



Evaluating Passengers' Satisfaction with Aircraft Cabin Interior in EgyptAir

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Abstract

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Passengers are paying more attention to their comfort during flights. The passengers' choice of an airline depends on several factors including price, safety, loyalty programs, quality of service, inflight entertainment, and baggage handling. Another key factor influencing their choice of airline is their level of satisfaction and sense of comfort in the aircraft cabin, which is the main focus of the current study. Many factors of the entire cabin system, including the cabin environment, facilities, services, and psychological variables of passengers, all have an impact on their comfort. Airlines are increasingly focusing on comfort to differentiate themselves by developing the aircraft cabin interior to enhance passenger comfort and obtain a competitive advantage in highly competitive markets. The emergence of smart aircraft cabins provided smart solutions to all discomfort issues that negatively influenced passenger experience during flight. The smart plane of the future has the potential to smooth cabin operation and improve the customer experience in numerous ways such as smart overhead compartments, futuristic smart seats, smart dimmable windows, smart services, and Zero-Touch entertainment screens with 4k clarity. The current study aims to evaluate passenger satisfaction with the current aircraft cabin interior in EgyptAir and investigate factors that influence passenger discomfort in the aircraft cabin. Furthermore, to explore how passengers perceive the "smart cabin" in addressing their discomfort issues as well as its influence on enhancing their comfort during the flight. To meet the study goals, an online survey was distributed among Egyptian frequent travelers on EgyptAir. A total of 311 valid questionnaire forms were collected and analyzed. The results indicate that passengers are satisfied with the current aircraft cabin in EgyptAir; however, they reported some discomfort issues that influence their convenience during flights. Moreover, the majority of passengers showed their interest in using the "smart cabin" and its impact on enhancing their sense of comfort.

Introduction:

Passengers are paying greater attention to their comfort during flights. In a competitive industry, comfort is becoming one of the main factors that airlines seek to use to differentiate themselves. (Liu et al., 2019). The reason behind this is the impact of comfort on passenger satisfaction and well-being, and their intention to fly again with the airline in the future. (Ahmadpour, 2014). The cabin environment, amenities, and services such as seats, lighting, noise, and cabin crew service all have an impact on passenger comfort (Patel and D'Cruz, 2018). The comfort of a passenger's flight experience influences their choice of airline. (Wang et al., 2021). According to Vink and Van (2011), comfort attracts passengers. As the number of passengers increases, it is critical to consider passenger comfort during flights.

The aircraft cabin interior is an important aspect of passenger comfort on board. Nowadays, the airline industry is working to upgrade cabin interiors to provide passengers with a satisfying experience and enhance their comfort during flights. The aircraft cabin interior is comprised of various components; each component has its function. This includes aircraft seating, in-flight entertainment and connectivity, galley equipment, aircraft lavatories, aircraft windows, and overhead compartments (Franco-Urquiza et al., 2021).

Many people associate aircraft cabin interior design with their comfort. Comfort is simply defined as "a pleasant state of physiological, psychological, and physical harmony between a human person and their surroundings, as well as a sense of subjective well-being" (Wang et al., 2021). Before beginning the design process, it is vital to determine which interior components are crucial to the comfort of passengers. Several airplane interiors were improved to enhance passenger comfort. New materials, lighting systems, seat mechanics, and varied seat arrangements are just a few examples. However, the question is whether these innovations are noticed as comfortable by passengers. Technological advancement has provided smart solutions to all discomfort issues that negatively influenced passenger experience during flight. The aviation industry perceives smart technology as an important approach to improving efficiency and attracting more passengers (La et al., 2021). Despite the importance of aircraft cabin interiors in enhancing passenger comfort, there is a lack of research that examines the passenger's perception and their level of satisfaction with the aircraft cabin in the context of EgyptAir. Therefore, the current study aims to evaluate passengers' perceptions of EgyptAir's current aircraft cabin interior as well as their perceptions of a futuristic smart aircraft cabin in terms of improving their comfort.

