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Effects of Airports Safety and Security Issues Enforced on Customer Satisfaction

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I. INTRODUCTION

Aviation security refers to the prevention of acts of unlawful interference against civil aviation, such as seizure of an aircraft or placing a hazardous device on-board an aircraft. Aviation security is costly and controversial, no other security measures directly affect such a large portion of the country's population. Due to the increasing demand for air transport, passengers will be directly and significantly affected by security services. The strategy document consists of three primary categories of threats against the aviation domain based on the threat. These include threats involving aircraft, threats to aviation infrastructure and threats involving hostile exploitation of air cargo. Yet, what still can be done is to ask individuals about their perceptions respectively, at particular environments and assume that their answers reveal passengers' experiences and judgements about those particular environments and their declared safety. Thus, the term "perceived safety" is used here as a general concept that characterizes one's declared feelings of anxiety and or fear along a trip. We do not claim clear cut causality between environmental conditions and declared safety. Instead, we assume that if different environments affect passengers differently, then this evidence is enough to demand actions that lead to an improvement of these places. This means that the term "perceived safety" includes just about all possible mechanisms that lead passengers to declare that they are either satisfied or unsatisfied with their safety. Despite the use of technologies to standardize many of the key processes at airports, service encounters still often involve people who can affect how services are delivered. Also, airport operators are not the only providers of services at an airport- some are offered by partners such as airlines, handling agents, concessionaries, security companies and governmental agencies and different providers may have conflicting objectives and views on how service quality should be delivered.

A. Statement Of Problems

Many airports have become complex and commercial businesses that compete at various levels. This includes competing for passengers that are needed to fill the aircraft of the airport's airline customers but also whose spending has become a vital source of income at airports. In addition, I am stating that problems experienced in security-check are one of the main factors causing passenger dissatisfaction. Moreover, security process can cause time stress which, would be a large determinant of anxiety. I found that satisfaction with security officers was influential on passenger satisfaction. In a similar study police officers controlling passports being effective, the security personnel's being polite, the security check's being sensitive, the police officer's being courteous and helpful, security check layovers' being low, passport controls' being fast all have important effect on passenger satisfaction.

B. Literature Review

Airports face several challenges when serving passengers, for instance, as a result of terminal congestion, uneven demand, exposure to local disruptions and external events, the involvement of multiple staff and service providers, and fragmented passenger segments that have diverse expectations regarding service quality. Despite efforts to standardized several key processes at airports such as at check-in, bag drop, security screening, passport control and departure gates, it means that, unlike in manufacturing, where companies strive for 'zero-defect' production, it is almost impossible to avoid defects in service delivery. Instead, service failures are inevitable at airports, and while failures with some service attributes may have little impact on overall satisfaction, the impact of others may be significant and subsequently affect behavioural intentions such as airports reuse and recommendation. Despite the importance of service quality to airports and an understanding of the attributes that contribute to it, maintaining service quality airports is a challenge for serval reasons. Prior to Covid-19, many airports were getting busier and experiencing pressure on their ability to maintain and improve standards. For instance, the world's airports served 9.1 billion passengers in 2019, and this was expected to more than double by 2040 based on a projected growth rate of 4.1% per annum. Global passenger traffic at airports has declined dramatically during Covid-19, and forecasts are expected to be revised downwards.

However, as traffic begins to recover, new safety and hygiene measures, including the ongoing need for social distancing, mean that airports will still experience pressure on their ability to maintain and improve standards, all it while serving relatively fewer passengers. Demand for airports is typically uneven and consequently there are often temporal variations in the delivery of service quality and how it is perceived by passengers. Airports are also exposed to local disruptions (i.e., to equipment or infrastructure, airline operations, or surface access) and external events such as adverse weather conditions that can affect service quality. Despite the use of technologies to standardize many of the key processes at airports, service encounters still often involve people who can affect how services are delivered. Also, airport operators are not the only providers of services at an airport- some are offered by partners such as airlines, handling agents, concessionaries, security companies and governmental agencies and different providers may have conflicting objectives and views on how service quality should be delivered. This is noted by me in the context of the airport- airline relationship because I claim that airports and airlines currently operate as separate entities, resulting in alternative views of the passenger journey which is hindering industry progression in terms of service quality and innovation. Another issue is that airports cater to increasingly fragmented passenger segments. This makes it much harder for airports to meet the different expectations of their passengers. Therefore, in Europe where the research was carried out, the activities that was conducted is to know the effects of airports safety and security issues enforced on customer satisfaction.

C. Aim And Objectives Of Study

The aim of the study is to scrutinize the effects of airports safety and security issues enforced on customer satisfaction. In achieving this aim, the following specific objectives were laid out as follows:

1) To identify the environments that trigger poor perceived safety at airports.
2) To access whether passengers' perceived safety is associated with perception of airport environments on passengers' status and way of travelling to the airports.
3) To evaluate the cost of the variation of passengers' perceived safety is explained by airport environments.

D. Research Hypothesis

In order to pursue the objective of this research, the following generalized statements have been designed to guide and aids in obtaining the result for the experiment to be conducted. For this work, the null hypothesis will be represented with H0 while the alternative hypothesis will be represented with hypothesis H1.

Hypothesis One

- H0: Passengers' satisfaction level does not differ significantly according to their gender and level of education.
- H1: Passengers' satisfaction level differs according to their gender and level of education.

Hypothesis Two

- H0: There is no significant relationship between security services at airports and passenger satisfaction.
- H1: There is a significant relationship between security services at airports and passenger satisfaction.

II. RESEARCH DESIGN AND METHODOLOGY

The relevance of this research entails that, an efficient air transportation system and shipping modes helps quality improvement of the air transport system and also elevate international and domestic trade, business and economic process of a nation. This study will be of immense benefit to other researchers who intend to know more on their research work. This study contributes to knowledge and could serve as a guide for other study.

PERCEIVED SAFETY AT AIRPORTS: THEORY AND HYPOTHESIS

A passenger's declared perceived safety at an airport depends on multiscale environmental and temporal factors that start when the passenger leaves home for the airport or when he or she lands when returning from a trip. Although airports vary by size (e.g., international vs. domestic), location (e.g., intraurban vs. outskirts), design and type (e.g., modern, see-through walls), they follow some basic standards. All airports have entrances and exits, lobbies, security checkpoints, basic facilities (e.g., toilets, medical assistance, guard patrol offices), social areas with restaurants and shops, transition areas (e.g., stairs, elevators, spaces between gates or terminals), and waiting areas at gates.

