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A Review on Passenger Satisfaction with Airport Service Quality

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Abstract:- Travellers' satisfaction with the services provided at airports serves as a reflection of the airport's competitiveness and corporate image. In this study, a comprehensive and analytical literature review is conducted, focusing on studies published since 2018, to identify and analyse the factors that have a positive influence on travellers' satisfaction. The research finds that there is a consistent set of airport services (typically 6-8 categories) that significantly influence on travellers' satisfaction and positive reviews. It is evident that regardless of the diverse research methods utilized, the findings across various studies consistently highlight the positive influence of Airport Service Quality (ASQ) on travellers' satisfaction and the overall perception of the airport. Moreover, only a limited number of papers have employed sentimental analysis and Machine Learning techniques in the context of ASQ, indicating the need for the application of these techniques.

Keywords*: Systematic Literature Review, Airport service quality, topic modelling, sentimental analysis*

1. Introduction

The airport serves as the first point of contact for travellers and plays a crucial role in shaping their overall impression of a country. As a result, the reviews pro-vided by travellers hold immense significance for the aviation industry. These review ratings have the potential to strongly influence travellers' decision-making when it comes to selecting an airport (Da Rocha et al., 2022; Li et al., 2022; Barakat et al., 2021; Dhini & Kusumaningrum, 2018; Mirghafoori et al., 2018). Even minor improvements in airport services can lead to positive changes in travellers' perceptions and enhance their overall airport experience (Gajewicz et al., 2022; Aydogan, 2021; Kiliç & Çadirci, 2021; Lapcın, 2021). Given that travellers can easily access and refer to other travellers' online reviews, airport management must prioritise the Airport Service Quality (ASQ). In order to under-stand the key areas that airport management should focus on to enhance positive reviews, researchers have developed tools (Da Rocha et al., 2022) for extracting and analysing travellers' reviews. In the meantime, it is important to note that variations in research methodology employed across studies may impact the reli-ability and credibility of the findings.

This study undertakes a thorough and analytical literature review to identify gaps in the understanding of Airport Service Quality (ASQ) factors that impact travellers' satisfaction and their intention to revisit or recommend the airport.

2. Objectives

The objective of this study is to ascertain the current trends in research concerning passengers' satisfaction with airport service quality, with a specific focus on identifying gaps in existing research, particularly in the context of utilizing deep learning. The highlighted gaps are intended to inspire researchers to explore aspects that require further investigation.

3. Methods

This review encompasses an examination of Airport Service Quality (ASQ) and passenger satisfaction using a combination of qualitative and statistical analysis methodologies. The following figure provides a workflow of the search and anal-ysis process.

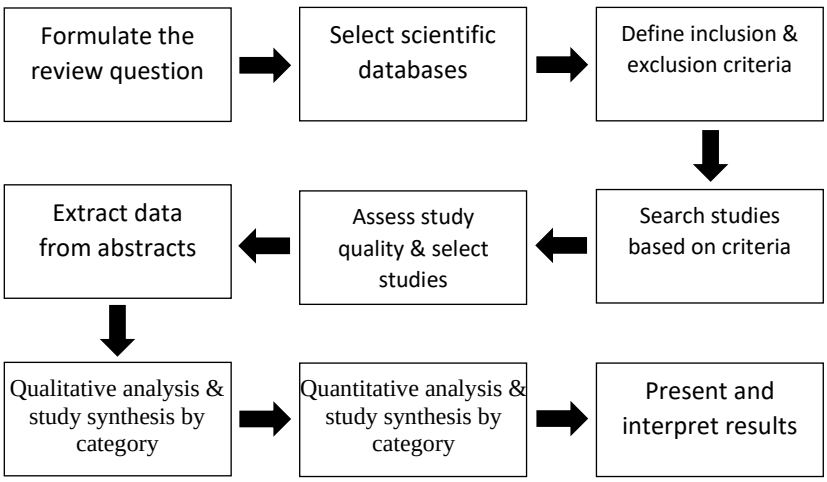

Fig. 1. Workflow of literature review on ASQ and passenger satisfaction

The review focuses on the study of ASQ and passenger satisfaction, exploring four main areas: countries / regions of study, datasets, airport services and research methods. The literature search is conducted using academic sources, including ScienceDirect, IEEE Xplorer, ACM, Emerald and Springer. To ensure relevance to the study's purpose, specific keywords are selected and combined to form search phrases: "passenger perception" OR "traveller perception" OR "passenger satisfaction" OR "traveller satisfaction" OR "level of service" OR "service quality" OR "service evaluation" OR "sentimental analysis" AND "airport*". The search is performed in the title, abstract, and keywords fields, with a time limitation filter set to include publications from 2018 onwards.

