more likely to use SST based service delivery systems (Kokkinou & Cranage, 2013). Gelderman, Paul and Diemen (2011) suggest that if the waiting times for using the SSK and

conventional service delivery channels are the same, customers prefer a more personalized service delivery system which is offered by the conventional service delivery systems. In an airport setting, that would mean that the passengers would prefer to check-in with a desk agent than a kiosk if the perceived waiting times for both systems are similar. This is also because the waiting time at a kiosk cannot be truly estimated since different passengers are processed at different rates based on their familiarity with the kiosk while on the other hand, desk check-in agents are trained to process passengers at a more consistent rate.

A study by Reinders, Dabholkar and Rudd (2008) also evaluated the effect of compelling passengers to use Self Service Technologies and how it affected the service quality of the passengers. The study found that forced usage of SSTs lead to lesser favorable customer attitudes towards Technology based self-service systems (TBSS) or in other words SST. This also lead to lesser favorable attitudes towards the service providers at large. But offering the passengers service employees (SE) as a fall back option did reduce the negative effects of the unfavorable attitudes discussed above as the customers were more comfortable with the 'idea of escape' or an idea that they have a choice to forgo the method of check-in they do not agree with (Reinders et. al, 2008). To summarize their findings, the researchers suggested that passengers preferred being given a choice rather than being limited to a singular but unconventional service delivery method. Castillo and Valpuesta (2013) studied the demographic traits of the passengers who checked in online using internet or cellular devices or SSKs for their flights out of five airports in Spain versus the passengers who checked in at the airport at the desk. A total of 19,426 passenger data was used for this study, out of which over 8,400

passengers were of foreign nationality. The airports the data were sampled from were Tenerife, Alicante, Seville, Valencia, and Santiago which are scattered through the length and breadth of Spain. Their findings suggested that passengers aged below 30 years were 11.5% more likely to use SST based check-in systems. Passengers with university degrees were also 11.5% more likely to use SST based systems. There was also a 12% fall in the likelihood of passengers, who arrived at the airport using public transportation, using a desk to check-in. Passengers who flew more than 12 times a year were also 17% less likely to use a check-in desk. Female passengers were found to prefer SST based check-in systems more than their male counterparts (Castillo & Valpuesta, 2014). This study gave an insight into the demographics of the passengers that use SST based check-in systems, however, the researchers did not clarify if the passengers were compelled to use the SSKs since the airlines that primarily fly out of these airports are low cost carriers and penalize passengers for checking in at the airport. Hence, there was no indication of the service quality that the passengers received.

### **SSTQUAL**

While there existed a global template for evaluating service quality in a traditional customer-employee interaction, SERVQUAL, an abbreviation of service quality (Parasuraman, Zeithaml & Berry, 1988), there was no standard template for scaling the perceived service quality in a customer-technology interaction. SERVQUAL laid out the dimensions of the service quality in a customer-employee interaction as Tangibility (physical abilities, equipment and, appearance of the service delivery), Reliability (ability to perform the promised service dependably), Responsiveness (willingness to help customers with prompt service), Assurance (knowledge, courtesy and the ability of the

service employees to inspire trust and confidence), and Empathy (the caring attitude and individualized attention of the service employee); it was however not suggested how the scale could be applied to a customer-technology interaction. Though empirical scales had previously been established to evaluate customer-technology interactions, they could not be not applied across all the industries that utilized integrated SSTs; in other words, they were not versatile. For example, scales like SITEQUAL (Yoo & Donthu, 2001), IRSQ (Janda, Trocchia, & Gwinner, 2001), eTail (Wolfenbarger & Gilly, 2003), E-S-QUAL (Parasuraman, Zeithaml & Malhotra, 2005) and other similar scales evaluated different parameters like ease of use, privacy, security, entertainment, efficiency, aesthetic design, access, accuracy, and functionality. of service quality in the scope of online web-based shopping but not banking. Similarly, PeSQ (Cristolbal, Flavian & Guinaiu, 2007) evaluated the customer service, web design, assurance and order management in internet based services but the scale did not account for the features that are common among online-shopping websites or health-care patient portals (Lin & Hsieh, 2011). There was a need to develop a scale that would serve as a versatile evaluation scale that can be applied singularly across various SST based industries like banking, air-transport, retail and health-care. Noting the key components of the principles used to develop the aforementioned scales as a literature foundation, Lin and Hsieh (2011) developed an initial set of 75 scale items for their SSTQUAL scale. Through further screening by subject matter experts, they were able to establish a 37-item scale initially. They further refined the scale through principle component analysis and varimax rotation to retain a 27-item scale. These scale-items represented mutually exclusive components of perceived service quality and seven dimensions of service quality that were collectively comprised

of these 27 scale items were identified as - functionality (FUN) which represents the functional characteristics of SSTs, including responsiveness, reliability and ease of use; enjoyment (ENJ) which describes perceptions of enjoyment encountered during SST based service delivery and the outcome; security and privacy (SEC) which depicts perceived safety from intrusion, fraud, and loss of personal information; assurance (ASU) which portrays the confidence in the service delivery system due to the reputation and confidence of the service provider; design (DES) which consists of the overall design of the SST system; convenience (CON) which depicts the accessibility of SST systems; and customization (CUS) which demonstrates the degree to which an SST can be altered to fit the customer's individual preferences and transaction histories. The scale used a seven-point Likert scale scaling from strongly disagree to strongly agree. To further improve the psychometric measurement properties of this scale, the scale was refined through confirmatory factor analysis and the final SSTQUAL scale consisting of 20 scale-items was developed. The scale and its accompanying questionnaire was then tested for validity by surveying random customers from industries offering SST and the convergent, discriminant and nomological validity of the scales were established.

They were also able to test the generalizability and the replicability of the scale by surveying customers across multiple industries that utilize SSTs, like the banking industry and the transportation industry. This resulted in the development of a scale that suggested be used as a diagnostic tool to understand or evaluate the strengths and weaknesses of a service provider's SST in terms of the different primary dimensions of the service quality. They also suggested that the scale could be used within a single industry to evaluate the strengths and weaknesses among different settings of service delivery systems. In the

case of this study, this scale can be used to evaluate the service quality that is perceived by the passengers who use conventional check-in systems versus the service quality perceived by the passengers who use SST based check-in systems. In a study conducted by Radomir and Nistor (2012) in context of SST in the Romanian banking industry, it was found that customers base their perceptions regarding the service quality of SSTs on five dimensions: functionality, image (IMG) which was a consolidation of design and assurance, enjoyment, security and customization. Convenience, one of the identified service quality dimensions from Lin and Hsieh's (2011) scale was found to have shared commonality among scale items with the customization scale-items. Their revised scale, hence consolidated the original scale into an 18-item SSTQUAL scale. They reevaluated the revised scale through a study based on the response of highly-educated Romanian professionals towards SST in 2014 (Radomir & Nistor, 2014) and were able to establish a more statistically sound scale. This refined revised SSTQUAL scale consolidated the scale further by categorizing Image (Design and Assurance) with Convenience hence creating a new dimension DESCONASU bringing the total number of service quality scale items to 14. However, it had been noted by Lin and Hsieh (2011) and Radomir and Nistor (2012, 2014) that the SSTQUAL scale can only be perfected with further replications and repetitions. The questionnaire they used for their study is compared with the original SSTQUAL questionnaire in the premise of the banking industry alongside their refined questionnaire that they used for their 2014 study and is showcased in Appendix E. They also found that the results across all dimensions of service quality also corresponded with positive customer behavioral intentions (CBI), which primarily means

the intentions of the customers to use the technology again and hence indicating stronger customer retention.