Yet, there is a need to better understand how the arrangements and maintenance of these parts (and services provided in them) impact on passengers' perceived safety. Traditionally, passengers' perceived safety is considered to be a function of how well airport personnel perform their duties (screeners, security guards, and ground personnel). In terms of security services, found, for example, that personnel with more training comply with protocols and rules more than those with less training do. Security checkpoints may also be a source of stress which is accepted for the sake of overall safety. Research in transit crime has also shown that the physical characteristics of transit environments (e.g., lighting, floor separations, security hardware) are associated with perceived safety. Researchers argue that safety directly or indirectly relates to the visibility of passengers, the possibilities to be seen and to see others. Equally, well-maintained facilities provide an indication that personnel of the airport have everything under control. Clearly visible lobbies, overpass walkways for the overview, and separation of passenger flows have been shown to be factors positively affecting safety in transit nodes. Transportation sites such as airports may often be crowded but lack capable guardians—people who, sometimes just by their presence, discourage crime or other unpleasant events from taking place. However, the capacity of passengers to intervene is often overestimated. Travelers, who might be considered informal guardians, often have no sense of ownership while in transit. They might be unwilling to get involved in places like an airport as they are "in a hurry" (completely focused on getting to their destination/gate) or they do not feel any attachment to the other passengers at the airport. Therefore, the existence of nearby potential controllers or guardians does not necessarily guarantee surveillance at airports. Statistics on crime at international airports show that thefts from baggage carousels, swiped property left unattended (especially laptops and iPads), and thefts by baggage handlers are common. For the effect of these "uncertainties" and potential "threats" along the trip on passenger's overall anxiety. Declared perceived safety is also affected by the way a passenger gets to or from the airport and what happens en route, either from home or from an incoming flight. Harvey showed that travel time and cost were the most important factors influencing the choice of airport access mode for passengers in one North American airport. Gupta, Vovsha, and Donnelly found that passenger travel behaviour to the airport is significantly different for business and no business travellers. They also found that taxis and shared vans were favoured when traveling to airports with a higher number of flights, and local bus/coach service was favoured when traveling to airports with a higher number of domestic flights. Different types of passengers might have different preferences. For instance, Chang found that elderly passengers were less likely to use public transport when going to the airport because they did not feel as safe as they did by other means. His results also indicated that "safety" was the most important factor in choice of access mode (preferring to ask family members to drive them to the airport, while general passengers prefer to take a taxi). Yet, many crimes happen outside the main terminals, often in parking lots and where goods are parked in transit. Crime statistics at airports often cover large areas, including passenger terminals, parking facilities, aircraft ramps, offices, and cargo areas, but may often miss what happens when passengers are in transit, from home to the airport, or in flight, on their journey in the air. For instance, at Los Angeles Airport, which has its own special police force, statistics show miscellaneous crimes at parking lots are common, followed by thefts, burglary, and physical damage. This study builds on the current studies on safety and security issues in airports and is informed by the traditional literature that associates perceived safety with passengers' individual characteristics and environmental features of places, more specifically of transit environments. Thus, the declared perceived safety is expected to be affected by the individual attributes of each passenger (e.g., age, gender, ethnic affiliation). For the purposes of this case study, we follow the recent strand of Western research on perceived safety and we expect that apart from individual characteristics of passengers (e.g., age, gender), passengers' declared satisfaction with safety at airports is determined by (a) the quality of the physical and social indoor environment, including facilities and services they may offer and the immediate outdoor areas (parking and arrival areas), and (b) the transit environments that passengers are exposed to while in transit, either departing or arriving at the airport.

1) Passengers' declared safety varies across different environments of the airport. Declared safety at security checkpoints is for instance lower than elsewhere.

2) The satisfaction with the airport's physical and social environment (e.g., perception of services at security checkpoints, maintenance of facilities) experienced by passengers is expected to be associated with the overall declared safety at the airport.

3) Similarly, the status of the passenger (departing or arriving at the airport) is expected to be associated with patterns of passengers' satisfaction with their safety at the airport. The mode of travel to the airport is expected to affect the declared satisfaction with safety at the airport. Those using public transportation modes, because of the risks they might be exposed to during the trip, are expected to declare less satisfaction with their safety than those arriving at the airport in vans, taxis, or private cars.

4) It is expected that the variation of passengers' perceived safety is affected by characteristics of passengers, everything else remaining equal.

A. *Study Area/Type Of Research*

The studied airport presents an interesting case. First, it is one of the most important European regional airports with 7.5 million passengers per year. The airport is approximately six kilometres of the town centre, so compared to the average for other European airports; it is close to the urban centre. The airport is increasing, and this expansion has allowed the opening of new commercial activities and also new passenger-oriented services. Second, passengers can arrive by their own car, taxi, or public transportation. There is a direct scheduled coach service for customers that connects the airport with the city centre and the railway station. Third, the airport is committed to reach a series of quality standards, including quality of the environment. As part of their commitment to this goal, the airport collects information about passenger satisfaction every three months, a dataset that made this analysis possible.

B. *Data And Methods*

The survey data used in this study has been gathered by a specialized data collection company, which collects data in order to assess the quality of the airport in terms of regularity of the service, cleanliness, and comfort of spaces, and information to passengers. It is based on a random but representative sample of passengers before embarking/lighting. The data collection last one week, including Saturdays and Sundays. The time of interviews is variable, from 6 a.m. to 9 p.m. depending on the flights that has to be sampled. The available dataset is an output of seven survey sets, covering the period from January 2014 to September 2015, comprising a total of 3,859 passengers. The survey is composed of three sets of questions. The first set of questions is about the profile of the passenger (age, gender, nationality, education, profession, home country, number of companions, state of the trip, means of transport to reach the airport, airline, destination, number of flights per year). The second set of questions refers to the use and perception of the environment of the airport and experience with the facilities, checkpoints, information, and quality of services. The third set of questions is devoted to the way the passenger arrived at the airport and the perception of the passenger on the premises of the airport while in transit (in a bus or parking lot). This dataset was complemented by another survey conducted in December 2015, consisting of two questions about which places travellers judged as more problematic in terms of safety at the airport. Answers to the complementary questions were also incorporated into this analysis. The dataset was imported into SPSS2 after a process of data cleaning using spreadsheets. SPSS was used to organize, recategorize, and relabel the data into new variables. A reanalysis consisted in running frequency analysis to identify any inconsistencies in the data. The main variable (perceived safety) used in this analysis is on a scale from 1 to 10, from awful to excellent, reflecting the passenger's perceived safety and safety of his/her belongings in the airport. Since most passengers declared feeling satisfied with their safety, a dichotomous variable (Satisfied/Not satisfied) was created. Many variables were also modified in an attempt to reduce the number of categories. A summary of the variables used in the analysis is shown in Appendix. Cross tabulation using Chi-square tests enabled comparisons between distributions of two or more variables (e.g., differences between men and women in satisfaction with services at checkpoints). "The Chi-square test gives a criterion for verifying, on probabilistic grounds, the consistency of a theoretical hypothesis with a set of experimental data". Frequency analysis provided the direction of possible relationships between the variables. Although cross tabulation does not show causality, this analysis was fundamental to identify the main trends in the data and help select questions from the survey to be the independent variables in the regression models. In order to evaluate how much of the variation of passengers' perceived safety is explained by airport environments, everything else remaining equal, a binary logistic regression analysis was performed (The dependent variable was the dichotomous variable, whether the passenger was satisfied with his/her safety = 1, or otherwise = 0). Logistic regression is well suited for describing and testing hypothesis about relationships between a categorical outcome variable and one or more categorical or continuous predictor variables. The literature supports the use of a logistic regression model when aiming to evaluate customer satisfaction, whose information is usually collected through categorical responses. For simplicity, let us imagine only one explanatory variable X and the selected dependent variable Y. The regression equation of Y on X, using a logistic function, assumes the following form:

$$P\,(Y = 1 \vee X) = \frac{e^{\alpha+\beta x}}{1 + e^{\alpha+\beta x}}$$

where P (Y = 1|X) represents the probability that Y = 1 given X, the value(s) of predictor(s), α is the Y intercept, and β is the regression coefficient. Y = 1 means that we are referring to the probability of success, namely the passenger's satisfaction with safety at the airport. The set of independent variables revealed the characteristics of the environment of the airport and experience of services, transportation to the airport, and individual characteristics of the traveller. The dependent variable was constituted by those who answered the question: How do you judge your safety and of your belongings in the airport? To assess the robustness of the results across different models and types of passengers, we adopted two modelling strategies.