The search for relevant articles and reviews is conducted in journals and conference proceedings, excluding technical reports. After filtering out redundant studies, a final set of 75 articles is obtained. The pre-selection process involves reading the abstracts of all the identified articles in the databases. From this initial screening, 45 studies are pre-selected based on their relevance to evaluating the quality of airport services in some capacity. Subsequently, a thorough reading and detailed analysis of the full papers lead to the selection of 39 studies that are deemed suitable for addressing the research problems of this review.

4. Results

The study applies a qualitative classification and summarization approach for ASQ analysis and finds different research methods used by researchers, but with a common objective, i.e., to identify the areas serving travellers' satisfaction. Most studies utilise either surveys (i.e., primary data) or travellers' online reviews (i.e., secondary data).

Table 1 below gives the recent studies in ASQ and its relation or correlation with and impact on travellers' satisfaction and positive reviews. Most of the studies, particularly those that use secondary data such as Twitter, Google Review, airline quality or Skytrax, employ topic modelling and sentimental analysis. The rest mostly use statistical analysis based on primary dataset collected directly from travellers to investigate the impact of ASQ on travellers' satisfaction, revisits and reviews.

Table 1. Summary of papers reviewed

Author	Dataset	Services	Classifier	Result
[1]	7813 reviews from google review, taken before the end of April 2018	Arrival & departure, food & beverages, ground trans., immigration service, security screening, facilities, staff service and wayfinding.	Support vector Machine (SVM) and Naïve Bayes Classifier	SVM outperforms Naïve Bayes
[2]	20,288 online reviews written between 2005 and August/2018 on TripAdvisor	airport hotels	None	Heat maps for airport hotel services and sentimental status of the guests
[3]	Twitter US Airline Sentiment dataset (14487) and AraSenTi dataset (15,752)		CNN and LSTM	LSTM performs better (Accuracy CNN 0.77, LSTM 0.80 with English tweets) (Accuracy CNN 0.751, LSTM 0.78 with Arabic tweets)
[4]	London Heathrow airport's Twitter account - dataset includes 4,392 tweets	food & beverages, check-in, staff, baggage claim area, security, gates, passport control, ground transport and waiting	None	WiFi, WC, food & beverages and lounge are the areas where London Heathrow Airport provided the highest level of service; meanwhile the areas that need improvement are waiting, parking, arrival, staff and passport control.
[5]	Survey from 1,037 passengers from Thailand	security, check-in, wayfinding, airport environment, access, arrival services, and airport facilities	No classifier (confirmatory factor analysis)	ASQ does influence travellers' satisfaction.
[6]	Online review platform Skytrax (2,278)	Predictors: queueing times (QT), terminal cleanliness (TCL), terminal seating (TS), terminal signs and directions (TSD), food and beverages (FB), airport shopping (SHP), airport wifi service (WF) and airport staff (STF).	No classifier (standard multinomial logit model)	Most of the negative sentiment is related to airport staff and queueing times.
[7]	Input from 314 Cambodian outbound travellers	No specific number of airport services	No classifier (confirmatory factor analysis and structured equation modelling)	ASQ influence travellers' satisfaction.
[8]	8 experts		No classifier (Analytic Hierarchy Process (AHP))	
[9]	Survey of 874 passengers		No classifier (elementary factor analysis)	Human interaction is critical for traveller's positive-sentiment.

