The Influence of Self-Service Kiosk Technology on Customer Satisfaction at Subang International Airport: A Proposed Conceptual Framework

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ABSTRACT

This study presents a conceptual framework for investigating the influence of self-service kiosk technology on customer satisfaction at Subang International Airport. Despite the prevalence of self-service kiosks, empirical research on customer satisfaction with this technology at Subang International Airport is scarce. This research aims to fill this gap by examining the impact of perceived usefulness (PU), perceived ease of use (PEOU), and perceived enjoyment (PE) on customer satisfaction. The conceptual framework draws on the Technology Acceptance Model (TAM) as a theoretical foundation and synthesises relevant literature to identify key factors influencing customer satisfaction. The research employs a three-phased approach, beginning with a comprehensive review of pertinent literature. Data will be collected through a questionnaire survey targeting a sample size of 384 respondents selected via purposive sampling. The analysis will be conducted using SPSS software. The findings are expected to offer valuable insights for industry practitioners and scholars, shedding light on critical factors that can enhance customer satisfaction and contribute to the literature on self-service kiosk technology in Malaysia.

INTRODUCTION

The hospitality industry, driven by an unwavering commitment to customer satisfaction, has witnessed profound transformations with the integration of technology. Among these technological innovations, self-service kiosks (SSKs) have emerged as a prominent feature in the airline industry, offering solutions for minimising bottlenecks, reducing operational costs, enhancing efficiency, and delighting guests (Gupta & Sharma, 2021). From self-check-ins to

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smart self-service kiosks, technology now permeates every facet of the passenger experience within the airline industry. Self-service kiosks are a prevalent self-service technology (SST) within specific hospitality industry sectors. These kiosks are commonly utilised in the hospitality and tourism sectors, serving functions such as self-service check-in for airlines and are increasingly being adopted in restaurants as part of a new trend. The adoption of SSKs for self-check-ins, self-checkouts, and food services has become increasingly prevalent across various sectors of the hospitality industry, including airlines, hotels, and retail (Hong & Ahn, 2023; Lien et al., 2021; Vakulenko et al., 2018; Mukerjee, 2020). The onset of the COVID-19 pandemic further accelerated the adoption of self-service technologies as service-oriented businesses sought ways to minimise physical contact and uphold safety measures (Choe et al., 2021). However, this technological evolution poses questions about maintaining a delicate balance between efficiency and the personalised, human touch that defines hospitality. As establishments invest in technological innovations to remain competitive, assessing how these advancements influence customer satisfaction and contribute to the industry's overall reputation is imperative. Recognising the growing significance of customer satisfaction in the hospitality sector, airlines have increasingly embraced self-service technologies (SSTs) to enhance the customer experience (Kim et al., 2013). Nevertheless, despite the burgeoning interest in technology-driven service industries, there remains a notable gap in research regarding the nuanced impact of technology on customer satisfaction within the hospitality industry. Therefore, the primary objective of this paper is to examine the intricate relationship between perceived usefulness, perceived ease of use, perceived enjoyment, and their collective influence on customer satisfaction. By addressing this research gap, this study provides valuable insights into the interplay between technology, particularly SSKs, and customer service satisfaction. These insights have the potential to inform industry practices and contribute to ongoing dialogues surrounding the integration of technology in the hospitality sector.

Problem Statement

The adoption of self-service kiosk (SSK) technology has transformed customer interactions in the airline industry, enhancing operational efficiency and convenience for both passengers and service providers (Lu et al., 2019). Airports worldwide, including Subang International Airport, increasingly use SSKs for check-ins, baggage handling, and other traditionally human-assisted processes (Gures et al., 2018). However, despite this growing implementation, research on customer satisfaction with SSKs remains limited (Meuter et al., 2000). While self-service technologies offer benefits such as speed, convenience, and user autonomy (Lovelock & Wirtz, 2016; Collier et al., 2017), studies also reveal challenges related to user anxiety, technical issues, and impersonal customer experience (Dabholkar & Bagozzi, 2002; Makarem et al., 2009).

This study thus seeks to address this gap by investigating how SSKs influence customer satisfaction at Subang International Airport. Drawing on the Technology Acceptance Model (TAM), it will examine key factors—perceived usefulness (PU), perceived ease of use (PEOU), and perceived enjoyment (PE)—which previous studies highlight as significant predictors of user acceptance and satisfaction (Taufika & Hanafiah, 2019; Curran & Meuter, 2007). Furthermore, the study considers how additional factors such as perceived security, trust, and customisation impact customer satisfaction within the context of self-service technology (Hong & Slevitch, 2018). These insights are intended to inform strategies for optimising customer experiences and promoting the continued adoption of SSKs in the airline industry (Ograjensek & Gal, 2019).