Literature Review**Factors Influencing Passenger Comfort in the Aircraft Cabin Interior****Aircraft Window Glass**

Passenger comfort is greatly influenced by physical environmental conditions such as lighting and temperature. The use of traditional low-emissivity (Low-E) glass windows in aircraft cabins allows infrared wavelengths and glare to enter, warming the interior

area and causing visual discomfort for passengers (Culp et al., 2015). Passengers' anxiety, nervousness, and stress levels are decreased when they enjoy the view through the window. However, due to the rapid temperature rise, the window itself generates a new heat source. Because the radiation heat flow is so large, the passengers near the windows remain quite heated. As a result, passengers are often obliged to close the window to avoid sunshine and heat, even when they want to enjoy the scenery outside (Lu et al., 2015).

Economy Class Seats

Bouwens et al. (2018) stated that the aircraft seat influences passenger comfort. Legroom is one of the most important factors influencing passenger comfort (Li et al., 2018). Moreover, Anjani et al. (2020) stated that legroom, which is determined by seat pitch and distance, is an essential feature that considerably increases the comfort of economy class passengers. Legroom has a very high influence on aircraft interior comfort. Seat pitch is defined as "the distance from a point on the seat in one row to the same point on a seat in the next row", while legroom is described as a space large enough for passengers to comfortably stretch their legs. (Zhao et al., 2020) (Figure 1).

Despite all of the advancements in aircraft design, there is still a question about the comfort experience of long-haul passengers in economy class, especially in aircraft with small seat dimensions, and its effect on passengers' intentions to fly with the same airline in the future. The seat pocket is designed in such a way that passengers who travel in economy class have to scrunch their legs to avoid the pocket hitting their knees. This is considerably more difficult when the seat in front is reclined. (Al-Murrakshi, 2021). Passengers may avoid reclining their seats to improve their comfort because doing so will reduce the comfort of passengers behind them. (Patel and DCruz, 2018).

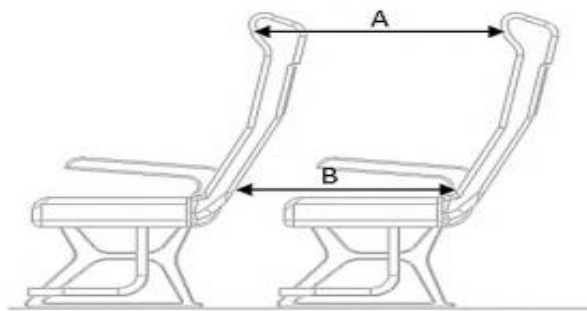


Figure 1: Seat pitch (A) and legroom (B) (source: Phothong and Worasuwanarak,2021).

Inflight Entertainment (IFE)

In-flight entertainment (IFE) is essential since one of the most significant factors that passengers consider when purchasing a ticket is entertainment (Williamson et al., 2019). Moreover, Patel and D'Cruz (2018) claimed that, in terms of significance, inflight entertainment ranks second behind seats and legroom, as it is often used by passengers to entertain themselves. Passengers need the entertainment to pass the time and imagine themselves somewhere other than thousands of feet above the earth in a metal tube. Furthermore, Hawk (2018) stated that in-flight entertainment systems provide more than just comfort; they reduce fatigue and health risks associated with air travel, besides reducing fear and anxiety, increasing satisfaction and confidence in airlines, and maintaining passenger loyalty (La, 2021). Nevertheless, several concerns are frequently addressed while employing IFE. Passengers are dissatisfied with the quantity and effectiveness of their personal space, as well as the quality of the in-flight entertainment screens. Moreover, passengers do not have full control over the positioning of seatback screens and personal devices. (Williamson et al., 2019)).

Overhead compartments

Carry-on luggage stored in overhead compartments is the most common cause of passenger boarding delays. Boarding time will be extended due to the time it takes to find a suitable place. Travelers with a lot of luggage require a lot more time to find the available space in the overhead compartment. They may have to transfer to other rows to find empty spaces (Nugroho and Asrol, 2022). According to Pamplona and Alves (2020), delays have a substantial influence on passenger satisfaction. Moreover, Luo et al. (2021) stated that boarding time is critical since it affects aircraft efficiency as well as passenger comfort and safety.