First, we modelled the total sample, the "full model," which includes all passengers (both arriving and departing) while in the second modelling strategy, data on departing passengers, which constitutes more than half of the sample, was split into male and female.

RESULTS

Places that trigger poor perceived safety at airports. Among an independent sample of 400 travellers, toilets are pointed out as places that trigger feelings of worry and anxiety about their safety, including their belongings (Figure 2(a)), after airport entrances, security checkpoints, and boarding areas. Among those 21% of passengers who pointed out problematic places at the airport, about half of them suggested feelings of confusion, especially at airport entrances. Security check points, boarding areas, restaurants, and shops are also mentioned as places where they feel anxious or less safe. Additionally, some travellers complain about poor signage, confusion, and noisy and poorly lit places in certain parts of the airport; these factors all negatively affect access to information (Figure 2(b)). Figure 3 illustrates the security checkpoints and bus stop area at the airport.

C. Sampling Design And Plan Association Between Passengers Perceived Quality Of Airport Environments And Declared Safety

Results from cross tables and Chi-square analysis show significant associations between the total travellers declared perceived safety and almost all factors that characterize a passenger's experience with the airport (important to note that these tests are not indicative of causality). Good illumination, silent places, air-conditioned environments, efficient passenger-transfer systems, such as escalators or elevators, are together helpful for making passengers feel safer. Yet, many passengers declare higher levels of perceived safety when they are simultaneously

satisfied with the overall cleanliness of the airport and its maintenance conditions. Among other airport services, toilets are worth mentioning. There is a relationship between passengers' perception of safety and some characteristics of toilets, such as cleanliness and maintenance.

Passengers declared more satisfaction when they experienced good toilet functionality and a good supply of toilets in the various airport areas. What emerges in these results is also, a high level of association between how one declares feeling safe and the access to overall information at the airport. Thus, travellers feel safe with efficient info points, clear info messages, understandable signage, and information on monitors. For the sample of departing and arriving passengers, results are in general very similar to the overall sample. However, for departing passengers, findings reveal that airport security checks have a significant impact on their perception of safety, in some cases positive, in others, negative. For instance, as many as 68% of passengers that report being dissatisfied with their perceived safety are also unhappy with the efficacy or quality of security inspections. Jointly, the courtesy and competence of security staff affect the individual perception, often positively. The declared perceived safety at the airport is also associated with travellers' experiences prior to their arrival at the airport (Figure 4). Note that about 30%of travellers come by airport coach. The way they arrive at the airport affects their declared perception of safety at the airport. Passengers using public transportation to go to the airport, for instance, report a lower level of satisfaction with their safety than those using cars. Bus users report high levels of dissatisfaction and complain about crowded conditions on the bus in route to the airport. Other aspects that have a negative impact on traveller's perceived safety are the frequency of bus departures and problems with the punctuality of public transportation overall. Regarding car users, several characteristics of car parks are important to explain this choice of transport, such as sufficient capacity of car parks, short distance to the airport, good accessibility and clear signage, and staff 's courtesy and competence. Finally, several interesting findings are worth highlighting for this sample of passengers. The international literature shows that women declare more often than men do, that they are less satisfied with their safety in transit environments. However, for this particular sample of passengers, this is not the case. Male passengers are often more critical about their safety than female travellers are. Another unexpected result is about passenger age and safety: perceived safety increases with age. Elderly passengers (> 55 years old) tend to declare feeling safer than younger groups of passengers (14–34 and 35–54). Nationality (Native/no native passengers) seems to be ineffective to explain safety, while the level of education increases the passenger's anxiety. Actually, 74% of passengers with lower levels of education report satisfaction with their safety, while only 66% of passengers with an advanced education share that opinion. Passengers traveling alone are surely the most satisfied in terms of perceived safety, reaching 74%. The percentage of satisfaction sharply decreases, to 56%, when passengers are traveling in a group of three or more people. Results show that high-frequency air travellers feel more comfortable in the airport environment, and, moreover, when a passenger has previously visited the airport, the difference between satisfied and not satisfied is even more evident.

Interestingly, the more time a passenger spends in the airport terminal before the security check, the higher is his or her feeling of safety. Satisfaction decreases as time decreases: 78% are happy if they have more than 1 hr there, 64% if they spend between 30 and 60 min before the checkpoints.

Allowing passengers to calmly fulfil the flight requirements before the security checks affect their overall perceived safety. Moments of anxiety and confusion at the entrance of the airport can be mediated by arriving at the airport in good time. Although we are not claiming any causality, these associations are worth noting before we start the hypothesis testing in the next section.

D. Modelling The Impact Of Airport Environments On The Variation Of Passengers Overall Perceived Safety

We modelled passenger satisfaction with perceived safety in the airport as a function of passenger perceptions of the environmental attributes of the airport, controlling for individual characteristics and the conditions along the trip, following the conceptual model shown in Figure 1. To assess the robustness of the results across different models and types of passengers, we adopted two modelling strategies: the "full model" strategy, which includes all passengers (both arriving and departing, Table 1) and the second modelling strategy, includes data on departing passengers, which constitutes the more than half of the sample, was split into male and female (Table 2). Passengers who say they are happy with the overall maintenance and cleanliness of the airport are twice as likely to declare themselves satisfied with their safety and their belongings at the airport. These variables are also significant for departing passengers (Table 1). As many as 11 out of 14 variables concerning the environmental attributes of the airport were significant to explain passenger satisfaction with their safety. These attributes are noise levels/silence, air conditioning, cleanliness, monitors, recorded messages, signage, elevators and escalators, and overall maintenance. As expected, for arriving passengers' individual characteristics are more important to explain their overall declared safety than are the airport's environmental features (age, whether the passenger is accompanied, frequency of travel, whether the passenger has previously been at this airport). Departing passengers, who have more time to experience the airport, are most certainly more influenced by the environment of the airport than those arriving (for this arriving group, only five variables are significant out of 14). Yet, regardless whether they are arriving or departing, women are more perceptive of the airport environment than men are (10 significant variables for female passengers, and only six for male passengers). There are interesting gender differences. For instance, for an additional woman who declares dissatisfaction with the air conditioning, the odds of having her declare satisfaction with her safety decrease by 35%; a similar percentage is found for satisfaction with the message system among women. Interestingly, these two factors (air conditioning and recorded messages) do not matter to male passengers. For an additional individual who declares dissatisfaction with the maintenance of toilets, the odds of having the passenger declare satisfaction with safety decrease by 43% (38% for men and 63% for women, Table 2). For passengers on departing flights, the variable most important to explain satisfaction at the airport is the variable that reflects satisfaction with security checkpoints, yet the variables reflecting the perception of the environment of the airport are also highly relevant. Departing passengers who declare satisfaction with the security check practices are at least three times more likely to declare satisfaction with their safety and their belongings at the airport (especially women, who are four times more likely). They tend to be satisfied with waiting times at checkpoints and competence of the personnel. The model indicates that passengers who do not travel alone tend to declare less satisfaction with their safety at the airport than those who fly by themselves. For one additional person the passenger adds as a companion, the odds of having the passenger satisfied with safety decrease 20% (Table 1), and as it regards departures, this is a factor that affects more male passengers (23%) than females (16%; Table 2), so men are more sensitive when departing than arriving.