Literature Review

Underpinning Theories

The Technology Acceptance Model (TAM) is a particularly suitable framework for this study, as it has proven effective in explaining user acceptance and satisfaction with technology in various contexts, including self-service technology. Originally developed by Davis (1989), TAM posits that perceived usefulness (PU) and perceived ease of use (PEOU) are primary determinants of users' intentions to adopt and utilise a technology. This foundational model has been widely applied, adapted, and validated in studies focused on customer satisfaction, demonstrating its versatility and relevance in assessing both acceptance and satisfaction outcomes.

In the context of self-service technologies (SSTs), prior studies have utilised TAM to link technology acceptance factors to customer satisfaction directly. Venkatesh and Davis (2000) found that perceived usefulness significantly influences customer satisfaction, as users perceive self-service technologies that streamline tasks and improve efficiency as satisfying. Similarly, Venkatesh et al. (2003) highlighted that a technology's ease of use is strongly associated with satisfaction levels, noting that user-friendly, intuitive interfaces enhance positive perceptions of self-service experiences.

Further research has expanded TAM by incorporating additional factors to enhance its applicability to customer satisfaction in SST environments. For example, Li and Chen (2019) extended TAM to include elements such as perceived enjoyment, trust, and personalisation, finding that these factors further strengthen users' positive experiences with self-service technology. Curran and Meuter (2007) specifically identified perceived enjoyment as a significant influence on customer satisfaction, suggesting that when users derive enjoyment from interacting with technology, their overall satisfaction with the service experience increases. These adaptations highlight TAM's capacity to incorporate effective and experiential elements, providing a comprehensive framework for measuring customer satisfaction beyond basic acceptance.

Thus, TAM's established ability to explain how PU, PEOU, and related factors shape customer satisfaction makes it an appropriate theoretical framework for this study. By focusing on these determinants within self-service kiosk (SSK) technology, this research contributes to an enhanced understanding of how acceptance factors relate to satisfaction, offering insights that could guide the effective implementation and optimisation of SSKs in the airline industry.

Customer Satisfaction

Customer satisfaction is defined as consumers' fulfilment response, a judgment about a satisfying level of consumption-related fulfilment which the product/service offers (Reynoso, 2010). The degree to which customers' expectations are fulfilled or surpassed throughout their encounters with a hospitality establishment is referred to as customer satisfaction. It is a vital component that propels sustainability and success in the hospitality industry. By prioritising the needs and preferences of their customers, the hospitality industry may enhance customer loyalty, build a positive reputation, gain a competitive edge, and eventually generate a profit. Customer satisfaction can be defined as an indicator of how well a business adheres to the needs and expectations of its customers regarding the products, services, and overall experience it provides. It serves as a gauge of the health of the company, indicating how well customers view the products and services the organisation offers (Franklin, 2023). A previous study stated that the concept of customer satisfaction was defined as consumers' fulfilment response, emphasising a judgment regarding the satisfying level of consumption-related fulfilment provided by the product or service (Hong & Slevitch, 2018). This definition aligns with the broader discourse on customer

satisfaction, shedding light on the subjective and evaluative nature of customers' experiences with products and services. Based on a study the findings from this study reveal that there is a positive connection with customer satisfaction in the context of self-service kiosks (SSKs). This supports the assertions made by Wang (2012), suggesting that when SSKs are easy to use, they enhance customer service. These findings contribute valuable insights to the existing literature on factors influencing customer satisfaction in the context of self-service technology.

Despite the potential benefits, several challenges should be looked into to encourage customer adoption of self-service kiosk technology at airports. First, through efficient communication and education efforts, it is necessary to overcome customers' knowledge of the availability and benefits of self-service kiosks (Marques & Lopes, 2018). Second, some customers who are not tech-savvy may be put off by the self-service kiosks' complicated instructions and interfaces (Lee et al., 2014). Third, trustworthiness in technology may be weakened by worries about data privacy and security breaches; therefore, assurances about strong security measures need to be emphasized (Mamaghani et al., 2019). Furthermore, some customers express a preference for in-person communication over self-service kiosks, highlighting the significance of dispelling the notion that technology is impersonal (Hjalager & Dolnicar, 2012; Bailey & Pearson, 2018). Next, accessibility barriers, such as height restrictions or small font sizes, pose challenges for customers with disabilities (Campos et al., 2017). Finally, technological problems and reliability issues can undermine trust in self-service kiosks, emphasising the significance of routine maintenance and quick resolution of technical issues (Oliveira et al., 2017). A complex strategy including staff training, accessibility improvements, interface design improvements, user education, security guarantees, and technological reliability measures is needed to address these issues. Airports and airlines may promote a higher level of customer acceptance and adoption of self-service kiosk technology by reducing these challenges, which will increase both operational effectiveness and customer satisfaction.