Meal Service Trolleys

Service trolleys are one of the factors that contribute to passenger discomfort in the cabin, as they intensify the feeling of being stuck in closed areas and obstruct passengers' ability to walk around the cabin or use the restrooms, resulting in a line of trapped passengers attempting to return to their seats. Another source of passenger irritation during a flight is when the cabin crew wakes them up to ask whether they want a meal (Romli et al. 2016).

Smart Cabin and Passenger Comfort

Rapid advancement has resulted in intelligent solutions to all concerns that have impacted passenger satisfaction during flights. Airlines might enhance passenger satisfaction and competitiveness by embracing digital technologies. In a highly competitive industry, the strength of airlines depends on the quality of service perceived by passengers. As a result, digital technology adoption in the airline sector is required to significantly influence passenger satisfaction. Travelers that have a positive

experience with an airline will promote positive word of mouth to their friends. Therefore, benefiting the airlines in terms of gaining a competitive advantage and attracting more passengers. The smart plane of the future has the potential to improve the customer experience in a variety of ways (Shiwakoti et al.,2022).

- **Smart Dimmable Window:** It allows passengers to immediately modify the brightness of their window from clear to dark, or part of it, to control lighting, glare, and heat entering in while maintaining the view. They improve visual, thermal, and auditory comfort for a more relaxing environment (Zakirullin, 2022).
- **Futuristic Intelligent Seats:** It responds to passengers' movement, weight, size, and temperature by raising or lowering the tension of the material, ensuring passengers sit as comfortably as possible. The smart seat also sends data to each individual's Smartphone, allowing them to further adjust their environment; pre-set settings include sleep, eating times, and massage. Moreover, the seat automatically adjusts itself during flight based on the passenger's weight, size, and movement. It also tackles the issue of legroom anger, which is generated by people overly reclining in their seats (Layer Design, 2021).
- **Zero-Touch entertainment screens with 4k clarity:** passengers can enjoy high-quality entertainment options. Furthermore, they can use the Zero-Touch to link Personal Electronic Devices (PEDs) with their seat-back IFE screen by connecting to Wi-Fi and scanning a Quick Response Code (QR) code displayed on the screen. Customers may then use their electronic devices to explore and enjoy entertainment options available on the airline's inflight entertainment system. (Qatar Airways,2021).
- **Smart overhead compartments with sensors:** Smart overhead compartments, fitted with sensors and linked to an aircraft Internet of Things (IoT) system that gives real-time data to crew tablets, can save the time upon boarding. The present technique reduces the amount of time people spend looking for overhead space, which speeds up the boarding process and makes boarding less stressful for both flight attendants and passengers. Airbus introduced a green, yellow, and red light system that alerts passengers and flight attendants on how much space is left in each compartment. A red light indicates that the storage is full, a green light shows that there is adequate space for luggage, and a yellow light indicates that only small items such as clothes can be stored in the compartment (Tiu et al., 2016).
- **Smart Meal Service:** With technology improvements, the current trolley service could be replaced with a smart, or vending machine-style ordering system, in which passengers may select from a menu via an app and pick up their meals from the galley when ready. These in-flight vending machines can provide passengers with amenities such as travel pillows and headphones in addition to meals. (Romli et al,2016). A380 Super Jumbo offers a radio frequency identification tag solution through which passengers can order their meals a la carte via a seat-mounted touch screen and then pick up their orders properly heated at mealtime by inductive ovens. This new trend helps to facilitate and increase service efficiency, which improves passenger experience (Frank et al., 2016).

