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# Assessing the Impact of Technostress on EgyptAir Passenger Satisfaction

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## ABSTRACT

The airline industry's growing reliance on digital technologies makes it vital to assess their impact on passenger experience. EgyptAir's digital services-like mobile apps and kiosks-offer convenience but may also cause psychological strain. Recognizing and managing technostress is essential to maintaining customer satisfaction. This research aims to assess the impact of technostress on passenger satisfaction with EgyptAir. To achieve that, this research used the descriptive analytical approach. The research adopts a quantitative approach through a structured questionnaire distributed to a sample of 385 passengers. The findings indicate that passengers experienced varying levels of technostress, particularly in the areas of digital overload, complexity, and privacy concerns. These pressures appeared to affect passengers' ability to navigate the digital journey with ease. At the same time, passengers expressed generally positive attitudes toward EgyptAir's support systems, particularly among younger individuals and those with higher digital proficiency. Age, educational level, and prior experience with digital tools were found to influence the degree of technostress and satisfaction reported. Based on the study findings, key recommendations include developing national guidelines for digital passenger experience and launching public digital literacy campaigns through the Ministry of Civil Aviation. EgyptAir is advised to simplify its digital interfaces, adopt a hybrid service model, and enhance transparency regarding data use. Strengthening technical support and providing multimedia guidance are essential to ease passengers' interaction with digital tools. Finally, integrating technostress indicators into feedback systems will help monitor and improve digital service effectiveness.

## KEYWORDS

Airline Technology, Digital Proficiency, EgyptAir, Passenger Satisfaction, Technostress.

# تقييم تأثير الضغوطات التكنولوجية على رضا ركاب مصر للطيران

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**الملخص**

تزايد اعتماد صناعة الطيران على التقنيات الرقمية يجعل من الضروري تقييم تأثير هذه التقنيات على تجربة المسافرين، وتقدم مصر للطيران خدمات رقمية مثل تطبيقات الهواتف والأكشاك الإلكترونية تُسهم في تسهيل الرحلة، لكنها قد تتسبب أيضًا في ضغوط نفسية، ويُعدّ التعرف على هذه الضغوط وإدارتها أمرًا أساسيًا للحفاظ على رضا العملاء، وتهدف هذه الدراسة إلى تقييم تأثير الضغوط التكنولوجية على رضا المسافرين في مصر للطيران، وقد استخدم لذلك المنهج الوصفي التحليلي، وتم اعتماد النهج الكمي من خلال استبيان منظم وُزّع على عينة مكونة من 385 راكبًا. أظهرت النتائج أن الركاب يعانون من مستويات متفاوتة من الضغوط التكنولوجية، خصوصًا فيما يتعلق بفرط الاستخدام، وتعقيد الإجراءات الرقمية، والقلق المرتبط بالخصوصية، وقد أثرت هذه الضغوط على قدرة الركاب في التنقل بسهولة ضمن الرحلة الرقمية، ومع ذلك، أبدى العديد من الركاب مواقف إيجابية تجاه أنظمة الدعم المقدمة من مصر للطيران، خاصة بين الشباب والأشخاص ذوي الكفاءة الرقمية العالية، كما تبيّن أن العمر، والمستوى التعليمي، والخبرة السابقة في استخدام الأدوات الرقمية عوامل تؤثر في مستوى الضغوط التكنولوجية والرضا. وبناءً على نتائج الدراسة، تتمثل التوصيات الرئيسة في: وضع إرشادات وطنية لتحسين تجربة المسافر الرقمية، وإطلاق حملات توعية لرفع الوعي الرقمي بالتعاون مع وزارة الطيران المدني، كما يُنصح مصر للطيران بتبسيط واجهاتها الرقمية، وتطبيق نموذج خدمة هجين، وتعزيز الشفافية فيما يتعلق باستخدام البيانات، ومن المهم كذلك تقوية الدعم الفني، وتوفير مواد إرشادية مرئية لتسهيل تفاعل الركاب مع الأدوات الرقمية، بالإضافة إلى دمج مؤشرات قياس الضغوط التكنولوجية في أنظمة تقييم رضا المسافرين لمراقبة وتحسين جودة الخدمات الرقمية باستمرار.

**الكلمات الدالة**

تكنولوجيا الخطوط الجوية، الكفاءة الرقمية، مصر للطيران، رضا الركاب، الضغوط التكنولوجية.