[10]	Survey of 957 passengers	No specific type of service	No classifier (elementary factor analysis, conformity factor analysis and structured equation modelling)	People, facilities, access, hygiene, arrival
[11]	None	No specific type of service	analytic network process method	Facilities
[12]		commercial areas, cafeterias and restaurants	Logistic regression	Commercial areas associated with negative-sentiment, cafeterias and restaurants are associated with positive-sentiment.
[13]	1,224 passengers' comments on the top 10 airports collected from Skytrax	baggage claim, immigration process, access gates, procedures at the airport, leisure activities, employee service, transfer/transit amenities, terminal facilities, passport control, ambient conditions	No classifier. (topic modelling, sentimental analysis, and emotion recognition)	Most of the topics (airport services) were associated with positive feedback.
[14]	42,137 reviews collected from Google Maps	List shortened from 23 services into 8 services	No classifier. (topic modelling and sentimental analysis)	Positive sentiment is positively correlated with star rating in google map
[15]	>300,000 tweets	6 types of services	No classifier (text mining and sentiment analysis)	By comparing the results from social media with official service quality report from the DOT, this study found that the proposed service quality metrics from social media are valid and can be used to estimate the service quality.
[16]	Survey from passengers of Wuhan Tianhe International Airport No specific number of participants involved	7 services (mentioned in the results column)	NO classifier (EFA used)	Traffic, handling of check-in procedures, signs of direction indication (identification), environment at the airport, security and passport/ID card inspection, entry procedures, services and facilities at the airport
[17]	Survey of Australian passengers	check-in, security, convenience, ambience, basic facilities, mobility	No classifier (SEM was used)	Satisfaction with ASQ is the major motivation to reuse the airport and revisit the destination. Passenger satisfaction and reuse airport exert significant mediation effects between airport service quality and destination revisit.

[18]	791 travellers via Shanghai Pudong International Airport (PVG)	non-processing (main facilities, value addition) and processing (queue & waiting time, helpfulness & communication, prime services)	No classifier (CFA and SEM were used)	
[19]	1,693 reviews	seat comfort, staff, food & beverages, entertainment, ground services, value for money	text mining analysis, semantic network analysis, frequency analysis and linear regression analysis	Travellers' satisfaction and positivity are equally influenced by quality of services of the airport and airlines.
[20]	7,358 reviews	Wifi, food, airport staff, service attribute	Linear regression, sentimental analysis	There are variances in sentimental values based on travellers' group
[21]	518 Brazilian respondents	No specific type	structural equation modeling	ASQ can influence trust perceived. Value, customers' satisfaction, and the corporate image of airports
[22]	5,000 passenger reviews	class of air travel purchased, low cost/a full-service carrier, staff, seat comfort and legroom, luggage/flight disruptions	Latent Semantic Analysis (LSA)	Text mining is the recommended tool for sentimental analysis. The results show passengers' satisfaction is more influenced by staff behaviour as well as the quality of services.

The following subsections report the study findings in ASQ and its relation with travellers' sentiments on airport services based on a qualitative approach using classification and summarisation. The literatures above are classified into three categories based on the methodologies employed by ASQ studies, i.e., systematic literature review papers, papers using statistical analysis, papers for sentimental analysis based on topic modelling and Machine Learning.

a. Systematic Literature Review

Firstly, this research examines the systematic literature reviews conducted on ASQ since 2018, which reviews the papers published either less than or more than ten years ago. The systematic literature review conducted by Da Rocha et al. (2022) reveals gaps in studies that focus on the quality of service at airport terminals. These gaps include the lack of studies concerning service quality in developing countries' airports, as well as important airport issues such as access, and the lack of demographic data collection from travelers. However, recent investigations (Da Rocha et al., 2022; Freitas et al., 2021; Pappachan, 2020) have found a growing interest in service quality research in developing countries' airports. While the studies reviewed by Da Rocha et al. mainly focus on online comments that may however imply demographic information, other researchers using surveys do collect demographic data directly from respondents. Furthermore, the research by Da Rocha et al. focuses on the sentimental status study of travellers, there are numerous studies address broader services in airports as evidenced in Table 1.

Aydogan's review (2021) focuses on the measurements used in ASQ studies and introduces a list of airport services for sentimental status analysis. This list is consistent with the results of other studies by Barakat et al. (2021), Chonsalasin et al. (2021), Halpern and Mwesiumo (2021), and Martin-Domingo et al. (2019). The study concludes that the most explored ASQ dimensions are servicescape, services, facilities, information, security, and check-in, while the less explored ones are access, comfort, convenience, ticketing, function, and ICQ (Immigration, Customs, and Quarantine). Samad et al. (2021) conducted a study on the factors impacting ASQ using a multi-criteria decision-making approach based on a combination of systematic literature review and interviews with experts. The study shows that travellers' positive sentiment is highly connected to the efficiency of the following airport services: baggage delivery time, up-to-date aircraft and in-flight facilities, courtesy of

employees, on-time performance, online purchase process, value for money, handling of delayed flights, promptness of booking, convenience of buying tickets, and loyalty programs. However, the list is a mix of airport services and airline services such as flights and booking, and the study does not explicitly differentiate between services provided by airport management and airline carriers.