Since passenger satisfaction is critical to airlines, embracing smart technology in the airline industry can address all discomfort situations encountered by passengers during flights, thereby enhancing passenger comfort. A satisfied passenger conveys three to five other people about their good experience. Conversely, a dissatisfied passenger alerts seven to twenty other individuals about their bad experiences. As a result, a negative experience has a greater influence on an airline than a positive one, emphasizing the need to adopt new technologies to enhance passenger satisfaction (Bacinskas and Kempers,2020). Based on the literature review, the following hypotheses are proposed:

- H1:** Passenger satisfaction with current aircraft cabins in EgyptAir has a significant impact on passenger interest in using futuristic smart cabins.
- H2:** Passengers' interest in using futuristic smart cabins has a significant impact on enhancing their comfort.

Methodology

Sampling and Data Collection

The study employs a quantitative analysis. It is simply defined as "a statistical method used to obtain numerical data and hard facts, as well as, determine cause-and-effect relationships between two variables" (Sheard, 2018). A survey was chosen as the most effective quantitative research method. It allows the researchers to gather information and examine specific characteristics of a large population (Schneider and Harknett, 2022). The study employed a non-probability selective sampling technique in which the sample is selected based on the subjective judgment of the researcher when choosing members of a population to participate in the study instead of using random selection (Berndt,2020)

The target population of this sample is Egyptian frequent travelers who frequently fly with EgyptAir. An online questionnaire was designed and distributed on Egyptian frequent travelers in EgyptAir via social media platforms. Braun et al.(2021) highlighted that online questionnaires conducted through the Internet and using smartphones are becoming more popular due to advantages such as lower costs and widespread Internet access. Moreover, the respondent can complete the questionnaire at any time and in any location according to their convenience. A total of 311 valid surveys were collected and analyzed.

The Study Instrument

The survey scale used in the study is selected from previous literature (Shiwakoti et al., 2022; Heiets et al., 2022; Ninnemann et al., 2022; Efthymiou et al., 2021; Ahmadpour et al., 2016). It is composed of three sections that aimed at fulfilling the study objectives. The first section includes questions about socio-demographic variables (gender, age, and type of cabin class they frequently travel on; whether business, economy. In the second section of the questionnaire, passengers are asked to rate their degree of satisfaction with specific services in EgyptAir's aircraft cabin interior, including aircraft window glass, economy class seats, inflight entertainment screens,

overhead compartments, and meal service trolleys. The third section of the questionnaire comprises questions aimed at investigating passengers' perception toward using smart aircraft cabins in EgyptAir, and its impact on enhancing their comfort. The response is based on a five-point Likert scale agreement (1=strongly disagree, 5=strongly agree).

Data Analysis

Data gathered from respondents were analyzed using a variety of statistical tools. First, the convergent validity test was employed to assess how the scale correlates with other variables and measures of the same constructs. Second, Cronbach's alpha test was used to assess the questionnaire scale's internal consistency and reliability. Third, the study employs descriptive statistical analysis to provide a comprehensive summary of the sample. Finally, the study hypotheses were tested using simple linear regression analysis. The data were analyzed with SPSS version 26.

Results and Discussion

Demographic Profile

Results reflected in Table 1 show that the majority of respondents to this study are between the ages of 18 and 30 (55%) and are mostly males (53.1%). In terms of the type of class, the majority of respondents (71.7%) traveled in economy class, 25% traveled in both business and economy class, and 2.9% traveled in business class.

Parameter	Category	Frequency	Percentage
Age	18-30	171	55.0 %
	31-40	68	21.9 %
	41-50	49	15.8 %
	51-60	18	5.8 %
	61 +	5	1.6 %
Gender	Male	162	53.1%
	Female	148	47.65%
Type of Class	Business- class	9	2.9%
	Economy class	223	71.7%
	Both of them	79	25.4%

Convergent validity and reliability test

Convergent validity involves measuring a construct with independent measurement techniques and demonstrating a high correlation among the construct measures. Measurements of the same construct should be highly correlated and have a consistent pattern of intercorrelations. (Carlson Herdman,2012). Cheung et al. (2023) highlighted that convergent validity is established when the composite reliability value (CR) is 0.7 or higher and the value of the average variance extracted (AVE) and Cronbach's alpha are both greater than 0.5. In the current study, table 2 shows that the value of AVE > 0.5, the composite reliability, and Cronbach's alpha > 0.7. This indicates a high reliability of survey items.