Although prior literature as discussed in the sections above have identified the contributors to the adaptability or the lack of the same towards SSTs, there hasn't been sufficient research done into how the passengers perception towards service quality can be compared over two different service delivery systems providing the same precise service. At an airport, a kiosk operates similarly like a conventional check-in desk, but without the customer-employee interaction aspect. While the perceived service quality has been evaluated in respective service delivery systems: customer-technology and customer-employee interactions; there has been no comparison between the two services with respect to their perceived service quality using a singular scale. Moreover, despite Radomir and Nistor (2014) concluding in their study that the perceived service quality correlates with CBI, the particular dimensions of perceived service quality that have a stronger influence over CBI was not investigated. This study addresses both these gaps in the literature within the field of service quality and the subsequent adaptability of SSTs at airports.

This study will attempt at using the SSTQUAL scale for evaluating perceived service quality in a customer-technology interaction as well as a customer-employee interaction. This is based on the common definitions of the perceived service quality dimensions between the SSTQUAL scale and its service-employee interaction counterpart SERVQUAL.

## Methodology

This study aimed to compare the perceived service quality of passengers who use SSTs and passengers who don't while checking their luggage in before a flight at the airport. The comparisons were made in terms of the effect of check-in methods on the participating passengers' perceived service quality and how the different parameters of service quality attributed towards the CBI. This evaluation was conducted making use of the SSTQUAL survey questionnaire, revised and refined by Radomir and Nistor (2012 and 2014). The participants for the study were above the age of 18 and had flown with check-in luggage with multiple US based airlines in the past 12 months. Participation of the respondents was considered as their consent. The questionnaire was modified to fit the context of luggage check-in at airports. A singular questionnaire was utilized that accommodated responses from passengers using either of the check-in systems. The particular questionnaire has been showcased in Appendices B and F with the respective variable designations. The questionnaire was shared on social media like Facebook as well as academic circles and professional circles of the author via online survey platforms like Google forms and Survey Monkey. The participants were asked to respond to the questions using a 7-point Likert scale with one being strongly disagree and 7 being strongly agree. Apart from the responses to the questionnaire items, demographic data like age-group and gender were also collected. Other study-related data including annual frequency of travel, purpose of travel during the flight with respect to which the questionnaire was answered, the nature of flights the passenger takes in a year and the general preference of check-in were also collected. The method of check-in on the flight with respect to which the questionnaire was filled was also a questionnaire item to



segregate the data sample collected base on the method of check-in (kiosk check-in and desk check-in). The general preference of check-in was also a questionnaire item to check if the passengers were compelled to use a particular method of check-in on their most recent travel with respect to which the questionnaire was answered. The target sample size was 50 responses divided equally between the two check-in methods. See Appendix B for the complete questionnaire.

The SSTQUAL scale evaluates the perceived service quality by aggregating the means of the responses to the question items representing their respective dimension. This study compared the means of the perceived service quality across all dimensions grouped according to the method of check-in and also check for the significance in the difference of the marginal means using multivariate analysis of variance (MANOVA). The different dimensions of service quality of the two respective check-in methods were also compared using analysis of variance to test the between-subject with the individual questionnaire items as dependent variables (DV) and the method of check-in as the fixed factor or independent variable (IV). This analysis also helped determining the validity of the  $H_1$ ,  $H_2$  and  $H_3$  hypotheses. The customer behavioral intentions question items that did show significant variance based on the method of check-in were further evaluated for significance in correlation with the individual SSTQUAL scale items using two-tailed regression analysis.

## Results

**Data Summary**

The demographic characteristics and the supplementary travel data of the data sample are shown in Table 1

Table 1

*Demographic and Travel Characteristics of Sample Data.*

Characteristic	Number of Cases (N)	Percentage of the Sample
Gender		
Male	23	42.1
Female	34	57.9
Age		
18 to 24	10	17.5
25 to 34	26	45.6
35 to 44	10	17.5
45 to 54	6	1.5
55 to 64	5	8.8
Purpose of travel <sup>a, b</sup>		
Leisure/personal	41	71.9
Business/work	11	19.3
Both	5	8.8
General purpose of travel in a year <sup>b</sup>		
Always leisure/personal	14	24.6
Mostly leisure	30	52.6
Both	8	14.0
Mostly business/work	4	7.0
Always business/work	1	1.8
Annual frequency of travel <sup>b</sup>		
0 to 5	27	47.4
6 to 15	26	45.6
16 to 25	2	3.5
26 and above	2	3.5
Method of check-in <sup>a</sup>		
Desk	30	52.6
Kiosk	27	47.4
General Preference of check-in method <sup>a</sup>		
Desk	36	63.2
Kiosk	21	36.8

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Characteristic	Number of Cases (N)	Percentage of the Sample
Airline Flown with <sup>a, b</sup>		
American Airlines	12	21.1
Delta Airlines	11	19.3
United Airlines	4	7.0
Southwest Airlines	14	24.6
Other	16	28.0

Source: Created by the author.

Note.

<sup>a</sup> Travel using an airline's service.

<sup>b</sup> with respect to the most recent flight.

<sup>c</sup> Airlines with less than 4 responses were categorized under *Other*. These airlines included Alaska Airlines, Virgin America, Spirit Airlines, Hawaiian Airlines, Frontier Airlines, Jetblue, and Allegiant Airlines ..

**Frequencies and Mean**

The means of the cumulative service quality questionnaire item responses for passengers using desk check-in (N = 30) and passengers using kiosk check-in (N= 27) were 5.407 (1.556) and 5.931 (1.311), respectively. The mean of the cumulative CBI responses for passengers using desk check-in and kiosk check-in were 5.755 (1.372) and 6.449 (0.776), respectively. The means for the individual questionnaire items with respect to the method of check-in are showcased in Table 2. See Appendix D for the frequencies of the questionnaire responses.