Notably, Self-service kiosk technology has emerged as an essential tool in the service industries, transforming the customer's access to products and services while providing excellent convenience and effectiveness. An extensive study has been conducted on the impact of self-service kiosks on customer satisfaction, revealing important insights into the factors influencing users' perceptions and experiences. Numerous studies underscore the significant contributions of self-service kiosks in enhancing convenience and expediting transactions, thereby augmenting overall satisfaction among users (Curran & Meuter, 2007). Self-service kiosks improve customer satisfaction by giving them more control over their transactions and interactions (Cyr et al., 2006). Additionally, the design and usability of kiosk interfaces emerge as critical determinants, with intuitive layouts and clear instructions amplifying user satisfaction, while complex interfaces detract from the user experience (Sivakumaran et al., 2012). Furthermore, customers' enjoyment of using self-service kiosks, as well as their perceptions of reliability and trustworthiness, significantly affect satisfaction, emphasising the necessity of seamless functionality and solid security measures. Furthermore, the allure of personalisation and customization options offered by self-service kiosks contributes to heightened satisfaction and engagement, amplifying the overall service experience (Curran & Meuter, 2007). In conclusion, even though self-service kiosk technology has been recognised in the past for its benefits in raising customer satisfaction, usability, trust, and reliability. It is vital to be crucial in determining how consumers perceive and interact with this innovative technology especially in one of the International Airport in Malaysia.

Factors influencing Self Service Kiosk Technology based on Technology Acceptance Model (TAM)

Perceived usefulness

Perceived usefulness is an individual's perception of how technologies, or a specific technology, are designed to improve the efficiency and effectiveness of the persons' jobs or roles (Davis, 1989; Bolodeoku et al., 2022). Perceived Usefulness measures how much someone thinks that using a specific system would improve their job performance (Davis et al., 1989). Improved job performance could also contribute to customer satisfaction. This factor is a key predictor of customer behavior within the Technology Acceptance Model (TAM). It was also found that perceived usefulness significantly affects customer adoption and behavior of SSTs. (Taufika & Hanafiah, 2019). According to Patel and Patel (2018), perceived usefulness (PU) has a significant beneficial impact on individual adoption and usage of online banking services. In a similar vein, Alalwan et al. (2016) claimed that PU has a major influence on behaviour and adoption in mobile banking. In agreement with these results, Marakarkandy et al. (2017) concluded that PU and perceived ease of use (PEOU) significantly impact technology-based services. Furthermore, a study by Alalwan et al. (2016) reported significant outcomes regarding the relationship between Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) in the context of technology adoption and behaviour. The combined influence of PEOU and PU is also highlighted as having a significant impact on the usage of Self-Service Technologies (SST), according to Demoulin and Djelassi (2016).

Perceived Ease of Use

According to Schöpfel et al. (2019), perceived ease of use describes how simple or difficult it is to learn how to use an information system. "Ease of use" describes the degree of effort required to use technology and the complexity of the service delivery process. (Dabholkar, 1996; Davis, 1989; Yen, 2005). In accordance with the Technology Acceptance Model (TAM), the user-friendly nature of self-service kiosks (SSK) within upscale hotels becomes a critical factor in their successful adoption. According to TAM, people are more likely to accept technology when they believe it to be user-friendly. The intuitive design and streamlined processes of SSKs contribute to a positive perception of ease of use among hotel guests, aligning with the findings of Legris et al. (2003), who highlighted the significant impact of perceived ease of use (PEOU) on perceived usefulness (PU). Furthermore, Amin et al. (2014) provide additional evidence in favour of this relationship by asserting that customer satisfaction and perceived ease of use are positively correlated with each other. This highlights ease of use is importance in influencing customers' opinions and willingness to embrace new technology. A study by Robertson et al. (2016) found that SSK and Interactive Voice Response (IVR) clients have higher links between ease of use, reliability, and satisfaction than internet customers.

Perceived Enjoyment

Studies in the hospitality industry indicate that incorporating self-service kiosks (SSK) into hotels significantly affects customer satisfaction. The simple design and quick processes of SSKs assist in establishing a feeling of joy in hotel guests. Customers enjoy the self-service experience, which increases overall customer happiness. Perceived enjoyment refers to how much a person thinks using a self-service technology is fun or enjoyable (Dabholkar et al., 2003; Weijters et al., 2007). Based on a study by (Gupta & Sharma, 2021), implementing self-service kiosks improves customer satisfaction, particularly among younger people. Thus, consumers with significant intrinsic motivation, such as enjoyment or empowerment, will be more likely to use SSTs (Moon & Lee, 2022). Customer satisfaction research in the context of SSKs provides useful insights into the aspects that lead to the favourable reception and adoption of self-service technology in the

hospitality industry, aiding hotels in generating a more fun and gratifying visitor experience. However, other literature on enjoyment and SSTs does not indicate that enjoyment is more important in IVR or online SST contexts (Robertson et al., 2016). The study by (Djelassi et al., 2018) found that airport SSTs improve travellers' confidence, enjoyment, and overall satisfaction. Another researcher stated that functionality, enjoyment, personalisation, and ease significantly impact airline SSTs' perceived values and satisfaction, leading to behavioural intentions (Kim & Park, 2019).