E. Data Analysis And Interpretation

LIST OF FIGURES

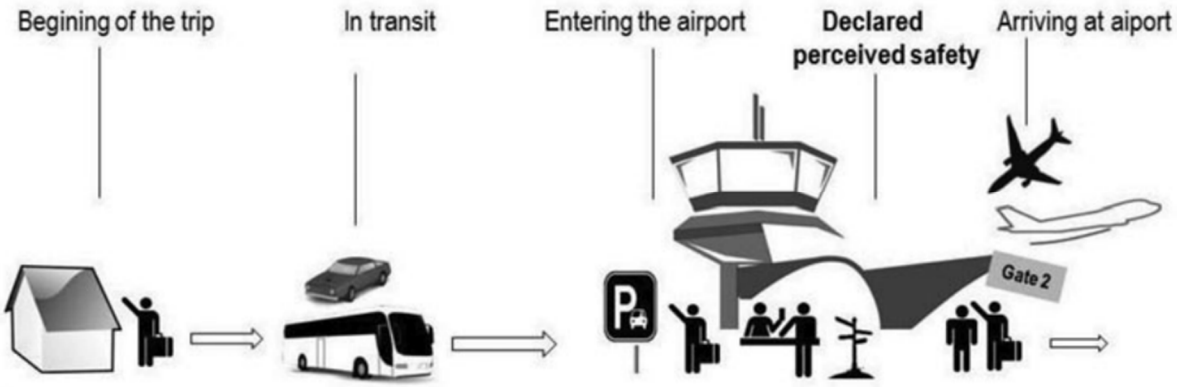

Figure No- 01: Perceived safety by passengers at airports: A tentative conceptual framework.

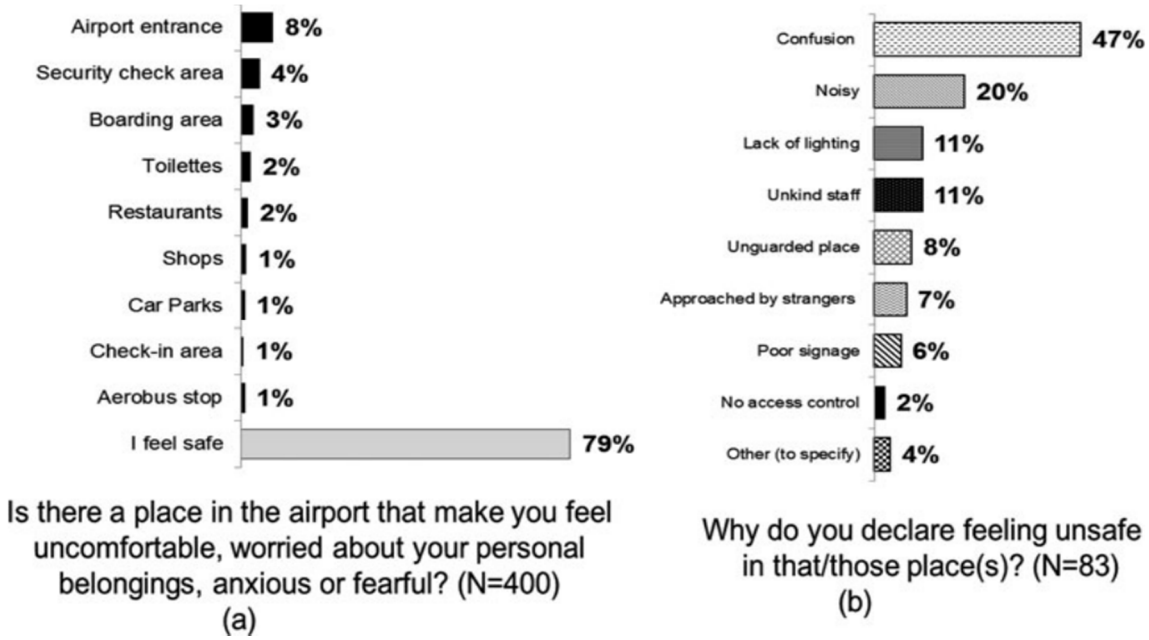

Figure No-2: a) Perceived safety at airport places. b) Reasons for feeling unsafe.

a) Security checkpoints

b) Bus at airport entrance

Figure No-3 Security checkpoints and bus at airport entrance

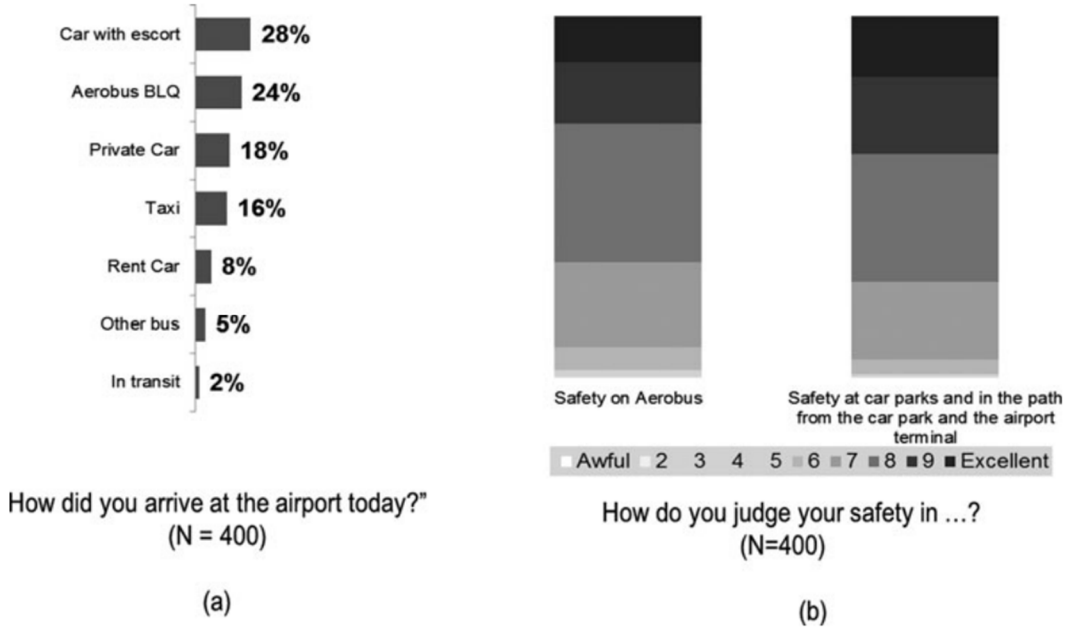

Figure No: 4- a) Access to the airport by mode b) perceived safety.