Table 2

*Means of responses*

Questionnaire items	Desk check-in (N = 30)		Kiosk check-in (N = 27)	
	M (SD)	95% CI	M (SD)	95% CI
FUN1	6.00 (1.08)	[5.60, 6.40]	6.33 (0.83)	[6.00, 6.66]
FUN2	5.67 (1.52)	[5.10, 6.23]	6.11 (0.93)	[5.74, 6.48]
FUN3	6.00 (1.12)	[5.56, 6.44]	6.48 (0.89)	[6.13, 6.83]
ENJ1	3.83 (1.78)	[3.17, 4.50]	4.96 (1.61)	[4.33, 5.60]
ENJ2	5.33 (1.49)	[4.78, 5.89]	6.07 (1.36)	[5.54, 6.61]
ENJ3	4.83 (1.58)	[4.24, 5.42]	4.96 (1.83)	[4.24, 5.69]
SEC1	6.20 (0.89)	[5.87, 6.53]	6.44 (1.01)	[6.04, 6.85]
SEC2	5.27 (1.55)	[4.69, 5.85]	5.59 (1.39)	[5.04, 6.14]
DESCONASU1	4.73 (1.60)	[4.14, 5.33]	5.48 (1.55)	[4.87, 6.10]
DESCONASU2	5.30 (1.30)	[4.72, 5.68]	6.26 (1.20)	[5.79, 6.73]
DESCONASU3	6.20 (1.30)	[5.72, 6.68]	6.96(0.192)	[6.89, 7.04]
DESCONASU4	5.43 (1.74)	[4.79, 6.08]	6.30 (0.95)	[5.92, 6.67]
CUS1	5.90 (1.19)	[5.46, 6.34]	5.83 (1.56)	[5.24, 6.47]
CUS2	5.10 (1.69)	[4.47, 5.73]	5.22 (1.56)	[4.61, 5.84]
CBI1	5.37 (1.33)	[4.87, 5.86]	6.37 (0.79)	[6.06, 6.68]
CBI2	5.70 (1.34)	[5.20, 6.20]	6.52 (0.80)	[6.20, 6.84]
CBI3	6.20 (1.30)	[5.72, 6.68]	6.52 (0.75)	[6.22, 6.82]

Source. Created by the author.

Note. M = mean

SD = standard deviation

N = number pf cases

CI = confidence interval

**Statistical Analysis**

A multivariate analysis of variance (MANOVA) examined the method of check-in as independent variable (IV) and the different perceived quality questionnaire items as well as the CBI responses as the latent variables or dependent variables (DVs). As observed in table 3, no multivariate significance ( $p > .05$ ) was found between the method of check-in and the over-all service quality. And in table 4, it can be seen that a significant effect of the method of check-in was found on the CBI questionnaire responses. It can also be observed in table 5 that the test of between-subject effects revealed significant effect ( $p < .05$ ) of check-in method on scale items ENJ1, ( $p = .015$ ), DESCONASU2 ( $p = .002$ ), DESCONASU3 ( $p = .004$ ) and DESCONASU4 ( $p = .026$ ). The check-in method also exhibited significant effect on CBI1 ( $p = .001$ ) and CBI2 ( $p = .008$ ) but no significant effect of method of check-in was found for the CBI3 questionnaire responses ( $p > .05$ ). See appendix G for the tables displaying all the results of test of between subject effects based on the method of check-in for all questionnaire items.

Table 3

*Multivariate Analysis of Variance Among Perceived Service Quality Question Items.*

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial eta Squared
Check-in Method	Pillai's Trace	.374	1.373 <sup>b</sup>	14.000	42.000	.202	.271
	Wilks' Lambda	.626	1.373 <sup>b</sup>	14.000	42.000	.202	.271
	Hotelling's Trace	.599	1.373 <sup>b</sup>	14.000	42.000	.202	.271
	Roy's Largest Root	.599	1.373 <sup>b</sup>	14.000	42.000	.202	.271

<sup>a</sup> Design: Intercept + Check-in Method

<sup>b</sup> Exact statistic

df: Degree of freedom

Sig.: Significant value

Table 4

*Multivariate Analysis of Variance Among Perceived CBI Responses.*

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial eta Squared
Check-in Method	Pillai's Trace	.199	4.377 <sup>b</sup>	3.000	53.000	.008	.847
	Wilks' Lambda	.801	4.377 <sup>b</sup>	3.000	53.000	.008	.847
	Hotelling's Trace	.248	4.377 <sup>b</sup>	3.000	53.000	.008	.847
	Roy's Largest Root	.248	4.377 <sup>b</sup>	3.000	53.000	.008	.847

Note. <sup>a</sup> Design: Intercept + Check-in Method

<sup>b</sup> Exact statistic

df: Degree of freedom

Sig.: Significant value

Table 5

*Test of Between Subject Effects.*

Source	Dependent Variable	Type III Sum of Squares	df	Mean of Square	F	Sig.
Check-in	ENJ1	18.134	1	18.134	6.267	.015
Method	DESCONASU2	15.945	1	15.945	10.199	.002
	DESCONASU3	8.272	1	8.272	9.143	0.004
	DESCONASU4	10.583	1	10.583	5.244	.026
	CBI1	14.316	1	14.316	11.706	.001
	CBI2	9.521	1	1.442	1.248	.008

Note. *df*: Degree of freedom

Sig.: Significant value

A two-tailed regression analysis was conducted to examine the correlation between different service quality questionnaire responses grouped with respect to the method of check-in and CBI. These results are showcased in table 5.

Table 6

*Pearson's Correlation Between Customer Behavioral Intentions and Questionnaire Items.*

Dependent Variable		CBI1		CBI2		CBI3	
		Desk check-in	Kiosk check-in	Desk Check-in	Kiosk check-in	Desk check-in	Kiosk check-in
FUN1	<i>r</i>	-.024	.506	.308	.538	.221	.512
	<i>p</i>	.90	.007*	.97	.004**	.241	.006*
FUN2	<i>r</i>	.354	.663	.612	.658	.498	.587
	<i>p</i>	.055	.000**	.000**	0.000**	.005*	.001**
FUN3	<i>r</i>	.337	.254	.491	.331	.316	.681
	<i>p</i>	.068	.200	.006*	.092	.089	.000**
ENJ1	<i>r</i>	.406	-.049	.454	-.044	.418	.176
	<i>p</i>	.026*	.807	.012*	.827	.022*	.381
ENJ2	<i>r</i>	.615	.367	.791	.0281	.676	.450
	<i>p</i>	.000**	.059	.000**	.155	.000**	.018*
ENJ3	<i>r</i>	.492	-.017	.529	.223	.286	.461
	<i>p</i>	.006*	.934	.003**	.263	.125	.015*
SEC1	<i>r</i>	.375	.602	.429	.605	.324	.664
	<i>p</i>	.041*	.001**	.018*	.001**	.081	.000**
SEC2	<i>r</i>	.353	.247	.205	.231	.332	.282
	<i>p</i>	.56	.215	.277	.247	.073	.154
DESCONASU1	<i>r</i>	.569	.569	.315	.594	.193	.502
	<i>p</i>	.001**	.002**	.09	.001**	.306	.008*
DESCONASU2	<i>r</i>	.798	.342	.570	.335	.406	.400
	<i>p</i>	.000**	.081	.001**	.087	.026*	.039*
DESCONASU3	<i>r</i>	.136	.093	.095	.129	.324	.138
	<i>p</i>	.472	.643	.617	.512	.081	.494
DESCONASU4	<i>r</i>	.273	.257	.206	.445	.389	.138
	<i>p</i>	.144	.196	.276	.02*	.034*	.000**
CUS1	<i>r</i>	.273	.295	.414	.616	.395	.493
	<i>p</i>	.239	.135	.023*	.001**	.031*	.009*
CUS2	<i>r</i>	.399	.494	.272	.552	.179	.457
	<i>p</i>	.029*	.009*	.146	.003**	.343	.017*

Note:

*r* = co-efficient of regression

*p* = value of significance

\* *p* < 0.05, two-tailed.