Usman et al. (2022) studied the research evolution on ASQ and the measurement index of passenger satisfaction using a small data sample (27 articles) from the years 2000 to 2020. The study finds that there exists an ASQ measurement dimension discrepancy between research and applications in the airport industry. Bakır et al. (2022) applied bibliometric analysis to ASQ studies from 1975 to 2020 and found that the majority of studies (100 papers) focused on passenger satisfaction and the impact of ASQ. Jianpinitnun et al. (2019) targeted specific airport services and passenger groups, namely elderly people, but their methodology is not clear, and the empirical data applied is limited. Jain et al. (2021) found few papers that applied sentimental analysis and Machine Learning for ASQ analysis, which encourages further investigation into ASQ analysis and sentimental status predictions using Machine Learning methods.

Although there are only a small number of systematic literature reviews available, they provide insight into the current research trends in ASQ analysis. Mainly, the focus of research is on studying ASQ dimensions, their importance to travellers, and their impact on their views. Additionally, there is a growing interest in service quality research in developing countries' airports.

b. Survey and Statistical Analysis

Many studies use statistical methods to identify the determinants of a traveller's sentiment such as satisfaction or expectation. For example, Halpern and Mwesiumo (2021) use the standard multinomial logit model to relate dissatisfaction with specific airport services to the likelihood of travellers promoting airport services. They find that airport staff and queuing times have the most influence (either positive or negative) on travellers' intention to promote an airport. Chonsalasin et al. (2021) use Confirmatory Factor Analysis (CFA) to empirically prove that security, check-in, wayfinding, airport environment, access, arrival services, and airport facilities are significant determinants of travellers' expectations. Similarly, Saut and Song (2022) employ CFA and Structural Equation Modelling (SEM) and find that travellers' positive sentiment is the significant determinant of their intention to revisit the airport. They report that service quality particularly facilities, check-in, servicescape, security and airport image play a significant moderating role between positive sentiment and intention to revisit. Armenti et al. (2018) use Exploratory Factor Analysis (EFA) to show that human interaction in an airport is among the most important determinants of travellers' positive sentiment, which is also confirmed by the study of Hong et al. (2020). Similarly, Liu and Zheng (2021) use EFA to identify seven dimensions including traffic, check-in handling, direction signs, airport environment, security, entry procedure and airport services that significantly influence travellers' assessment of ASQ.

Pappachan (2020) argued that the ASQ scale needs to be refined and applied the Airports Council International (ACI) to measure travellers' positive sentiment in Indian airports. Antwi et al. (2020) employed the Airport Indicators of Passenger Experience (AIPEX) model to assess the influence of ASQ on travellers' satisfaction. They split airport services into two groups, i.e., non-processing (including main facilities and value addition) and processing (including queue and waiting time, helpfulness and communication, and prime services), and found that the processing category significantly influences travellers' satisfaction. Hong et al. (2020) applied SEM to reveal that ASQ is significantly related to airport reuse and destination revisiting. Freitas et al. (2021) used the analytic network process method to investigate Turkish airports and focused on facilities to sustain travellers' positive sentiment. They also found that positive sentiment is associated with food service using logistic regression when investigating Brazilian airports. The survey conducted by Sun and Huang (2022), followed by an expert review, suggests that airport services mainly revolve around airport personnel, i.e., reliability, proficiency, and empathy. Prentice and Kadan's (2019) survey suggests that travellers' satisfaction and reuse of airports significantly mediate the relationship between ASQ and intention to revisit the destination. However, the work does not provide specific airport services that the respondents refer to. Brochado et al. (2019) and Shadiyar et al. (2020) conducted an assessment of travellers' satisfaction and positivity towards services related to both airlines

and airports, including seat comfort, staff, food and beverage, entertainment, ground services, and value for money. They employed various analysis tools, such as text mining analysis, semantic network analysis, frequency analysis, and linear regression analysis, to show that satisfaction is equally influenced by the quality of services in the airport and the quality of airline services. The research also reveals that ASQ not only positively influences travellers' mood but also increases their trust and enhances the corporate image of the airport.