Table 2: Analysis of convergent validity and composite reliability for passenger satisfaction with EgyptAir's current aircraft cabin interior

Aircraft cabin interior	AVE > 0.5	CR >0.7	Cronbach's α
Aircraft window glass (5 Items)	0.54	0.81	.831
Economy class seats (5 items)	0.51	0.80	.709
overhead compartment (4 items)	0.5	0.63	.820
Inflight entertainment system (4 items)	0.54	0.67	.749
Meal Service trolleys (5 items)	0.55	0.76	.824

C α : Cronbach's Alpha; CR: Composite reliability; AVE: Average variance extracted.

Passenger satisfaction with current aircraft cabin interior

Aircraft Window Glass

Results presented in Table 3 show that passengers' satisfaction with the current window glass was evaluated above the middle of the five-point agreement scale. Most of them prefer window seats (4.13). They consider windows to be a significant aspect of enjoying the view (4.28), as they book window seats to enjoy the view (4.05). The results indicated a high satisfaction rate with the aircraft window glass in EgyptAir (3.65). However, the majority of respondents reported a moderate rate regarding the sun's heat effect on their comfort while doing some activities such as reading, sleeping, etc. (3.4).

Table 3: Descriptive statistics of passenger satisfaction with EgyptAir's current aircraft window glass

Aircraft Window glass	Mean	Std.
On EgyptAir flights, I always prefer window seats when traveling.	4.13	0.885
On EgyptAir flights, I perceive the window as an important factor to enjoy the view outside the window.	4.28	0.832
On EgyptAir flights, I always book a window seat to enjoy the view outside the window.	4.05	0.994
On EgyptAir flights, the sun's heat does not drive me to close the window to block the sun's heat and light while enjoying the view outside the plane window.	3.55	1.07
On EgyptAir flights, the sun's heat from the plane window doesn't affect my comfort while doing some activities such as reading, relaxing, sleeping, and watching movies	3.4	1.12
On EgyptAir flights, I'm satisfied with the aircraft window glass	3.65	1.027

Economy Class Seats

Table 4 reveals that passengers consider seat comfort to be a significant aspect in improving the in-flight experience (4.13). Most respondents rated a moderate level of satisfaction with EgyptAir's economy class seats (3.12). Furthermore, they demonstrated a low degree of comfort when the neighbor passengers reclined their seats (2.66).

Table 4: Descriptive statistics of passenger satisfaction with economy class seats

Economy class seats	Mean	Std
On EgyptAir flights, seat comfort improves my in-flight experience.	4.13	0.929
On EgyptAir flights, I don't feel restricted when passenger recline their seats.	2.66	1.147
On EgyptAir flights, I can easily adopt a comfortable sitting posture.	3.29	1.019
On EgyptAir flights, reclining my seat doesn't bother the passenger behind me.	2.8	0.999
On EgyptAir flights, I'm satisfied with economy class seats.	3.12	1.062

Inflight Entertainment screens

Findings in Table 5 indicate that the majority of passengers show a high level of satisfaction with the quality and clarity of the current in-flight entertainment screens in EgyptAir (3.58). It improves the inflight passenger experience (4.12); it reduces psychological stress (3.88).

Table 5: Descriptive statistics of passenger satisfaction with Egypt Air's current inflight entertainment screens

In-flight entertainment screens	Mean	Std
On EgyptAir flights, the inflight entertainment system improves my travel experience.	4.12	0.857
On EgyptAir flights, the Inflight entertainment system reduces my psychological stress,	3.88	0.869
On EgyptAir flights, I'm satisfied with the quality of the inflight entertainment screens	3.58	1

Overhead Compartments

Passengers showed a high level of satisfaction with the current overhead compartments in Egypt Air (3.35). They can easily identify the available space in the overhead compartment (3.51). However, most respondents reported a low rate of no aisle congestion caused by passengers checking for available space in the overhead compartments (2.79) (table 6).