\*\* *p* < 0.005, two tailed



### Discussion

#### **Effect of the Method of Check-in on Perceived Service Quality**

By comparing the means of the aggregate perceived quality of desk check-in method (5.407) and kiosk check-in method (5.931), it can be said that passengers who used the latter check-in method perceived a higher service level. However, as seen in table 4, the multivariate analysis of variance between the two methods of check-in and the overall perceived quality did not show any significance. Hence, it can be said that there was no significant difference between the perceived service quality of the passengers' using desk check-in and kiosk check-in thus validating the null hypothesis  $H_0$ .

#### **Effect of Method of Check-in on Dimensions of Perceived Service Quality**

As it can be seen in table 5, the test of between-subject effects did establish the influence of check-in method on the passengers' perception of the enjoyment gained by the perceived interestingness of process of the respective check-in system (ENJ1), the technology being (DESCONASU2) used as well as the reputation (DESCONASU3) and popularity (DESCONASU4) of the respective airlines. Hence, null hypotheses  $H_{2b0}$  and  $H_{2d0}$  can be rejected to a certain extent. The null hypotheses  $H_{2a0}$ ,  $H_{2c0}$  and  $H_{2e0}$  however have been found to be true.

#### **Effect of Method of Check-in on Customer Behavioral Intentions**

**Intent to recommend services to friends and colleagues (CBI1).** The mean of the customer behavioral intentions of passengers who checked in using a desk-agent (5.755) was lower than the mean of the customer behavioral intentions of the passengers who checked in using a kiosk (6.449). The multivariate analysis of variance also

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established a significant trend between the method of check-in and the passengers' customer behavioral intentions. As seen in table 5, a strong effect between the method of check-in and the customer's intention to recommend the airline's service to friends and colleagues (CBI1) was found. The test of between-subject effects alongside multivariate analysis of variance did validate hypotheses H<sub>3a1</sub>. As seen in table 6, for passengers using desk check-in, a significance in correlation at .001 level using two-tailed regression analysis was found only between the intention to recommend services to friends and colleagues and the passenger's perceived enjoyment (ENJ1, ENJ2 and ENJ3) from using the respective service delivery system. Also, significant correlation at .01 level was established between the aesthetic appeal of the layout of the desks (DESCONASU1), technology used at the desk (DESCONASU2) and the passenger's belief that the airline's service delivery system had their best interest at hearts (CUS2) and the intention to recommend the services of the airline. Significant correlation at .01 level was also established between the security felt by the passengers during their transactions at the check-in desk (SEC1) and the intent to recommend the services. For passengers using the kiosk to check their luggage in, significant correlation at .001 level was found between the intent to recommend the airline's service to their friends and colleagues and the passengers perception of the ease of checking their luggage in (FUN3) and the perceived appeal of the layout of the kiosks (DESCONASU1). Significant correlation at .01 level was found between the intent to recommend the respective service of the respective airline and the belief that the airline had their best interests at heart (CUS2) was found too. Also, the security perceived by the passengers during their transactions with the kiosk (SEC1) showed a more significant correlation ( $p < .005$ ) with the intent of

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recommending the airlines' services when compared to its check-in desk counterpart ( $.05 < p < .005$ ).

**Intent to go through the process again (CBI2).** As seen in table 5, a strong effect between the method of check-in and the customer's intention to go through the process again (CBI2) was found. The test of between-subject effects alongside multivariate analysis of variance did validate hypotheses  $H_{3b1}$ . Among passengers who checked their luggage in at the desk, the overall enjoyment (ENJ1, ENJ2 and ENJ3) perceived by the passengers showed a significant correlation at a .001 level with the passenger's intent to go through the respective process again. Significant correlation at .001 level was also established between the passenger's intent to go through the process again and the passengers' perceived requirement of minimal effort (FUN2), and the passenger's perception of the technology used (DESCONASU2). Significant correlation at 0.01 level was also found between the intent to go through the process again and the passenger's perceived ease of utilizing the service delivery system (FUN3), the security felt during their transactions (SEC1), and the passenger's perception that the service sufficed their specific needs (CUS1). For passengers using the kiosk to check their luggage in, the perceived customizability of the kiosk (CUS1 and CUS2) showed significant correlation at 0.001 level with the passenger's intent to go through the service again. Significant correlation at 0.001 level was also established between the passenger's intent to go through the process again and the clarity of the process (FUN1), the perceived requirement of effort (FUN2) and the perceived appeal of the layout of the kiosks (DESCONASU1). Significant correlation at .01 level was found between the passenger's intent to go through the process again, and significant correlation at .01 level

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was found between the passenger's intent to go through the process again and the respective airline's perceived reputation (DESCONASU4). The passenger's perception of security during their transactions with the kiosk (SEC1) also showed a much more significant correlation ( $p < .005$ ) with the passenger's intent to go through the process again compared to that of the passengers who used the desk ( $p < .05$ ).

**Intent to use the airline's service again (CBI3).** As seen in table 5, a no significant effect between the method of check-in and the customer's intention to use the airline's service again (CBI3) was found. The test of between-subject effects alongside multivariate analysis of variance could not validate hypotheses  $H_{3c1}$ . For passengers using the desk to check their luggage in, a significant correlation at .001 level was established between their intent to use the respective airline's service again and the perception of feeling good from using the service (ENJ2). Significant correlation at .01 level was found between the passenger's intent to use the airline's service again and the perceived requirement of effort (FUN2), the interestingness of the process (ENJ1), the technology used by the service delivery system (DESCONASU2), the perceived reputation of the respective airline (DESCONASU4) and the perceived satiation of the passenger's specific needs (CUS1). However, in the case of passengers using the kiosk to check their luggage in, significant correlation at .001 level was found between the passenger's intent to use the respective airline's service again and the passenger's perceived ease of use of the technology (FUN3), the minimal requirement of effort. (FUN2), the perception of security felt during the transactions with the kiosk (SEC1), the perceived reputation of the respective airline (DESCONASU4) and all the customizability dimension items of the perceived service quality (CUS1 and CUS2). Significant correlation at .01 level was

## SELF SERVICE TECHNOLOGIES AT AIRPORTS

found between the passenger's intent to use the airline's service again and the perception of the clarity of the process (FUN1), the perception of feeling good after using the service (ENJ2), the perception of the interestingness of the additional functions offered by the kiosk (ENJ3), the perceived appeal of the layout of the kiosks (DESCONASU1) and the technology used by the kiosks (DESCONASU2). The perceived satisfaction with the privacy policy of the respective airlines felt by the passengers during their transactions with the passengers using either the desk or the kiosk to check (SEC2) their luggage in failed to show any correlation with any of the customer behavioral intention parameters (CBI1, CBI2 and CBI3). This can be explained since many of the passengers who participated in this study were unaware that the privacy policies printed on their ticket receipts and hence, could not answer the question definitively. Also, no significant correlation was established between any of the passenger's behavioral intentions and the eminence of the respective airline (DESCONASU3).