# 1. Introduction

The aviation industry has undergone a significant digital transformation in recent years, with airlines like EgyptAir adopting technologies such as online booking platforms, mobile applications, and self-service kiosks to improve operational efficiency and enhance passenger satisfaction. These advancements aim to streamline the travel process and cater to the expectations of increasingly tech-savvy travelers. However, the success of these technologies depends on their usability across diverse passenger segments, including those less familiar with digital tools (Khalaf et al., 2022). EgyptAir's mobile application, for instance, has received positive feedback for offering convenient features like mobile check-in and real-time updates. Nonetheless, passengers' ability to effectively use these tools varies, and those with limited digital literacy may struggle with their functionalities (Abdel Moghny et al., 2024). In addition, EgyptAir has implemented Chatbot systems to automate customer service interactions and reduce response times. While this AI-driven support enhances accessibility for some users, it may present barriers to others, particularly those unaccustomed to conversational interfaces (Abdel Rady, 2023).

Despite these technological improvements, the accelerated digitization of airline services has introduced new psychological challenges, especially for passengers who lack confidence in using such systems. One key issue is technostress—a form of stress resulting from interaction with digital technologies—which manifests as anxiety, information overload, and cognitive fatigue. This phenomenon is particularly pronounced among older passengers and those with limited experience in navigating digital platforms (Alam, 2016). Research has increasingly indicated that technostress can undermine the overall travel experience and reduce satisfaction levels. For example, passengers who face difficulty using digital check-in or boarding systems may experience frustration, decreased trust, and reluctance to engage with automated services in the future (Shiwakoti et al., 2022). These negative experiences underscore the need to examine how digital transformation affects different demographic groups within EgyptAir's customer base. Furthermore, understanding the relationship between technostress and passenger satisfaction is essential for guiding EgyptAir's future technology strategies. While digitalization offers clear benefits, failing to account for passengers' varying digital competencies risks alienating certain users. Therefore, a more inclusive approach to digital service design is required—one that balances innovation with accessibility.

## 1.1 Research Problem

In light of the rapid digital transformation within the aviation industry, airlines-including EgyptAir- have adopted a range of advanced technologies such as online booking systems, mobile applications, and self-service kiosks to enhance operational efficiency and improve passenger satisfaction. However, this growing reliance on digital platforms has introduced new psychological and behavioral challenges for certain passenger segments, particularly in the form of –technostress- a modern stress phenomenon associated with the use of and interaction with technology. Technostress can manifest as anxiety, confusion, cognitive fatigue, or a sense of inadequacy, especially among passengers with limited digital literacy, such as older adults or those unfamiliar with technological systems. Since passenger satisfaction is a key metric for evaluating service quality in the airline industry, there is a pressing need to investigate

the extent to which technostress affects the travel experience and satisfaction levels of EgyptAir passengers.

Accordingly, this study seeks to explore the dimensions and sources of technostress within EgyptAir's digital ecosystem, assess its impact on passenger satisfaction across different travel stages, and examine the demographic differences in technostress experiences. Ultimately, this research aims to generate actionable insights that could help EgyptAir mitigate technostress and enhance the overall passenger experience.

### 1.2 Research Objectives

- To identify the main sources of technostress experienced by EgyptAir passengers.
- To examine the relationship between technostress levels and passenger satisfaction.
- To assess how technostress affects the overall travel experience, including check-in, boarding, and in-flight services.
- To analyze demographic differences (e.g., age, gender, tech proficiency) in how passengers experience technostress.
- To propose recommendations for minimizing technostress and improving passenger experience.
- To evaluate the role of EgyptAir's digital services (e.g., mobile app, self-check-in kiosks, website) in contributing to or reducing technostress among passengers.

### 1.3 Research questions

1. What are the main sources of technostress among EgyptAir passengers?
2. How does technostress influence passenger satisfaction with EgyptAir services?
3. In which stage of the travel experience (e.g., booking, check-in, boarding, in-flight) is technostress most evident?
4. Are there significant differences in technostress levels based on passenger demographics such as age, gender, or digital literacy?
5. How do EgyptAir's digital platforms (e.g., mobile app, website, kiosks) contribute to or alleviate technostress?

What strategies can be implemented by EgyptAir to reduce technostress and enhance the passenger experience?