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Table-1: Results of the "full model"–Binary logistic regression, Y = Passenger's declared satisfaction with safety.

	Total sample = 3859			Departing passengers = 2136			Arriving passengers = 766		
	Coef.	St. Dev.	Exp(B)	Coef.	St. Dev.	Exp(B)	Coef.	St. Dev	Exp(B)
Individual attributes									
Male	−0.089	0.087	0.087	−0.134	0.129	0.874	−0.048	0.143	0.953
Age	0.227***	0.067	0.067	0.157*	0.1	1.17	0.194*	0.116	1.214
Nationality	0.07	0.096	0.096	0.322***	0.143	1.38	−0.029	0.157	0.972
Educational level	−0.097	0.076	0.076	−0.092	0.113	0.912	−0.175	0.13	0.839
Companions	−0.246***	0.055	0.055	−0.226***	0.083	0.798	−0.219***	0.09	0.803
Frequency of flights/year	0.213***	0.09	0.09	0.123	0.133	1.131	0.253*	0.152	1.288
Familiarity	0.725***	0.117	0.117	0.651***	0.183	1.918	0.415***	0.184	1.514
Environment attributes									
Well lit	0.087	0.1	1.062	−0.098	0.156	0.907	−0.017	0.159	0.983
Silent	0.067**	0.097	1.222	0.217*	0.152	1.242	0.267*	0.153	1.306
Air conditioning	0.096**	0.095	1.224	−0.088	0.151	0.916	0.16	0.152	1.173
Cleanliness	0.076***	0.102	2.059	0.556***	0.15	1.744	0.943	0.169	2.568
Overall maintenance	0.055***	0.099	2.215	0.448***	0.146	1.565	0.892	0.162	2.439
Signage	0.09***	0.098	1.307	0.126	0.162	1.134	0.164	0.141	1.178
Recorded messages	0.117***	0.07	1.3	0.357***	0.113	1.428	0.035	0.11	1.036
Monitors	0.258***	0.098	1.294	0.335**	0.163	1.398	0.267**	0.142	1.306
Overall information	0.069	0.102	1.072	−0.055	0.166	0.947	0.076	0.152	1.079
Elevators and Escalators	0.253***	0.061	1.288	0.452***	0.117	1.572	0.176**	0.087	1.193
Toilets:									
Availability	0.049	0.143	1.05	0.326*	0.191	1.385	−0.662**	0.3	0.516
Functionality	0.203*	0.141	1.225	0.111	0.188	1.117	0.133	0.282	1.142
Cleanness	0.193*	0.129	1.213	0.152	0.172	1.165	0.482**	0.25	1.62
Maintenance	−0.507***	0.153	0.602	−0.571***	0.201	0.565	−0.122	0.303	0.885
Experience services									
Security Check Points: Security Inspections	—	—	—	1.271***	0.129	3.565	—	—	—
Courtesy	—	—	—	−0.17	0.156	0.844	—	—	—
Competence	—	—	—	0.353**	0.163	1.424	—	—	—
Waiting Time	—	—	—	0.685***	0.125	1.983	—	—	—
Before check points									
Time before inspections	—	—	—	−0.118	0.096	0.889	—	—	—
Transport from/to airport	—	—	—	−0.151	0.126	0.86	—	—	—
Nagelkerke R Square	0.352			0.487			0.318		
Cox & Snell R Square	0.251			350			0.224		
(sig)	3719.394			1787.481			1321.563		

*Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

Table-2: Results–Binary logistic regression, Y = Passenger's declared satisfaction with safety–Departing passengers by gender (N = 2136).

	Male = 1335			Female = 801		
	Coef.	St. Dev.	Exp(B)	Coef.	St. Dev.	Exp(B)
Individual attributes						
Male	—	—	—	—	—	—
Age	− 0.038	0.134	0.963	0.336**	0.161	1.399
Nationality	0.426	0.186	1.531	0.319	0.236	1.376
Educational level	− 0.12	0.147	0.887	− 0.083	0.19	0.921
Companions	− 0.262*	0.107	0.769	− 0.179	0.139	0.836
Frequency of flights/year	0.119	0.164	1.127	0.114	0.24	1.121
Familiarity	0.737***	0.23	2.089	0.582**	0.317	1.789
Environment attributes						
Well lit	− 0.046	0.201	0.955	− 0.227	0.269	0.797
Silent	0.119	0.195	1.126	0.4*	0.26	1.492
Air conditioning	0.043	0.194	1.043	− 0.421*	0.264	0.656
Cleanliness	0.452***	0.192	1.571	0.784**	0.26	2.189
Overall maintenance	0.51***	0.192	1.666	0.352*	0.243	1.422
Signage	− 0.07	0.202	0.933	0.474*	0.291	1.607
Recorded messages	0.72***	0.145	2.055	− 0.353*	0.206	0.703
Monitors	0.232	0.21	1.261	0.531**	0.275	1.7
Overall information	− 0.031	0.212	0.97	− 0.055	0.286	0.947
Elevators and Escalators	0.405***	0.15	1.499	0.592***	0.202	1.807
Toilets:						
Availability	0.185	0.255	1.204	0.708**	0.316	2.03
Functionality	0.355*	0.247	1.427	− 0.112	0.311	0.894
Cleanness	− 0.055	0.22	0.946	0.36	0.294	1.43
Maintenance	− 0.465*	0.262	0.628	− 0.976***	0.346	0.377
Experience services						
Security check points:						
Security inspections	1.274***	0.166	3.574	1.404	0.222	4.072
Courtesy is good	− 0.212	0.193	0.809	− 0.222	0.282	0.801
Competence is good	0.42**	0.201	1.521	0.265	0.295	1.303
Waiting time is good	0.741***	0.158	2.098	0.751***	0.218	2.12
Before check points						
Time before inspections	− 0.237**	0.128	0.789	0.062	0.156	1.064
Transport from/to airport	− 0.166	0.16	0.847	− 0.15	0.219	0.86
Nagelkerke R Square	0.352			0.487		
Cox & Snell R Square	0.251			350		
(sig)	3719.394			1787.481		

*Significant at 10% level. **Significant at 5% level. ***Significant at 1% level.