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### Conclusion

The SSTQUAL scale appeared to be a very important tool in evaluating the perceived service quality of passengers who use either the desk or the kiosk to check their luggage in at the airport. It was observed that the means of the cumulative perceived quality among the passengers who used the kiosk to check their luggage in was greater than the means of the of the same among passengers who used the desk across all service quality dimensions. However, the study was unable to validate the significance of the method of check-in on the passenger's perceived service quality. Yet, the study was able to identify the effect of method of check-in on the intention of the passengers who use the desk to recommend the services to their friends and colleagues as well as go through the process again and the perceived service quality dimensions like the enjoyment received and the design and of the service delivery system. Hence, it can be said that passengers who use kiosks and perceive a higher service quality are more likely to recommend the services of the airline as well as go through the process of using the airline's luggage check-in service again. Also, passengers who felt safer with their transactions while using their kiosk were more likely to recommend the service, re-use the service and re-participate in the service. The stronger the perceived clarity of the process of using a SSK, the perception of minimal effort required while using the SSKs, the aesthetic appeal of the SSK, and the belief that the airline's SSKs have the passenger's best interests at heart, the better are the passenger's intentions to recommend and reuse the airline's services again as well as go through the process of using a SSK again.

Customer behavioral intentions play an active role in a service provider's or airline's retention of present customers and expanding their customer base. Hence, a

## SELF SERVICE TECHNOLOGIES AT AIRPORTS

focus on the functionality, design and convenience of the SSKs must be a prime focus if the service providers hope to increase the adaptability of their SST systems and further reduce their costs. Another important phenomenon was observed in terms of the passenger's knowledge of the privacy policy stated by the airlines. Since the passengers felt less satisfied by the same primarily due to their unawareness of its presence, airlines could emphasize on making the passengers aware of their privacy policy more evidently.

## SELF SERVICE TECHNOLOGIES AT AIRPORTS

### Future Studies

It is suggested that further studies must be conducted using a larger data sample and a larger geographical location. Also, since the data for this study was collected using online survey platforms, in-person data collection could potentially give different results. At the time of this study, the usage of SSKs was much lower than the IATA estimation, but a growing trend has been observed with respect to the familiarity and usage of SSKs. Hence, the results of the study might also be different as SSKs reach a higher rate of utilization with time. Further studies and researches can also be done to evaluate the specific dimensions of perceived service quality that affect the customer technological readiness. Another important limitation of this study is the assumption that the SSTQUAL scale can be used to evaluate perceived service quality in a customer-technology interaction and a customer-employee interaction simultaneously. Further studies can be done in the direction of evaluating the validity of this assumption or even developing a scale derived from the SSTQUAL scale and the SERVQUAL scale that can serve the aforementioned purpose.



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SELF SERVICE TECHNOLOGIES AT AIRPORTS

APPENDIX A

IRB EXEMPTION CERTIFICATE

SELF SERVICE TECHNOLOGIES AT AIRPORTS



EXEMPTION GRANTED

Mary Niemczyk Polytechnic School - Aviation Programs 480/727-1595

Mary.Niemczyk@asu.edu

Dear Mary Niemczyk: On 11/6/2017 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	Evaluating Passengers' Perceived Service Quality Towards Self Service Luggage Check-in Technologies At Airports Using SSTQUAL
Investigator:	Mary Niemczyk
IRB ID:	STUDY00007185
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	<ul style="list-style-type: none"><li>• Protocol, Category: IRB Protocol;</li><li>• Survey Instrument, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions);</li><li>• ConsentForm, Category: Consent Form;</li><li>• JamesHartmanCitiTrainingCertificate, Category: Other (to reflect anything not captured above);</li></ul>

## SELF SERVICE TECHNOLOGIES AT AIRPORTS

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2) Tests, surveys, interviews, or observation on 11/6/2017.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

Sincerely,

IRB Administrator

cc: Aditya Singh

James Hartman Robert Gray Mary Niemczyk.

SELF SERVICE TECHNOLOGIES AT AIRPORTS

APPENDIX B

DATA COLLECTION SURVEY INSTRUMENT



# SELF SERVICE TECHNOLOGIES AT AIRPORTS

4/12/2018

Passenger Satisfaction Levels towards Luggage check-in systems.

## Passenger Satisfaction Levels towards Luggage check-in systems.

This questionnaire is designed to evaluate your perceived service quality while checking in luggage at a conventional check-in counter or while checking in luggage using a kiosk.

While completing this survey, PLEASE ANSWER THE QUESTIONS BASED ON YOUR MOST RECENT FLIGHT EXPERIENCE.

If you checked your luggage in on your most recent flight using a kiosk, answer the questions with respect to kiosk usage. If you checked your luggage in using a desk, respond to the questions with respect to your experience using a check-in desk.

PARTICIPATION WILL BE CONSIDERED CONTENT.

You can read the consent form at

[https://docs.google.com/document/d/1j3tSHQ3nHI2kRomSVp1\\_kRTVf36orrnT4Q6hAbIQtw/edit?usp=sharing](https://docs.google.com/document/d/1j3tSHQ3nHI2kRomSVp1_kRTVf36orrnT4Q6hAbIQtw/edit?usp=sharing)

\* Required

### Untitled Section

**1. My gender is \***

*Mark only one oval.*

- Female
- Male
- Prefer not to say
- Other: \_\_\_\_\_

**2. My age is \***

*Mark only one oval.*

- 18 to 24 years old
- 25 to 34 years old
- 35 to 44 years old
- 45 to 54 years old
- 55 to 64 years old
- 65 and above

**3. The purpose of my most recent travel was \***

*Mark only one oval.*

- Leisure/Personal
- Business/Work
- Both

[https://docs.google.com/forms/d/1m29f\\_FWNuuv3fK YuqDiTEitX8PEoio9HHxiMkzyymLc4/edit](https://docs.google.com/forms/d/1m29f_FWNuuv3fK YuqDiTEitX8PEoio9HHxiMkzyymLc4/edit)

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# SELF SERVICE TECHNOLOGIES AT AIRPORTS

4/12/2018

Passenger Satisfaction Levels towards Luggage check-in systems.

**4. In a year, I travel mostly for \***

*Mark only one oval.*

- Always Leisure/Personal
- Mostly Leisure/Personal
- Both
- Mostly Business/Work
- Always Business/Work

**5. Annually, I fly the following number of times (a return-trip counts as two separate flights but two legs of a connecting flight count as one flight). \***

*Mark only one oval.*

- 0 - 5
- 6 to 15
- 16 to 25
- 26 and above

**6. The airline I flew with was : \***

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**7. How did you check-in luggage on your most recent flight? \***

*Mark only one oval.*

- At the Kiosk
- At the check-in desk

**8. How do you mostly check your luggage in? \***

*Mark only one oval.*

- At the Kiosk
- At the check-in desk

**9. The Self-luggage Check-in process at the Kiosk was clear to understand. (or) The luggage check-in process at the desk was clear to understand. \***

*Mark only one oval.*

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

# SELF SERVICE TECHNOLOGIES AT AIRPORTS

4/12/2018

Passenger Satisfaction Levels towards Luggage check-in systems.