## 2 Literature review

### 2.1. Technostress Concept

Technostress is a modern form of stress arising from the use of new technologies, particularly in professional and academic environments. The term was first introduced by Craig Brod (1984, p6), who defined it as "a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy manner". Since then, the definition has expanded to encompass a broader spectrum of psychological strain induced by excessive use or constant reliance on digital tools. It includes feelings of anxiety, mental fatigue, information overload, and the inability to disconnect from work-related technology (Tarafdar et al., 2007). Technostress for airline passengers refers to the psychological discomfort, anxiety, or cognitive strain caused by interactions with technological systems during the air travel experience.

These may include self-service kiosks, biometric check-ins, mobile boarding passes, in-flight entertainment systems, and airline apps for booking, rebooking, and updates. As air travel becomes increasingly digitized, passengers are expected to interact with various technologies that can induce stress, especially when they are unfamiliar, unreliable, or complex to use. Technostress in this context may stem from a lack of digital literacy, fear of making errors, concerns about privacy, or frustration with system malfunctions (Tarafdar et al., 2015; Fischer and Riedl, 2017).

Technostress among EgyptAir passengers refers to the psychological strain, confusion, or anxiety experienced due to the digital transformation of the airline's passenger services. With the increased use of automated booking systems, online check-in portals, biometric gates, mobile boarding passes, and customer service Chatbot's, EgyptAir—like many other international carriers—has embraced digitalization in its operations (Ministry of Civil Aviation, Egypt, 2022; IATA, 2023). While these innovations are intended to enhance efficiency and passenger satisfaction, they may have the opposite effect on certain user segments, particularly the elderly, less digitally literate travelers, or those lacking trust in online systems. These passengers may experience frustration, anxiety, or information overload when interacting with these technologies, especially when support is insufficient or systems fail (Tarafdar et al., 2015).

## 2.2. Dimensions of Technostress

Technostress among airline passengers can be broken down into several dimensions that reflect the specific stressors they face when using technology during their journey. The following are key dimensions of technostress that have been identified or observed in the context of airline passengers, based on academic and applied research in aviation and travel technology:

### 2.2.1. Techno-Overload

Passengers are often required to manage multiple digital tasks, such as online check-in, downloading boarding passes, using flight-tracking apps, and responding to updates or cancellations. This multitasking, especially under time pressure, can cause stress and confusion. Airline passengers are increasingly required to manage their travel through airline mobile app or website-checking flight status, issuing boarding passes, and navigating real-time updates. During peak seasons or disruptions, this increased digital workload can result in cognitive overload and anxiety (Abdel Rady, 2023).

### 2.2.2. Techno-Invasion

Passengers frequently receive mobile notifications, email alerts, or SMS updates regarding flight changes, gate information, and promotional offers. While these communications aim to enhance the travel experience, their constant nature can lead to "techno-invasion", a phenomenon where individuals feel their personal time is intruded upon by technology, resulting in stress and reduced well-being (Tarafdar et al., 2007). In the context of air travel, this continuous stream of information can make passengers feel perpetually connected to the travel process, hindering their ability to relax and disconnect during their journey. Research indicates that while real-time updates are valued by passengers, the excessive frequency and intrusiveness of these notifications can contribute to anxiety and a sense of being overwhelmed (Pielot and Rello, 2016). Moreover, the expectation for immediate responsiveness can exacerbate

stress levels, as passengers may feel compelled to constantly monitor their devices for updates, even during periods meant for rest or leisure (Ayyagari et al., 2011).

### 2.2.3. Techno-Complexity

Some passengers-especially elderly travelers or those unfamiliar with digital tools-may struggle to navigate airline self-check-in kiosks, mobile app, or website. Reports have noted usability challenges and a need for more accessible user interfaces. This complexity can induce feelings of inadequacy and stress. Research indicates that older adults often face difficulties when interacting with digital interfaces due to age-related declines in cognitive and motor abilities. For instance, a systematic review highlighted that many mobile applications lack design considerations tailored to the elderly, leading to usability challenges (Salman et al., 2018). Additionally, studies have shown that unfamiliarity with self-service technologies, such as airport check-in kiosks, can result in confusion and operational errors among users with limited experience (Yang and Zheng, 2019).

### 2.2.4. Techno-Insecurity

There is growing concern among airline passengers regarding data privacy and security, particularly with the use of biometric data and personal information in online booking and check-in processes. Travelers may feel insecure or skeptical about how their data is stored and used. Research indicates that while biometric technologies can streamline airport procedures, they also raise significant privacy concerns. For instance, a study by Ives and Etter (2018) discusses the potential risks associated with biometric data breaches, emphasizing the need for robust data protection measures. Additionally, Cavoukian (2012) highlights the importance of embedding privacy into the design of biometric systems to mitigate potential misuse of personal information.