APPENDIX DATABASE OF STUDY

Data Type	*Variable*	*Description*	*Unit*
Dependent variable	Safety	How do you judge your personal safety and of your personal belongings in the airport?	Categorical/Binary
Independent variables/ Individual attributes	Gender	Gender of the passenger	Binary
	Age	Age of the passenger	Categorical
	Nationality	Nationality of the passenger	Binary
	Education level	Level of education of the passenger	Categorical
	Companions	Number of people that are travelling with the passenger	Categorical
	Frequency of flights/year	Number of flight per year	Categorical
	Familiarity	Previous experience at the airport of Bologna	Binary
Environment attributes	Illumination	Satisfaction with airport lighting	Categorical
	Silent	Satisfaction with level of silence	Categorical
	Air conditioning	Satisfaction with conditioning system	Categorical
	Cleanliness	Satisfaction with airport cleanliness	Categorical
	Overall maintenance	Satisfaction with airport maintenance	Categorical
	Signage	Satisfaction with airport signage	Categorical
	Recorded Messages	Satisfaction with recorded messages	Categorical
	Monitors	Satisfaction with informative monitors	Categorical
	Overall Information	Satisfaction with simplicity to gather information	Categorical
	Elevators and Escalators	Satisfaction with efficiency of elevators and escalators	Categorical
	Availability of toilettes	Satisfaction with availability of toilettes	Categorical
	Functionality of toilettes	Satisfaction with functionality of toilettes	Categorical
	Cleanliness of toilettes	Satisfaction with cleanliness of toilettes	Categorical
	Overall maintenance	Satisfaction with maintenance of toilettes	Categorical
Experience services	Security Check Points	Satisfaction with overall security check	Categorical
		Satisfaction with courtesy of security staff	Categorical
		Satisfaction with competence of security staff	Categorical
		Satisfaction with waiting times at security gates	Categorical
Before checkpoints	Time before inspection	Amount of time spent before security checks	Categorical
	Transport from/to airport	Means of transport used to reach the airport	Categorical

III. RESULTS AND LIMITATIONS

Findings confirm hypothesis 1, that satisfaction with the airport's environment has an impact on overall declared perceived safety (Tables 1 and 2). The airport entrance, security checkpoint areas, boarding areas, toilets, and restaurants are places where passengers declare feeling less satisfied (Figure 2). As suggested in hypothesis 3, the airport environment has a greater effect on the perception of safety of departing passengers than of arriving passengers, most likely because of the difference in time spent by the two groups at the airport (the departing passengers spent more time than those who arrive). The overall cleanliness and maintenance of the airport terminal facilities are aspects that positively contribute to passengers' perceptions of safety. A maintenance schedule is needed to avoid periods of malfunctioning or breakdown. If failure or a malfunction occurs, the time for reaction and repair should be kept to a minimum, and passengers should be properly informed. According to ACI "elevators, escalators or moving walkways which are out of order can cause major nuisance to passengers especially when they are running out of time to reach a flight." These maintenance problems most certainly are not exclusive of airports. They cause a major stress factor in other transit environments, such as underground, railway, and bus stations. According to our findings, passenger satisfaction with safety in airports is dependent on security checks and a number of facilities and services provided at the airport. Security checks deserve particular attention because they constitute the central point of the whole "airport experience" and have different dimensions. One dimension is that security checks encompass a dramatic moment in the trip. From the passenger's perspective, security employees are "threats," while from the employees' perspective, every passenger is seen as a potential threat. Yet, the detection process has elements of "social negotiations" for passengers and security employees, an area framed by multiple interactions between employees and passengers. The output of these interactions affects passengers' perceived safety. Another dimension of it is how routines in security checks are perceived differently within groups of passengers, for instance, by men and women. My findings indicate that security checkpoints are more important to men's perceptions of safety than to women's (three variables significant out of four for men, and one for women, Table 2). According to me, this difference has to do with the way men and women "read" the experience at checkpoints.
The author writes: It may be that generally, men are more inclined to feel that if airport security is acting professionally, elevated screening measures will, in turn, enhance safety.

Women may be less inclined to perceive this connection due to heightened concerns regarding privacy issues arising from elevated screening. In addition to the importance of the availability and smooth functioning of escalators and stairs, the real-time information system in the airport is also considered relevant to passenger safety. This includes the signage that helps passengers find their way, information about restrictions on what can be carried in hand luggage, and real-time information systems that help transmit to passengers all the information necessary to keep flights on time and avoid delays. I note that airports are complex organizations, and their security routines are based on regulations that require constant training of personnel. Security staff should attend training courses to efficiently carry out their tasks and satisfy passengers' expectations, which are a balance between conducting operations as fast as possible without compromising the quality of checks and still fulfilling passengers' needs. Neither for men or women, the transport mode used to travel to the airport is relevant to explain their perceived safety while women tend to be more sensitive to the quality of the environment at the airport than men do. According to Table 2 satisfaction with safety goes beyond the risk of being late for a flight because of long waits at security checkpoints. Safety is also a function of a passenger's age and familiarity with the airport environment as well as the perception of airport maintenance, availability and quality of services and facilities, and information provision. These findings highlight the need to consider safety of passengers as a multifaceted phenomenon. The individual characteristics of passengers affect their perception of safety in the airport, as expected in hypothesis 4, but not always in the expected way. Safety is more important for men than women when traveling (Table 2) as they declare feeling less satisfied with their safety; but women are more receptive to the qualities of the airport environment to explain their perceived safety (note that eight attributes out of 10 were significant in the female model, against four attributes out of 10 for men). Flying alone also contributes to passengers' perceived safety, particularly for men. Passengers were asked how many people they were traveling with, and in most cases, findings show that the more people in a group, the less satisfied with their safety passengers declared themselves to be. Note that groups of three or more travellers are often families. This finding may be related to what Trickett (2009) calls "altruistic fear," a fear that individuals feel for other people whose safety they value. As Trickett (2009) suggests, middle-aged men "reported feeling especially vulnerable when they were out with their children and/or partners because they felt the need to protect them".

IV. CONCLUSIONS

This study set out to identify which are the environments that trigger poor perceived safety at airports. The exploratory analysis using Chi-square analysis shows significant associations between declared perceived safety and airport environments. The analysis also investigates patterns of passenger satisfaction with safety in an airport using binary logistic regression. Results using two different modelling strategies show a robust similar pattern, that passenger satisfaction with safety is affected by the passenger's perception of the airport's environment (e.g., elevators and escalators, availability and cleanliness of toilets, overall maintenance) as well as by the overall experience of being in transit, whether departing or arriving at the airport.