10. **Using the Self-Luggage Check-in Kiosk required little effort. (or) Checking my luggage in at the desk required little effort. \***

Mark only one oval.

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

11. **I was able to smoothly check-in my luggage using the kiosk. (or) I was able to smoothly check-in my luggage in at the desk. \***

Mark only one oval.

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

12. **The operation of the Self-luggage Check-in kiosk was interesting. (or) The operation of the check-in desk was interesting. \***

Mark only one oval.

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

13. **I felt good that I was able to use the Self-luggage Check-in kiosk. (or) I feel good that I was able to check-in my luggage in at the desk. \***

Mark only one oval.

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

14. **The Self-Luggage Check-in kiosk had interesting additional functions. (or) The check-in agent could perform other additional functions. \***

Mark only one oval.

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

15. **I felt safe conducting my transactions with the self-luggage check-in kiosk. (or) I felt safe with my transactions with the check-in agent at the desk. \***

Mark only one oval.

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

# SELF SERVICE TECHNOLOGIES AT AIRPORTS

4/12/2018

Passenger Satisfaction Levels towards Luggage check-in systems.

16. **A clear privacy policy was stated when I used the Self-luggage Check-in kiosk. (or) I am comfortable with the airline's privacy policy issued with my ticket/receipt. \***  
*Mark only one oval.*

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

17. **The layout of the Self-Luggage Check-in kiosk was aesthetically appealing. (or) The check-in desk was visually appealing. \***  
*Mark only one oval.*

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

18. **The Kiosk seemed to be using up-to-date technology. (or) The agent at the desk seemed to be making the use of up-to-date technology to check-in my luggage. \***  
*Mark only one oval.*

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

19. **The airline is well-known. \***  
*Mark only one oval.*

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

20. **The airline has a good reputation. \***  
*Mark only one oval.*

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

21. **The Self-Luggage Check-in kiosk understood my specific needs. (or) The check-in agent understood my specific needs. \***  
*Mark only one oval.*

	1	2	3	4	5	6	7	
Strongly Disagree	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Strongly Agree

# SELF SERVICE TECHNOLOGIES AT AIRPORTS

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Passenger Satisfaction Levels towards Luggage check-in systems.

22. **The airline's Self-luggage Check-in kiosk concept has my best interests at heart. (or) The airline's check-in agents have my best interests at heart. \***

Mark only one oval.

1    2    3    4    5    6    7

Strongly Disagree                        Strongly Agree

23. **I would recommend the use of Self-luggage Check-in kiosks to my friends and colleagues. (or) I would recommend the use of the airline's check-in desks to my friends and colleagues. \***

Mark only one oval.

1    2    3    4    5    6    7

Strongly Disagree                        Strongly Agree

24. **If I had to go through the process of luggage check-in again using a kiosk, I would do it again. (or) If I had to use the check-in desk again, I would do it. \***

Mark only one oval.

1    2    3    4    5    6    7


Strongly Disagree                        Strongly Agree

25. **The probability of using the airline's service again is high. \***

Mark only one oval.

1    2    3    4    5    6    7

Strongly Disagree                        Strongly Agree

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 Google Forms

SELF SERVICE TECHNOLOGIES AT AIRPORTS

APPENDIX C

CONSENT FORM

## SELF SERVICE TECHNOLOGIES AT AIRPORTS

**Title of research study:** Evaluating Passengers' Perceived Service Quality Towards Self Service Luggage Check-in Technologies At Airports Using SSTQUAL

**Investigator:** Dr Mary C. Niemczyk.

### **Why am I being invited to take part in a research study?**

We invite you to take part in a research study because your responses with other adult travellers will be used as a data input for comparing the two respective check-in methods.

### **Why is this research being done?**

The research is being done to understand if passengers prefer the luggage check-in services at staffed desks or kiosks.

### **How long will the research last?**

We expect that individuals will spend no more than 10 minutes participating in this research.

### **How many people will be studied?**

We expect about 50 adult individuals to participate in this research study.

### **What happens if I say yes, I want to be in this research?**

You will be asked to fill out a questionnaire with regards to your service satisfaction while checking your luggage in. You are free to decide whether you wish to participate in this study. However, by participating, you agree that you are 18 years old or older and you consent to participating in this study.

### **What happens if I say yes, but I change my mind later?**

You can leave the research at any time it will not be held against you.

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### **What happens to the information collected for the research?**

Efforts will be made to limit the use and disclosure of your personal information, including research study records, to people who have a need to review this information. We cannot promise complete secrecy. The results of this study may be used in reports, presentations or publications but your name will not be disclosed.

### **Who can I talk to?**

If you have questions, concerns, or complaints, contact Dr Mary C. Niemczyk at [Mary.Niemczyk@asu.edu](mailto:Mary.Niemczyk@asu.edu)

This research has been reviewed and approved by the Social Behavioral IRB. You may talk to them at (480) 965-6788 or by email at [research.integrity@asu.edu](mailto:research.integrity@asu.edu) if:

- Your questions, concerns, or complaints are not being answered by the research team.
  - You cannot reach the research team.
  - You want to talk to someone besides the research team.
  - You have questions about your rights as a research participant.
  - You want to get information or provide input about this research.

**Participating in this survey will be considered to be your consent.**



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APPENDIX D

FREQUENCIES OF QUESTIONNAIRE RESPONSES

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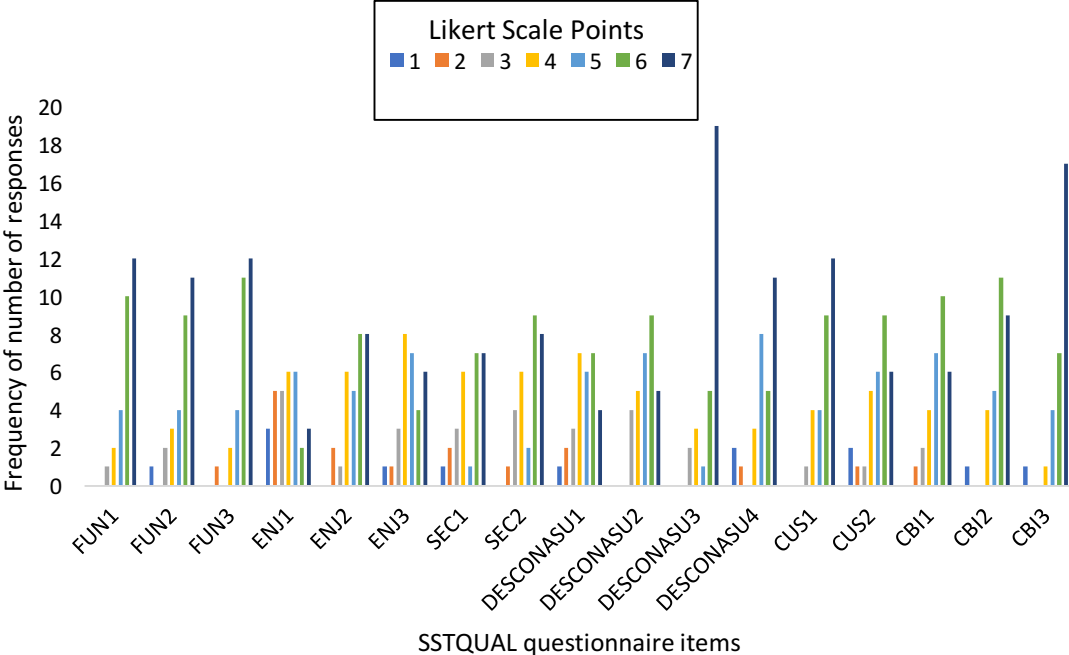