Table 6: Descriptive statistics of passenger satisfaction with Egypt Air's current overhead compartment

Overhead compartment	Mean	Std
On EgyptAir flights, I can easily identify the available space in the overhead compartment.	3.51	0.97
On EgyptAir flights, checking for available space in the overhead compartment doesn't consume time and effort.	3.39	0.97
On EgyptAir flights, checking for available space in the overhead compartment doesn't cause congestion in the aisle during boarding.	2.79	1.111
On EgyptAir flights, I'm satisfied with the overhead compartment.	3.35	0.971

Meal Service Trolleys

Table 7 reveals that the majority of respondents recorded a high satisfaction rate with the current meal service trolleys in EgyptAir (3.48). It doesn't bother them during flights (3.57). They don't feel annoyed when a crew member wakes them and asks about their meal choice (3.56). However, they recorded a moderate rate regarding their feeling of restricting themselves to walking in the aisle during service time (3.15), and meal serving time suits their needs (3.6).

Table 7: Descriptive statistics of passenger satisfaction with meal service trolley

Meal service trolleys	Mean	Std
On EgyptAir flights, Meal service trolleys don't restrict me to walk in the aisle or use the lavatory during service time.	3.15	1.09
On EgyptAir flights, Meal service trolleys don't bother me during flights.	3.57	0.994
On EgyptAir flights, I don't feel annoyed when a crew member wakes me up asking for my meal choice.	3.56	1.07
On EgyptAir flights, Meal serving time always suits my desire.	3.6	0.899
On EgyptAir flights, I'm satisfied with the meal service.	3.55	0.949

Passenger Perception Toward smart cabins

According to the findings in Table 8, the majority of passengers consider aircraft cabin digitization to be an essential aspect of improving their in-flight experience (4.09). Students reported that they will choose airlines with digitalized cabins over airlines with traditional aircraft cabins (3.99). This suggests that airlines that use digital cabins will have a competitive edge over airlines that use traditional aircraft cabins.

Table 8: Descriptive statistics of passenger perception toward smart aircraft cabins in EgyptAir

Smart Aircraft cabin	Mean	Std.
Smart aircraft cabin will enhance my comfort during the flight.	4.09	0.79
I will be attracted to the airlines with smart aircraft cabins over airlines with traditional ones.	3.99	0.859

Hypotheses testing

Table 9 shows the value of the standardized coefficient, their significance level, and the support for the acceptance of the hypotheses. The results for hypothesis 1 show that passengers' satisfaction with EgyptAir's current cabins has no significant impact on their interest in using EgyptAir's futuristic smart cabins ($\beta=.032$, $P=.572$). As a result, hypothesis 1. is rejected.

Table 9: Results of the regression model to test the Hypotheses.

Hypotheses	Path directions	standardized coefficient	Standard errors	T statistics	P values	Result
H1	PS of current cabins → perception of futuristic SC	.032	.032	.566	.572	Not supported
H2	PI in SC → enhances PAX comfort	.828	.035	25.954	.000	supported

PS: passenger satisfaction; SC: smart cabin; PI: passenger interest; PAX: passenger.

However, the results show that passengers' interest in using smart cabins has a significant impact on enhancing their comfort. The value of the standardized coefficient is .828 at sig = .000. This indicates that smart aircraft cabins will contribute to enhancing passenger comfort. Therefore, hypothesis 2 is supported.

Discussion

The findings of the study showed that Egyptian frequent travelers in EgyptAir are satisfied with the current Egypt Air aircraft cabin interior including, window glass, quality and clarity of inflight entertainment screens, overhead compartments, and smart service trolleys: However, they highlighted some discomfort issues that affect their convenience during flight. First, the negative influence of the sun's heat and light on passengers' ability to do some activities during the flight. It affects their visual comfort to the extent that passengers might be forced to close the window to avoid its harmful impact, even though they want to enjoy the scenic view outside the window. This result is consistent with Yang et al. (2020) who found that solar radiation is one of the significant causes of passengers' thermal discomfort. Second, the majority of passengers showed a low degree of comfort with economy class seats in EgyptAir. They reported the sense of feeling restricted due to insufficient legroom, particularly when neighbor passengers recline their seats. This finding supports research conducted by Anjani et al. (2020), who showed a significant relationship between seat pitch and passenger comfort. As well as a high correlation between legroom and passenger comfort.