RESEARCH METHODOLOGY

The section below will discuss and lay out the methodology that will be used in the next stage of the research. There is also a discussion of the sample size, unit of analysis, and research strategy. In this section, researchers will also go over instrumentation, data-gathering techniques, and questionnaire preparation.

Proposition Development

Therefore, investigating the factors influencing customer satisfaction using Self-Service Kiosk Technology in International Airport in Malaysia is ideal. Hence, below are the authors' propositions:

Proposition 1: There is a positive relationship between perceived usefulness and customer satisfaction.
Proposition 2: There is a positive relationship between perceived ease of use and customer satisfaction.
Proposition 3: There is a positive relationship between perceived enjoyment and customer satisfaction.

Proposed Conceptual Framework

Based on the reviews and recommendations of several scholars, this study has developed a conceptual framework that conceptualises factors influencing customer satisfaction using Self-Service Kiosk Technology in International Airport in Malaysia (Figure 1). In this study, perceived usefulness (PU), perceived ease of use (PEOU), and perceived enjoyment (PE) are the independent variables, while customer satisfaction will be the dependent variable in this framework.
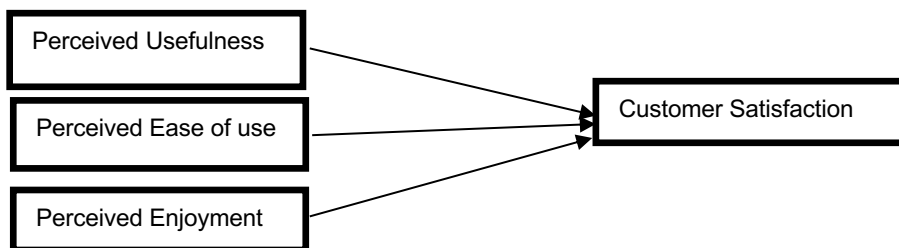

Figure 1. Proposed Conceptual Framework

This quantitative research will select a population of tourists who have used the self-service kiosk at the Subang International Airport. The unit of analysis would be individual passengers or customers who interact with the self-service kiosks at the airport. This study will target a minimum

sample size of 384 respondents based on Krejci and Morgan (1970). A purposive sampling technique will be used for this research because it has characteristics that are needed in the sample. A structured questionnaire will be used, and we will use a well-organized set of questions. This questionnaire is carefully crafted to gather information in a systematic way, in which PU and PEOU will be adopted from Taufika and Hanafiah (2019), while PE and CS will be adopted from Robertson et. al. (2016). A pilot test will be executed to make sure the questions are clear and easy to understand before sending out the real questionnaires to respected respondents. The researchers opted for a 6-point Likert scale instead of the traditional 5-point scale to provide respondents with more choices, making it easier for them to express their thoughts in more detail, helping us better understand their opinions, and helping us identify more precisely whether opinions lean towards one side or another. The researchers exported the data from the online survey, coded the data and transferred it into the Statistical Package for the Social Sciences (SPSS), described the sample's demographic characteristics, such as frequency, percentage, mean, and standard deviation, and analysed the propositions.

CONCLUSIONS

The implementation of self-service kiosk (SSK) technology at Malaysian airports represents a strategic initiative by airports and airlines to enhance customer satisfaction and service quality within the airline industry. This study's conceptual framework systematically examines the factors influencing customer satisfaction with SSK technology, particularly through the Technology Acceptance Model (TAM). By integrating TAM constructs—perceived usefulness, perceived ease of use, and perceived enjoyment, this research highlights their roles in shaping customer perceptions and experiences with SSKs in an airport setting.

Academically, this framework will advance theoretical knowledge by expanding TAM's application to self-service technology in the airline industry, providing a foundation for future empirical studies focused on customer satisfaction within hospitality. The insights expected from this research might serve as a roadmap for further investigations into how technology acceptance factors drive satisfaction in SST contexts, thereby enriching the discourse on technology-driven service innovations.

Practically, this study hopes to offer valuable implications for industry stakeholders seeking to improve customer satisfaction and foster sustained SSK adoption. By identifying factors that enhance customer satisfaction, airport and airline management can develop targeted strategies to improve SSK user experiences, address challenges, and support loyalty over time. This framework serves as a guide for the service industry in implementing SSK technology effectively, with recommendations that balance innovation with customer satisfaction. Such insights can support service providers in reducing labour costs and enhancing operational efficiency while concurrently elevating the customer experience to meet evolving consumer expectations.

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