The review indicates that many studies utilize statistical methods and surveys to identify the factors that influence travellers' sentiments. These studies offer a comprehensive list of airport services that sentimental analysis-based studies can use to evaluate the emotional state of travellers and assess the quality of airport services.

c. Sentimental Analysis (Topic Modelling and Machine Learning)

Topic modelling is a popular method used to analyse online comments made by travellers, with tools such as Latent Dirichlet Allocation (LDA) commonly employed to investigate the major airport services (Kiliç and Çadirci, 2021; Lee & Yu, 2018; Tian et al., 2020). These tools combined with dimension reduction approaches are applied to identify a limited number of topics from the comments of the travellers. Such multi-group analysis can reveal differences in sentimental status of traveller groups.

Bunchongchit and Wattanacharoensil's (2021) results indicate that business traveller group and couple leisure group share similar opinions on ASQ. Additionally, these two groups are the most vocal about expressing their opinions. Both groups give lower ratings and more negative sentiments in their reviews for each type of service compared to family and solo groups. The couple leisure group has the highest number of negative reviews, which highlights the need of improvement [23]. Research by Gajewicz et al. (2022) reveals that frequent travelers, in general, show a different level of satisfaction than the rest. Frequent travelers are more satisfied, but all travelers are dissatisfied with the prices of services in the airport. Li et al. (2022) used data collected from Google Maps to investigate the potential change in the sentimental status during Covid-19, without any specific preference for any traveler group. It shows that the rating is not impacted by covid-19, and the travellers have positive sentimental feedback towards airport personnel and the environment and neutral sentimental feedback towards facilities.

Recognizing that sentiment scores (i.e., positive and negative) (Kiliç and Çadirci, 2021) or sentimental values (i.e., positive, negative, and neutral) are not sufficient to accurately reveal people's specific sentiments (Tian et al., 2020), Lee and Yu [14] applied LDA to predict the star ratings of airports from sentimental scores. Bae and Chi (2022) employed an alternative approach called content analysis to distinguish between satisfied and dissatisfied travellers using their online reviews. The study found that dissatisfied travellers frequently used words such as "security," "check," "staff," "flight," and "line," whereas satisfied travellers often used words like "staff," "terminal," "time," "clean," "immigration," and "free." Martin-Domingo et al. (2019) used Data Mining to measure ASQ by analysing London Heathrow Airport's Twitter account dataset. The findings indicate that the frequency of passenger referring to the services, such as ground transport and waiting, differed significantly.

In recent years, Machine Learning, especially supervised methods such as Deep Learning, have gained popularity in predicting passenger sentimental values. Li et al. (2022) report that studies using social media data to predict sentimental values based on Vader (Hutto and Gilbert, 2014) and LSVA (Taecharungroj and Mathayomchan, 2019) found that the quality of airport services can be measured by sentimental values associated with various services, such as access, check-in/security, wayfinding, facilities, airport environment, and staff. The finding is in line with previous studies discussed in earlier sections. Chinonso et al. (2020) applied SERVQUAL to two airports in Nigeria with no specific service type and found that passengers generally have high expectations and low service ratings. Barakat et al. (2021) used thousands of English and Arabic tweets to train CNN and LSTM models to predict positive or negative passenger sentiments toward airport services. Although the LSTM model showed better prediction, the difference is insignificant. Moreover, this approach is more technique-oriented with limited emotion categories and application (Tian et al., 2020), while in practice, for negative emotions for instance, it is useful to understand if the travellers are sad, afraid, angry or disgusted. Kamış and Goularas (2019) evaluated several Deep Learning architectures with different datasets and found that the best performance was achieved when LSTM and CNN were combined. Generally, studies in Machine Learning and Deep Learning on ASQ and travelers' sentimental value since 2018 have been limited.

The literature review indicates that topic modelling is frequently employed to analyze online reviews written by travellers, with the goal of identifying specific airport services and differences in sentiment among various groups of travellers. While Machine Learning and Deep Learning techniques have been applied in some studies, these approaches are still relatively limited in their application to ASQ and travellers' sentimental values.