Airport entrances, security checkpoints, boarding areas, toilets, and restaurants are places that passengers indicate as critical for their perceived safety. Results also indicate that a number of dimensions of passenger safety are gendered, namely how women and men perceive safety along the trip and particularly at check points at airport. Findings like these call for safety interventions that are sensitive to passengers' needs and adopt a whole-journey approach to safety. However, the analysis shares, with other analyses of the same kind, limitations that are important to point out here. One limitation is that the question that capture safety has two dimensions ("one's personal safety" and "one's property/belongings" into one question)—and, therefore, might be problematic. Thus, "personal safety" might be high but simultaneously low for perception of "luggage safety." Another limitation is that the sample size is large enough to automatically create significant Chi Squares that would might not be present for a smaller sample (type I error). Future research should not only extend the time period of analysis but also assess the importance of a time dimension on the perceived safety of passengers at the airport and throughout their journey. Of particular importance is to check seasonal, weekly, and daily variations of responses, as they may reflect very different safety conditions at the airport. Moreover, despite the fact that the study has shown evidence that the perception of the environment affects overall passengers' perceived safety, these measures are based on "perception," not actual objective indicators. Data permitting, future research should explore other environmental features that are not dependent on surveys indicators, such as numbers of uniformed security personnel, density of passenger traffic, number of available checkpoints during shifts, access to public areas. Despite current limitations, this article makes contributions to the field of transit safety, by particularly focusing on passengers' perceived safety in airport's environments and services they provide—a topic which has so far been limited in the international literature.

This study is also innovative in its attempt to explore new theoretical grounds (section 2) to support the analysis of the airport environment and passenger satisfaction with safety, by drawing on principles from environmental criminology, architecture, and engineering.

V. ACKNOWLEDGEMENT

I owe my indebtedness to my supervisor Rani Jaiswal, The Head of Department Neha Bhatia, the lecturers in the department of aviation, of related research work of your moral support that facilitated the successful completion of my tertiary institution level. I am grateful to God almighty and my parent for their financial support in my career.

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Congestion occurs when infrastructure demand exceeds capacity, and one of the main symptoms is travel time delays. Door-to-door travel time in air transport is divided into three parts: round-trip travel time to the airport, travel time at the passenger terminal before and after the flight, and airside travel time after boarding. Airside travel time depends on many variables, but this article only discusses congestion issues and delays related to airports and airspace (on the way). The immediate challenge is to maintain the highest levels of safety in the face of increased traffic while reducing congestion (FAA, 2005, Moving America Safely). US and EU capacity issues can be exacerbated after the recent implementation of open skies.
Solutions for increasing airport capacity have already been widely discussed primarily by aviation economists who have analysed congestion cost pricing strategies and airport slot allocation solutions. The focus of this article is primarily on operational solutions to airport congestion such as: B. Minimize runway occupancy time and address typical airport capacity issues caused by uneven traffic, wake vortices, noise issues, bad weather and more. Congestion on the route is caused by crowded airspace, and several solutions are described, including B. Reduced Vertical Separation (RVSM), Mandatory Usage 8.33 kHz, use of European Union Single Sky Project and satellite navigation. Most of the congestion issues described in this white paper are based on extensive experience in Europe and the United States. Many of the available European and US solutions have also been adopted or are in the implementation stage elsewhere in the world. Insufficient airport capacity to meet the demands caused by passenger and aircraft traffic, and the resulting problems caused by airport congestion and operational delays, have become common challenges at major airports around the world., Affecting the movement of people and cargo. Studies of air transport systems show that when demand exceeds about 80% of the system's available capacity, delays and runway queues begin to increase significantly. Therefore, to solve the problem of airport congestion, we need to focus on finding ways to reduce the demand / capacity ratio.
Insufficient airport capacity to meet the demands caused by passenger and aircraft traffic, and the resulting problems caused by airport congestion and operational delays, have become common challenges at major airports around the world., Affecting the movement of people and cargo. Studies of air transport systems show that when demand exceeds about 80% of the system's available capacity, delays and runway queues begin to increase significantly. Therefore, to solve the problem of airport congestion, we need to focus on finding ways to reduce the demand / capacity ratio. Option A pertains to the incorporation of new infrastructure. This option increases the capacity of the entire airport or part of its subsystem. Option B provides a mechanism to reduce the demand for airport services. Option C does not reduce demand, but it redistributes operations, which improves airport operational efficiency. Finally, Option D also improves airport efficiency through operational or technological innovations
Literature review
Airports face several challenges when serving passengers, for instance, as a result of terminal congestion, uneven demand, exposure to local disruptions and external events, the involvement of multiple staff and service providers, and fragmented passenger segments that have diverse expectations regarding service quality. Despite efforts to standardize several key processes at airports such as at checking, bag drop, security screening, passport control and departure gates, it means that, unlike in manufacturing, where companies strive for `zero defect` production, it is almost impossible to avoid defects in service delivery. Instead, service failures are inevitable at airports, and while failures with some service attributes may have little impact on overall satisfaction, the impact of others may be significant and subsequently affect behavioural intentions such as airports reuse and recommendation.

Page 1 of 2

Despite the importance of service quality to airports and an understanding of the attributes that contribute to it, maintaining service quality airports is a challenge for serval reasons. Prior to Covid19, many airports were getting busier and experiencing pressure on their ability to maintain and improve standards. For example, airports around the world will serve 9.1 billion passengers in 2019, which is expected to more than double by 2040, based on a projected annual growth rate of 4.1%. During Covid19, global passenger traffic at airports is expected to decline dramatically and forecasts are expected to be revised downwards. However, as traffic begins to increase, new health and safety measures, including the continued need for social distance, will continue to pressure airports to maintain and improve standards while servicing relatively few passengers. increase.

Demand for airports is typically uneven and consequently there are often temporal variations in the delivery of service quality and how it is perceived by passengers. Airports are also exposed to local disruptions (i.e., to equipment or infrastructure, airline operations, or surface access) and external events such as adverse weather conditions that can affect service quality. Despite the use of technologies to standardize many of the key processes at airports, service encounters still often involve people who can affect how services are delivered. Also, airport operators are not the only providers of services at an airport some are offered by partners such as airlines, handling agents, concessionaries, security companies and governmental agencies and different providers may have conflicting objectives and views on how service quality should be delivered. This is noted by me in the context of the airport airline relationship because I claim that airports and airlines currently operate as separate entities, resulting in alternative views of the passenger journey which is hindering industry progression in terms of service quality and innovation. Another problem is that airports serve an increasingly fragmented passenger segment. This makes it much more difficult for the airport to meet the various expectations of passengers.

Therefore, in Europe, where we conducted the survey, we conducted activities to understand the impact of airport security issues on customer satisfaction.