Third, aisle congestion during aircraft boarding is due to time spent by passengers checking for available space in the overhead compartments to store their carry-on luggage, which leads to passenger inconvenience and a delay in departure. Finally, another critical issue that negatively influences passengers' comfort during flights is smart meal service trolleys. The majority of passengers reported feeling restricted from walking in the aisle or using the lavatory during service time, which increased their sense of discomfort during the flight.

Employing futuristic smart cabins provides smart solutions to all challenges and discomfort issues that affect passengers' convenience during the flight to enhance their satisfaction. However, the results of the study revealed that passengers' satisfaction with current aircraft cabins in EgyptAir has no significant impact on passengers' interest in using the futuristic smart cabins. This finding could be explained by the fact that passengers who haven't experienced smart cabins have less knowledge about the potential use of these futuristic smart solutions in EgyptAir aircraft cabins, which could lead to perceptions of higher satisfaction with EgyptAir's current aircraft cabins.

In other words, when passengers encounter the futuristic smart cabin and observe how it improves their in-flight travel experience by providing a more comfortable and convenient environment during flight, their perception of Egypt Air's current aircraft cabins may be less satisfactory or unsatisfactory. Evidence for this is that when the passengers were informed in the third part of the questionnaire about the smart cabin, its functions, and how it addresses discomfort issues reported by passengers during flight, they showed a high level of interest in using the smart cabin and its significant impact on enhancing their comfort. This finding confirmed a previous article by Martin-Domingo & Martín (2016) who found a positive correlation between employing smart cabins and passenger satisfaction. In addition, Heiets et al., (2022) found that passengers have a positive attitude toward smart aircraft cabins.

Conclusion and managerial implications

The current study aims to evaluate passenger satisfaction with the current aircraft cabin interior in EgyptAir and investigate some of the discomfort issues that negatively influence passenger satisfaction and affect their comfort during the flight. Besides, evaluating passengers' interest in using a futuristic smart cabin to address their discomfort issues and its impact on enhancing their comfort during the flight.

The findings reveal that passengers perceive aircraft window glass as an important factor in enjoying the view during flight. However, they reported that it is a primary source of heat and light which leads to visual discomfort; hence, aircraft manufacturers should apply smart electronic window glass to all aircraft types to allow passengers to control the shade while preserving the view outside, accordingly enhancing their comfort. Moreover, the majority of passengers showed a high degree of discomfort regarding the economy class seats in EgyptAir due to the insufficient legroom which provides them with a sense of feeling restricted in their personal space. To address this issue, EgyptAir must develop its seat design by providing passengers with extra reclining and more legroom.

Another important suggestion is introducing intelligent seats in the cabin to allow passengers to monitor and control their seat conditions by using their phones. Another critical issue reported by passengers in the study is the time spent by passengers finding available space in overhead compartments to store their luggage, which leads to aisle

congestion and departure delay. Therefore, aircraft manufacturers must embrace smart overhead compartments with sensors that provide a clear visual indication of available space faster and easier. This results in reduced aisle congestion, speedy boarding, and passenger convenience.

Meal trolleys in aircraft are a primitive and impractical way of serving many passengers during each flight. It prevents passengers from walking in the aisle or using the lavatory during service time; therefore, passengers have to wait until the service time ends so that they can move in the aisle, which causes a feeling of restriction and discomfort. Thus, the study emphasizes the importance of applying smart meal service in Egypt Air's aircraft cabins instead of trolleys. Since it facilitates and increases service efficiency by allowing passengers to select their meal from the menu on an app or via inflight entertainment screens and pick up their orders from the galley when prepared. EgyptAir must collaborate with leading IT companies in the aviation sector to develop its digital services. Finally, EgyptAir must upgrade and renew its fleet with smart aircraft cabins to attract more passengers and gain a competitive advantage in a highly competitive market.