5. Discussion

The qualitative literature analysis conducted in this research indicates that the reviewed studies primarily focus on analysing and discussing the quality of airport services and its impact on the satisfaction and likelihood of travellers to revisit or write positive reviews. The studies reveal that a considerable number of online reviews by travellers reflect their sentiment and assessment of the airport services' quality. It is observed that most travellers' comments are related to processing services, such as security checks, staff efficiency and guidance, which are critical airport services. Conversely, a smaller proportion of comments pertain to non-processing services like food and cafes. Several studies collect data from travellers in person at airports and explore the relationship between Airport Service Quality (ASQ), and travellers' satisfaction and intention to revisit. The subsequent subsections elaborate on our research findings in detail based on airport services, application areas, methods and datasets.

a. Airport Services

Despite the various techniques used to measure ASQ, most studies come to a similar conclusion that certain airport services are more likely to receive positive reviews if they are effectively managed. However, there is no standardized way of listing the airport services that should be focused on. Some researchers, like Gajewicz et al. (2022), evaluate facility attributes such as waiting time, cleanliness, efficiency, and availability of services individually, while others consider these attributes as a whole. Additionally, some researchers use broader terms, such as facilities to include amenities like food, restaurants, and ATMs, while others are more specific. Consequently, different lists of airport services are found in the studies, making it difficult to standardize a list of services in airports to be evaluated. Table 2 provides a list of airport services that cover all explicit facilities in the airport, based on the review.

Table 2. A list of airport services and specification

Services	Specification
Access	Transportation, parking facilities, trolleys, baggage, and cars etc.
Check-in and security	Waiting time, check-in queue/ line, efficiency of check-in staff, and waiting time at security inspection etc.
Facilities	ATM, toilets, and restaurants etc.
Wayfinding	Ease of finding your way through airport, and flight information screens etc.
Airport environment	Cleanliness of airport terminal, ambience of the airport, etc.

This study reveals that "processing" services, which involve interactions with official airport staff, are more important in travellers' evaluations compared to "non-processing" services, such as ATMs, cafes, and restaurants. The findings from previous studies suggest that there are correlations between the analysis methods and data sources used, namely:

- Utilizing topic modelling for sentimental analysis with travellers' comments;
- Applying EFA, CFA, and SEM with questionnaires;
- Implementing Analytic Hierarchy Process (AHP) with interviews.

In addition, the reviewed studies all identify 6 to 8 categories of airport services that require effective management to generate positive sentiment and encourage passengers to reuse the airport. Some studies focus on specific types of services, such as airport hotels (Moro et al., 2020), services for elderly passengers and self-service check-in (AlKheder, 2021). Table 3 provides a list of airport services based on a sample of 13 studies, with the service occurrences reported in Figure 2 across eight categories, where check-in is mentioned most frequently and queuing/waiting time occurs in studies least frequently. However, there are some inconsistencies in how certain

services are categorized. For example, some studies treat check-in and security as a single category, while queuing/waiting time is classified as a feature for arrival. Additionally, some airport services are uniquely featured in specific studies, such as services cap (Saut & Song, 2022), prime services (Antwi et al., 2020), and airport appearance (AlKheder, 2021).

Table 3. Airport services reported in the studies

Airport service	Study
Passport control, arrival services, airport environment, wayfinding, airport facilities, check-in, security, and access	[24]
Access, facilities, wayfinding, environment, personnel, check-in, security, and arrival	[25]
Access, check-in, passport, wayfinding, facilities, environment, arrival, people (personnel), and waiting	[3]
Signage and wayfinding, information, security, waiting times, staff, cleanness, comfort, and availability/efficiency of the airport services	[26]
Access, Security, check-in, facilities, wayfinding, environment, and arrival	[5]
Airport staff and queuing times	[6]
Security, check-in, wayfinding, environment, access, arrival services and airport facilities	[5]
Facilities, check-in, services cap, security and ambience	[7]
Traffic, check-in, signs and wayfinding, environment, security and passport/ID card inspection, entry procedures, and facilities	Liu and Zheng [16]
Non-processing (main facilities, value addition) and processing (queue and waiting time, staff (helpfulness and communication), prime services)	[18]
Seat comfort, staff, food and beverage, entertainment, ground services, and value for money	[19]
Access, check-in/security, way finding, facilities, environment, and staff	[3]
Services, airport appearance, check in/out services, and waiting time	[27]