Sources	Similarity
Airport service quality and passenger satisfaction: The impact ... https://www.sciencedirect.com/science/article/pii/S221053952100050X	3%
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NATIONAL AIR TRANSPORT CONGESTION AND CAPACITY PROBLEMS: THEIR IMPACT ON THE AVIATION INDUSTRY

- There is significant settlement the various aviation enterprise and the touring public that present day airport and airway overcrowding poses a severe problem. Since the U.S. airport and airway gadget is absolutely incorporated into the material of the country wide economy, its cap potential to move humans and items at affordable charges and without delays is instrumental in spurring home monetary growth. The persevering with upward thrust withinside the call for air provider underscores this importance-in 1978, 278 million passengers boarded at U.S. airports; throughout 1986 this variety rose to 415 million; via way of means of 1999 the discern is projected to attain 714 million.
- Those at once depending on the airport and airway gadget consist of enterprise and private travellers, airline and small plane operators, airport operators and personnel, plane and associated structures and elements producers, and the aeronautical services. Also affected are the holiday enterprise and groups who use air provider for shipment and package deal deliveries. Because the airport and airway gadget are so critical to U.S. commerce, its developing congestion has severe monetary implications for the nation. Pivotal gamers in the airport and airway gadget are the industrial plane and engine producers whose services and products offer the manner of transport.
- The producers` cap potential to satisfy the desires in their airline clients, and in the end of the general public, via way of means of growing and making use of generation in a well-timed and cost-effective way is complex via way of means of the gadget's loss of capability. This loss of capability creates marketplace uncertainty and has the cap potential for adversely impacting destiny sales. By developing delays, lowering protection margins, restricting get entry to positive airports, and contributing to network noise problems, congestion additionally inconveniences the general public and will increase prices to the airways. These prices are surpassed alongside to clients thru better price tag charges and delays. If prices lower the call for air provider, the airways will revel in decreased earnings and be much less capable of make investments withinside the plane essential to serve the general public. Even if call for isn't always adversely affected withinside the brief tem1, rules that require untimely retirement of plane, reengining or engine modifications, or set up of latest onboard avionics for more secure operation can be imposed on operators earlier than they're financially organized to include them. The effect Old} the airline enterprise, which has recovered in latest years from the intense fin There is significant settlement the various aviation enterprise and the touring public that present day airport and airway overcrowding poses a severe problem. Since the U.S. airport and airway gadget is absolutely incorporated into the material of the country wide economy, its cap potential to move humans and items at affordable charges and without delays is instrumental in spurring home monetary growth.
- The continuing rise in the demand for air service underscores this importance in 1978, 278 million passengers boarded at U.S. airports; during 1986 this number rose to 415 million; by 1999 the figure is projected to reach 714 million.1 Those directly dependent on the airport and airway system include business and personal travellers, airline and small aircraft operators, airport operators and personnel, aircraft and related systems and parts manufacturers, and the aeronautical services. Also affected are the vacation industry and companies who use air service for cargo and package deliveries. Because the airport and airway system are so vital to U.S. commerce, its growing congestion has serious economic implications for the nation. Pivotal players within the airport and airway system are the commercial aircraft and engine manufacturers whose products and services provide the means of transport.
- The manufacturers` ability to meet the needs of their airline customers, and ultimately of the public, by developing and applying technology in a timely and cost-effective manner is complicated by the system's lack of capacity. This lack of

capacity creates market uncertainty and can negatively impact future sales. By causing delays, reducing safety margins, restricting access to certain airports, and contributing to local noise problems, congestion causes inconvenience to the general public and increases airline costs. These costs are passed on to customers through higher ticket prices and delays. If costs reduce the demand for aviation services, airlines will be less profitable and will not be able to invest in the aircraft needed to serve the general public. Even if demand is unaffected in the short term 1, operators can use new in-flight avionics for early retirement, restart or engine changes, or safer operation of the aircraft before it is ready to install. It may be subject to regulations that require installation.

Sources	Similarity
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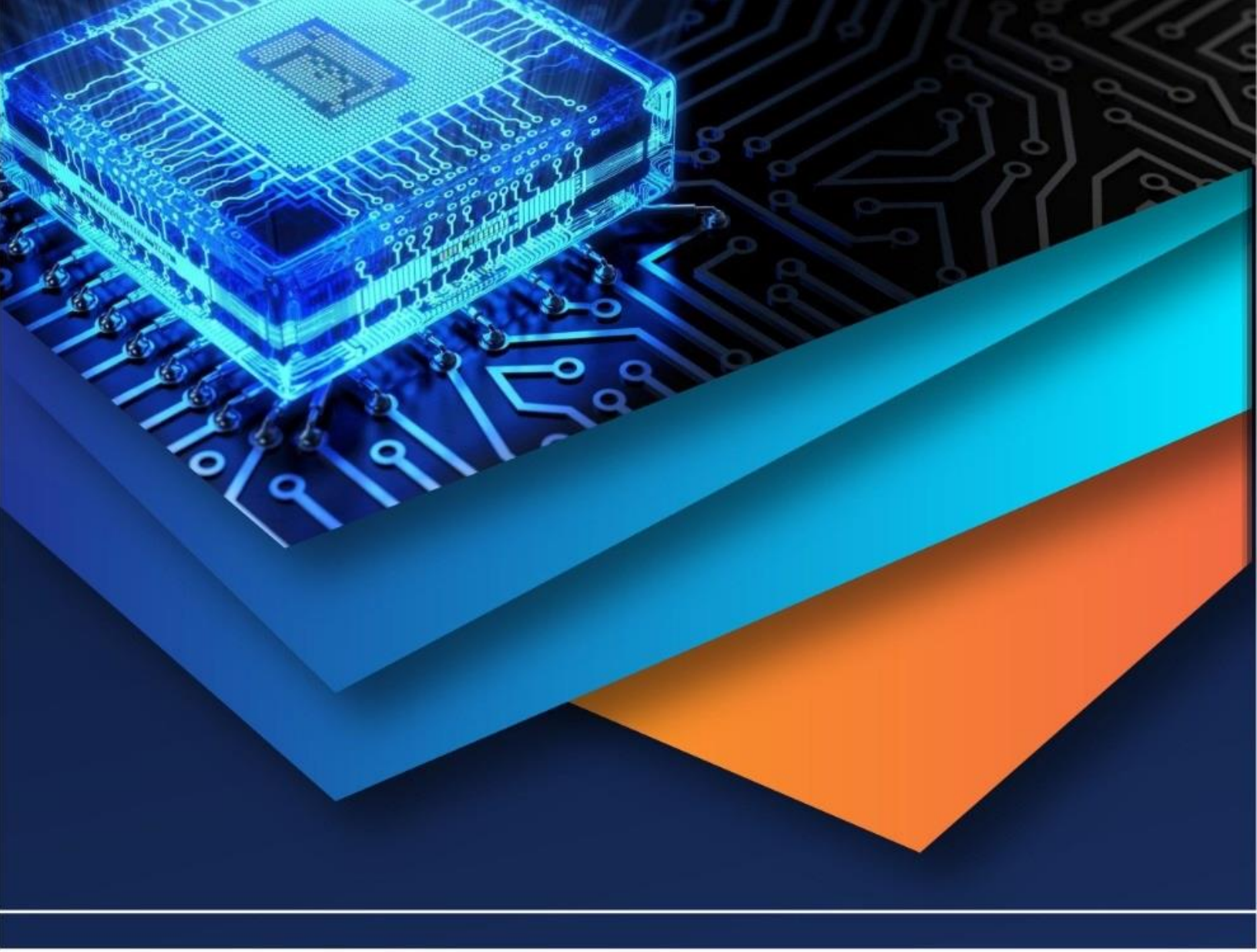

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