Limitations and further studies

The current study focused on specific components in EgyptAir aircraft cabins that influence passengers' comfort during the flight. Egyptian frequent passengers on EgyptAir were asked to evaluate their level of satisfaction with specific components in the aircraft cabin. These components include window glass, economy class seats, inflight entertainment screens, overhead compartments, and meal service trolleys. The current study also sheds light on some discomfort issues encountered by passengers during the flight that negatively affect their convenience and comfortability.

Despite the limitations, the study is significant, and the research conducted contributes to providing some suggested smart solutions to address discomfort issues and challenges faced by passengers during their flights with EgyptAir. This includes employing smart dimmable windows, smart overhead compartments with sensors, intelligent seats, and smart services to enhance passenger satisfaction and comfort during the flight.

A future line of research would be to explore some other factors that influence passengers' comfort in the aircraft during flight, such as quality of service, smell, aesthetics, vibration, etc. It would be interesting to examine how these factors affect passenger comfort and satisfaction during flight. It may also be necessary to investigate some other smart solutions that will contribute to enhancing passenger comfort and satisfaction, such as 3D printing, self-cleaning lavatories, ultraviolet UV cleaning technology, an automation concept for the individualization of inflight meals through pre-ordering, etc.

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تقييم رضا المسافرين عن المقصورة الداخلية لطائرات مصر للطيران

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المقدمة:

يعتمد اختيار المسافر لشركات الطيران على مستوى رضاهم وشعورهم بالراحة في مقصورة الطائرة. لذلك، تعمل شركات الطيران على تطوير المقصورة الداخلية للطائرة لتعزيز راحة المسافر والحصول على ميزة تنافسية في الأسواق شديدة التنافس. الهدف من الدراسة الحالية هو تقييم رضا المسافرين عن المقصورة الداخلية الحالية في مصر للطيران والتعرف على العوامل التي تؤدي إلى انزعاج المسافرين وتؤثر على راحته داخل مقصورة الطائرة. علاوة على ذلك، اكتشاف انطباع المسافرين عن "المقصورة الذكية" في معالجة مشكلاتهم التي تؤثر على راحتهم اثناء الرحلة وتأثيرها على تعزيز راحتهم. لتحقيق أهداف الدراسة، تم توزيع استطلاع عبر الإنترنت على المسافرين المصريين الدائمين على مصر للطيران. تم جمع وتحليل عدد 311 دراسة استقصائية صالحة . وقد توصلت الدراسة الي عدد من التوصيات ومنها:

- يجب على مصر للطيران تحديث أسطول طائراتها بخدمات رقمية وشراء طائرات ذات مقصورات ذكية لجذب المزيد من الركاب واكتساب ميزة تنافسية في سوق شديد التنافسية.
- يجب على مصنعي الطائرات تطبيق زجاج النوافذ الإلكتروني الذكي على جميع أنواع الطائرات للسماح للركاب بالتحكم في الظل مع الحفاظ على المنظر الخارجي، وبالتالي تعزيز راحة المسافرين اثناء الرحلة
- يجب تطبيق المقاعد ذكية في مقصورة الطائرة للسماح للركاب بمراقبة والتحكم في مقاعدهم باستخدام هواتفهم.
- يجب علي مصنعي الطائرات ان يقوموا بتطبيق الخزائن العلوية ذكية المزودة بأجهزة الاستشعار والتي توفر مؤشراً مرئياً واضحاً للمساحة المتاحة بشكل أسرع وأسهل
- يجب تطبيق خدمة الوجبات الذكية في مقصورة طائرات مصر للطيران بدلاً من عربات تقديم الوجبات. نظراً لأنه يسهل ويزيد من كفاءة الخدمة من خلال السماح للركاب باختيار وجبتهم من القائمة الموجودة في أحد التطبيقات أو عبر شاشات الترفيه على متن الطائرة.