Figure 1. Frequency of responses to SSTQUAL scale-items for desk check-in.

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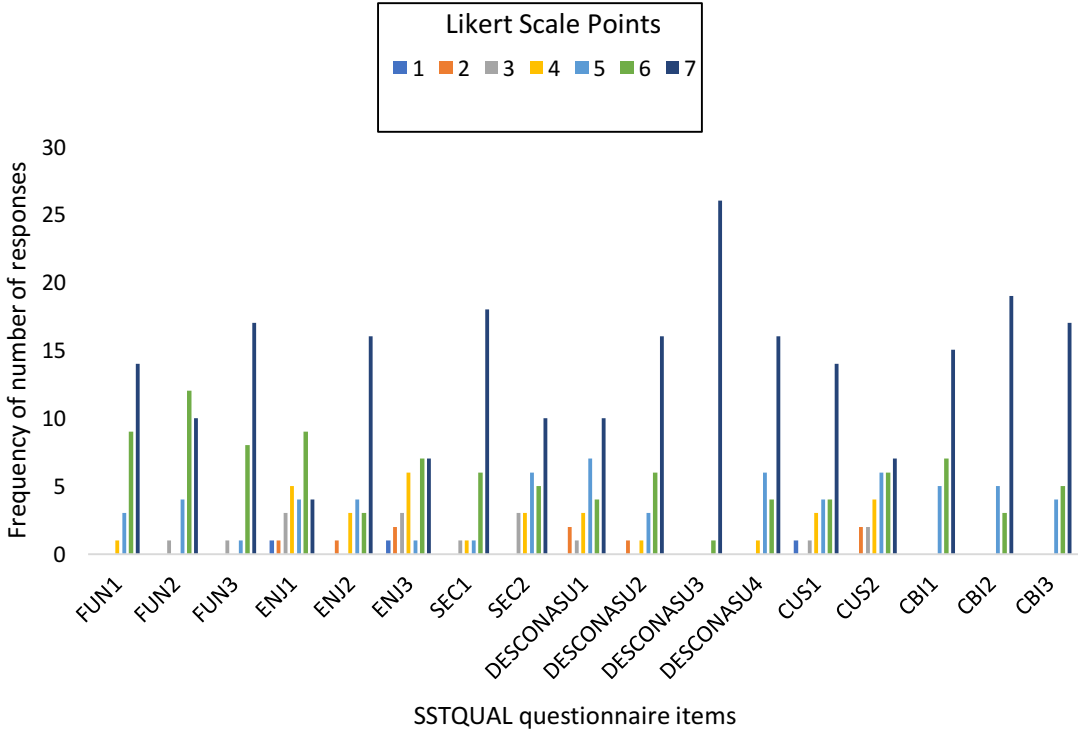


Figure 2. Frequency of responses to SSTQUAL scale-items for kiosk check-in.

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APPENDIX E

COMPARISONS OF SSTQUAL ORIGINAL, REFINED, AND REFINED AND  
REVISED SCALE.

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Table 1.

Comparing the dimensions of Service quality in the original SSTQUAL scale, Refined SSTQUAL Scale and Revised refined SSTQUAL.

Items	Original SSTQUAL dimensions	Refined original SSTQUAL dimensions	Revised refined SSTQUAL dimensions
I can get my service done with the bank's SST in a short time (FUN1) <i>b1 ,b2</i>	Functionality	Functionality	-
The service process of the bank's SST is clear (FUN2)	Functionality	Functionality	Functionality
Using the bank's SST requires little effort (FUN3)	Functionality	Functionality	Functionality
I can get my service done smoothly with the bank's SSTs (FUN4)	Functionality	Functionality	Functionality

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Items	Original SSTQUAL dimensions	Refined original SSTQUAL dimensions	Revised refined SSTQUAL dimensions
Each service item/function of the SST is error free (FUN5) <sup>b1, b2</sup>	Functionality	Security/Privacy	-
The operation of the bank's SST is interesting (ENJ1)	Enjoyment	Enjoyment	Enjoyment
I feel good being able to use the SSTs (ENJ2)	Enjoyment	Enjoyment	Enjoyment
The bank's SST has interesting additional functions (ENJ3)	Enjoyment	Enjoyment	Enjoyment
The bank's SST provides me with all relevant information (ENJ4) <sup>b1, b2</sup>	Enjoyment	Security/Privacy	-
I feel safe in my transactions with the bank's SST (SEC1)	Security/Privacy	Security/Privacy	Security/Privacy

## SELF SERVICE TECHNOLOGIES AT AIRPORTS

Items	Original SSTQUAL dimensions	Refined original SSTQUAL dimensions	Revised refined SSTQUAL dimensions
A clear privacy policy is stated when I use the bank's SST (SEC2)	Security/Privacy	Security/Privacy	Security/Privacy
The bank providing SST is well-known (ASU1) <sup>c</sup>	Assurance	Image	DESCONASU
The bank providing the SST has a good reputation (ASU2) <sup>c</sup>	Assurance	Image	DESCONASU
The layout of the bank's SST is aesthetically appealing (DES1) <sup>c</sup>	Design	Image	DESCONASU
The bank's SST appears to use up-to-date technology (DES2) <sup>c</sup>	Design	Image	DESCONASU

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Items	Original SSTQUAL dimensions	Refined original SSTQUAL dimensions	Revised refined SSTQUAL dimensions
The SST has operating hours convenient to the customers (CON1) <sup>a, c</sup>	Convenience	-	-
It is easy and convenient to use the bank's SST (CON2) <sup>b2, c</sup>	Convenience	Customization	-
The bank's SST understands my specific needs (CUS1)	Customization	Customization	Customization
The bank's SST has my best interests at heart (CUS2)	Customization	Customization	Customization
The bank's SST has features that are personalized for me (CUS3) <sup>a, b1</sup>	Customization	-	-
Customers' behavioral intentions			
The likelihood that I would recommend tis bank's services to a friend is high			CBI1
If I had to do it over again, I would make the same choice			CBI2
The probability that I will use this bank's service again is high			CBI3



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Source: Lin and Hsieh (2014), Radomir and Nistor (2012 & 2014) .