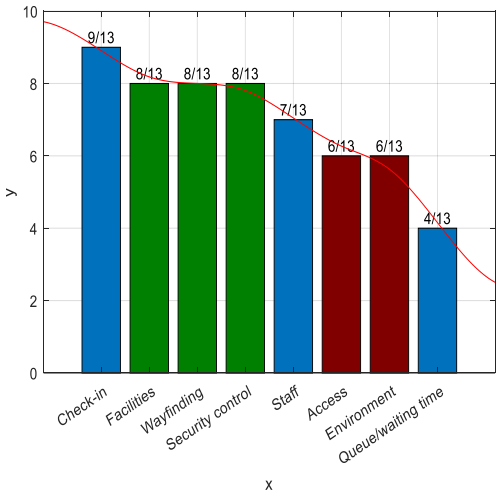

Fig. 2. Service occurrence from a sample of thirteen papers

b. Application Area

This review reveals that the studies on ASQ cover many countries, including developing countries, and in fact, airports in developing countries are more frequently studied than airports in developed countries, evidenced in Figure 3. The figure shows that 53% of the airports mentioned in the papers reviewed in this study are located in developing countries, while only 12% are in developed countries, which is in contrast to the study of Da Rocha et al. (2022). However, the findings on the airport services that positively impact travellers' satisfaction are consistent

across all the studies reviewed, regardless of the airport's location. Additionally, most of the studies reviewed in this review focused on airport ground services rather than flight or airline-related services.

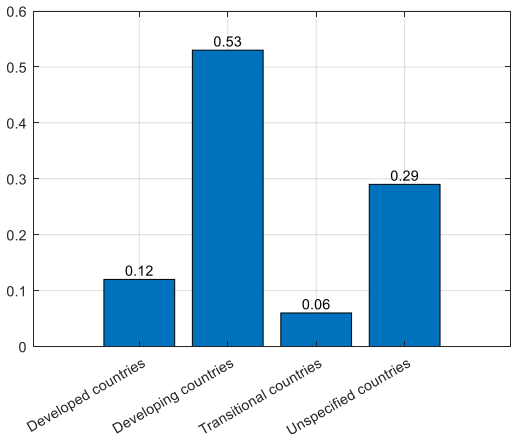

Fig. 3. Airport number percentage by country type

c. Methods and Datasets

The primary method used to analyse data collected from travellers in the reviewed studies is statistical modelling, including Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), and Structural Equation Modelling (SEM). These statistical methods help predict the influence of groups of ASQ factors. Empirical studies reviewed in this study typically provide a list of factors related to airport services that can positively influence traveller satisfaction and enhance airport images. Figure 4 shows that statistical analysis accounts for 33% of the reviewed studies, with a primary data collected directly from surveys. Studies that use topic modelling and sentiment analysis on secondary sources of data from online reviews on social media platforms such as Twitter and Skytrax account for 28% of the reviewed studies. Other methods, such as semantic network analysis, Analytic Hierarchy Process (AHP), and multinomial logit model, account for 22% of the reviewed studies.

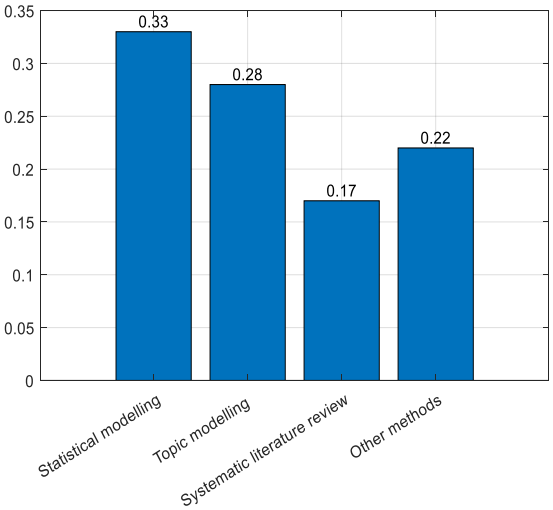

Fig. 4. Analysis methods used by papers

In addition, it is worth noting that many of the reviewed studies use SERVQUAL or refer to it when assessing ASQ and its impact on the sentiment of travellers who post their opinions online. However, there is ambiguity regarding how SERVQUAL, as a questionnaire analysis tool, can be applied to online posts. To address this issue, Lee et al. (2021) proposed a scale that could be used with data collected from social media (such as the "positive"

and "negative" sentiment values of tweets) to match SERVQUAL's 7-point Likert scale. The results also indicate that the use of Latent Dirichlet Allocation (LDA) and clustering methods can increase the reliability of the tool.

Figure 5 displays the targets and data types of the reviewed studies. The first bar indicates that over half of the studies focus on measuring the influence of ASQ on traveller satisfaction and airport image from the perspective of travellers, primarily through surveys. The remaining studies concentrate on analysing airport services that receive the most positive or negative comments based on social media data. Using social media data for ASQ investigation is a prominent trend for several reasons: the availability of large data sets on social media, which enhances the reliability of the results, the accessibility of free data, and the automated collection and analysis compared to manual survey approaches. Furthermore, the results obtained from analysing data posted on social media align with those reported in official reports, which further strengthens their reliability (Tian et al., 2020). The top social media data sources are Skytrax, Airline Quality, Twitter and Google Review.

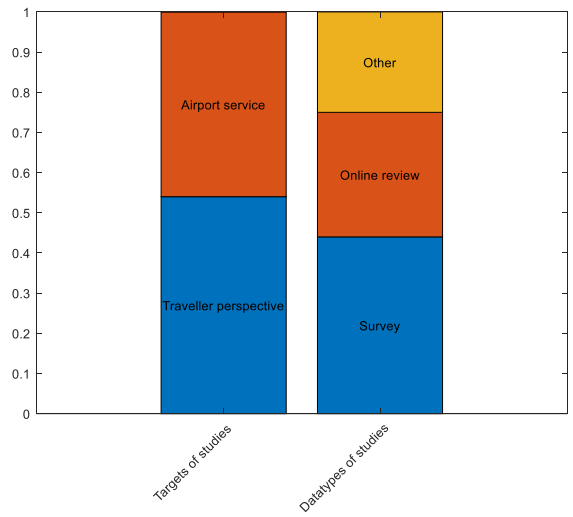

Fig. 5. Airport service study targets and data distribution.

The datasets for ASQ analysis are categorized into three classes, as shown in the right bar of Figure 5. Online reviews account for 31% of the reviewed papers, with major sources being Twitter and Skytrax. Surveys directly collected from travellers represent 44%, while other sources, such as interviews and papers, make up 25%. Papers that utilize interviews often involve experts who provide a list of ASQ issues and recommendations for improvement. However, it is worth noting that many experts include and emphasize flight-related issues, such as tickets and seats in ASQ analysis, which contrasts with the ASQ measurements proposed by other studies.

6. Conclusion

This research focuses on analysing and discussing the quality of airport services and its impact on the satisfaction and likelihood of travellers to revisit or write positive reviews. It demonstrates that there is a consistent set of airport services (typically 6-8 categories) that significantly influence on travellers' satisfaction and positive reviews, in which "processing" services predominately involving interactions with official airport staff are more important in travellers' evaluations compared to "non-processing" services such as ATMs, and cafes. It is found that recent studies on ASQ cover both developing and developed countries, and in contrast to some studies reviewed the airports in developing countries are more frequently studied than airports in developed countries.

Moreover, the study reveals the diverse range of research methods employed to investigate airport services and their correlation with data sources and travellers' sentimental status. However, regardless of the research methods utilized, the findings across various studies consistently highlight the positive influence of Airport Service Quality (ASQ) on travellers' satisfaction and the overall perception of the airport. It is found that using social media data for ASQ investigation based on Machine Learning is a prominent trend. However, only a limited number of papers

have employed sentimental analysis and Machine Learning techniques in the context of ASQ, indicating the need for further exploration of ASQ and the application of these techniques for predicting travellers' sentimental status.

It is evident that the reviewed studies do not commonly rank the airport services according to the number of negative comments received, although this could offer valuable insights to airport management for targeted service improvement. Additionally, the studies primarily focus on the binary classification of travellers' comments into positive and negative categories, with limited discussion on the specific types of emotions expressed by travellers. Understanding the specific emotions, such as fear, sadness, disgust, or anger, could provide more valuable guidance to airport management in tailoring their services accordingly. Future research in the field of airport service quality and passenger satisfaction should focus on the automation of emotion detection from travellers' real-time reviews, the identification of specific airport services associated with these emotions, and the development of predictive models for airport service improvement based on travellers' real-time reviews.

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