Note: Questionnaire is in context of the banking industry

<sup>a</sup> items comprised in the original SSTQUAL only.

<sup>b1</sup> items removed from the original SSTQUAL scale.

<sup>b2</sup> items removed from the refined original SSTQUAL scale.

<sup>c</sup> items combined in the DESCONASU dimension from the refined original SSTQUAL scale

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APPENDIX F

VARIABLE DESIGNATIONS FOR SSTQUAL SCALE QUESTIONNAIRE ITEMS

## SELF SERVICE TECHNOLOGIES AT AIRPORTS

Table 2

*Variable designation for SSTQUAL scale questionnaire items*

No.	Questionnaire Item	Perceived Service Quality Dimension	Variable Designation
1	The self-luggage check-in process at the Kiosk was clear to understand. (or) The luggage check-in process at the desk was clear to understand.	Functionality	FUN1
2	Using the self-Luggage check-in kiosk required little effort. (or) Checking my luggage in at the desk required little effort.	Functionality	FUN2
3	I was able to smoothly check-in my luggage using the kiosk. (or) I was able to smoothly check-in my luggage in at the desk.	Functionality	FUN3
4	The operation of the self-luggage check-in kiosk was interesting. (or) The operation of the check-in desk was interesting.	Enjoyment	ENJ1
5	I felt good that I was able to use the self-luggage check-in kiosk. (or) I feel good that I was able to check-in my luggage in at the desk.	Enjoyment	ENJ2
6	The self-luggage check-in kiosk had interesting additional functions. (or) The check-in agent could perform other additional functions.	Enjoyment	ENJ3

No.	Questionnaire Item	Perceived Service Quality Dimension	Variable Designation
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7	I felt safe conducting my transactions with the self-luggage check-in kiosk. (or) I felt safe with my transactions with the check-in agent at the desk.	Security/Privacy	SEC1
8	A clear privacy policy was stated when I used the self-luggage check-in kiosk. (or) I am comfortable with the airline's privacy policy issued with my ticket/receipt.	Security/Privacy	SEC2
9	The layout of the self-Luggage check-in kiosk was aesthetically appealing. (or) The check-in desk was visually appealing.	Design, Convenience And Assurance	DESCONASU1
10	The kiosk seemed to be using up-to-date technology. (or) The agent at the desk seemed to be making the use of up-to-date technology to check-in my luggage.	Design, Convenience And Assurance	DESCONASU2
11	The airline is well-known.	Design, Convenience And Assurance	DESCONASU3
12	The airline has a good reputation.	Design, Convenience And Assurance	DESCONASU4
13	The self-luggage check-in kiosk understood my specific needs. (or) The check-in agent understood my specific needs.	Customization	CUS1
14	The airline's self-luggage check-in kiosk concept has my best interests at heart. (or) The airline's check-in agents have my best interests at heart.	Customization	CUS2

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## SELF SERVICE TECHNOLOGIES AT AIRPORTS

No.	Questionnaire Item	Perceived Service Quality Dimension	Variable Designation
Customer Behavioral Intentions			
1	I would recommend the use of self-luggage check-in kiosks to my friends and colleagues. (or) I would recommend the use of the airline's check-in desks to my friends and colleagues.		CBI1
2	If I had to go through the process of luggage check-in again using a kiosk, I would do it again. (or) If I had to use the check-in desk again, I would do it.		CBI2
3	The probability of using the airline's service again is high.		CBI3

Source: Created by the author based on the SSTQUAL scale (Radomir & Nistor, 2014).

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APPENDIX G

TABLES DISPLAYING RESULTS OF STATISTICAL DATA ANALYSIS OUTPUT

SELF SERVICE TECHNOLOGIES AT AIRPORTS

Table 3  
*Test of Between Subjects*

Source	Dependent Variable	Type III Sum of Squares	dF	Mean of Square	F	Sig.
Check-in Method	The Self-luggage Check-in process at the Kiosk was clear to understand. (or) The luggage check-in process at the desk was clear to understand. (FUN1)	1.579	1	1.579	1.670	.202
	Using the Self-Luggage Check-in Kiosk required little effort. (or) Checking my luggage in at the desk required little effort. (FUN2)	2.807	1	2.807	1.728	.194
	I was able to smoothly check-in my luggage using the kiosk. (or) I was able to smoothly check-in my luggage in at the desk. (FUN3)	3.294	1	3.294	2.983	.090
	The operation of the Self-luggage Check-in kiosk was interesting. (or) The operation of the check-in desk was interesting. (ENJ1)	18.134	1	18.134	6.267	.015
	I felt good that I was able to use the Self-luggage Check-in kiosk. (or) I feel good that I was able to check-in my luggage in at the desk. (ENJ2)	7.797	1	7.797	3.811	.056

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Dependent Variable	Type III Sum of Squares	dF	Mean of Squares	F	Sig.
The Self-Luggage Check-in kiosk had interesting additional functions. (or) The check-in agent could perform other additional functions. (ENJ3)	0.239	1	0.239	0.083	.775
I felt safe conducting my transactions with the self-luggage check-in kiosk. (or) I felt safe with my transactions with the check-in agent at the desk. (SEC1)	0.849	1	0.849	0.944	.335
A clear privacy policy was stated when I used the Self-luggage Check-in kiosk. (or) I am comfortable with the airline's privacy policy issued with my ticket/receipt. (SEC2)	1.510	1	1.510	0.690	.410
The layout of the Self-Luggage Check-in kiosk was aesthetically appealing. (or) The check-in desk was visually appealing. (DESCONASU1)	7.954	1	7.954	3.202	.079
The Kiosk seemed to be using up-to-date technology. (or) The agent at the desk seemed to be making the use of up-to-date technology to check-in my luggage. (DESCONASU2)	15.945	1	15.945	10.199	.002
The airline is well-known. (DESCONASU3)	8.272	1	8.272	9.143	.004



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Dependent Variable	Type III Sum of Squares	dF	Mean of Squares	F	Sig.
The airline has a good reputation. (DESCONASU4)	10.583	1	10.583	5.244	.026
The Self-Luggage Check-in kiosk understood my specific needs. (or) The check-in agent understood my specific needs. (CUS1)	0.033	1	0.033	0.017	.896
The airline's Self-luggage Check-in kiosk concept has my best interests at heart. (or) The airline's check-in agents have my best interests at heart. (CUS2)	0.212	1	0.212	0.080	.778
I would recommend the use of Self-luggage Check-in kiosks to my friends and colleagues. (or) I would recommend the use of the airline's check-in desks to my friends and colleagues. (CBI1)	14.316	1	14.316	11.706	.001
If I had to go through the process of luggage check-in again using a kiosk, I would do it again. (or) If I had to use the check-in desk again, I would do it. (CBI2)	9.521	1	9.521	7.584	.008
The probability of using the airline's service again is high. (CBI3)	1.442	1	1.442	1.248	.269

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