### 2.2.5. E. Techno-Uncertainty

Frequent updates to airline digital systems, changes in app layout, or inconsistent system performance-especially during system maintenance-can create uncertainty for passengers. This dimension of technostress is heightened when passengers are unfamiliar with new updates or lack proper guidance from staff. A study by Khalaf et al. (2022) highlights that passengers often face obstacles when interacting with EgyptAir's digital platforms, such as automated kiosks and mobile applications. The research indicates a significant correlation between these digital transformation challenges and passengers' preference for traditional service methods, suggesting that unfamiliarity with new digital tools can lead to discomfort and stress. Furthermore, Abdel Rady (2023) emphasizes the importance of user-friendly interfaces and staff training in enhancing passenger satisfaction with airline mobile applications. The study recommends that airlines should not only focus on technological advancements but also ensure that passengers are adequately supported during transitions to new digital systems.

In summary, it is clear that the dimensions of technostress experienced by airline passengers represent real challenges that significantly impact their digital and emotional travel experience. From the overload of managing multiple digital tasks, to the intrusion of constant notifications, the complexity of unfamiliar interfaces, concerns about data privacy, and the uncertainty caused by frequent system updates-these factors create a travel environment marked by stress and discomfort, particularly for those with limited digital literacy or inadequate support. Understanding these

dimensions is not only essential for diagnosing the problem but also serves as a critical step toward designing more human-centered solutions that accommodate diverse passenger needs and reduce the psychological toll of technology in the tourism and aviation sectors.

### 2.3. Strategies to Reduce Technostress in EgyptAir Company

#### 2.3.1. User-Centered Design

User-centered design (UCD) emphasizes creating digital interfaces that are intuitive and align with users' needs, thereby reducing cognitive overload. In the airline industry, complex systems can lead to technostress among passengers and employees. Simplifying these systems through UCD can enhance usability and reduce stress levels (Tarafdar et al., 2007). For EgyptAir, implementing UCD principles can involve redesigning their website and mobile applications to ensure ease of navigation and clarity of information. By conducting user testing and gathering feedback, EgyptAir can identify pain points in their digital platforms and make necessary adjustments to improve the user experience, thereby reducing technostress.

#### 2.3.2. Hybrid Service Model

A hybrid service model combines digital tools with human support, offering flexibility to users who may prefer personal interaction over automated systems. This approach can alleviate technostress by providing alternatives to fully digital interfaces, catering to diverse user preferences (Alam, 2016). EgyptAir can adopt a hybrid model by maintaining staffed check-in counters alongside self-service kiosks and online check-in options. Additionally, providing customer service representatives to assist with digital tools can help passengers who are less comfortable with technology, thereby reducing anxiety and technostress.

#### 2.3.3. Digital Literacy Initiatives

Enhancing digital literacy among passengers and employees can reduce technostress by increasing confidence and competence in using digital tools. Training programs and educational resources can empower users to navigate digital systems effectively (Tarafdar et al., 2015). EgyptAir can implement digital literacy initiatives by offering tutorials, workshops, and informational materials that guide users through their digital platforms. By proactively educating users, EgyptAir can minimize confusion and frustration associated with technology use, thereby mitigating technostress.

#### 2.3.4. Responsive and Stable Digital Systems

Reliable and efficient digital systems are crucial in minimizing technostress. System errors, slow response times, and frequent downtimes can lead to user frustration and decreased productivity (Ayyagari et al., 2011). EgyptAir should prioritize the development and maintenance of responsive digital platforms. Regular system updates, performance monitoring, and prompt technical support can ensure that digital tools function smoothly, thereby reducing the likelihood of technostress among users.

#### 2.3.5. Feedback-Based System Improvement

Incorporating user feedback into system design and updates can lead to more user-friendly digital tools, thereby reducing technostress. Continuous improvement based on real user experiences ensures that systems evolve to meet user needs effectively (Tarafdar et al., 2015). EgyptAir can establish feedback mechanisms such as surveys, user testing sessions, and feedback forms to gather insights from passengers and employees. By analyzing this feedback and implementing changes accordingly,

EgyptAir can enhance their digital platforms, leading to reduced technostress and improved user satisfaction.

### 2.4. EgyptAir's Technological Applications

EgyptAir serves as a particularly relevant case for this investigation, given its status as the national airline of Egypt and one of the oldest carriers in the Middle east and Africa. The company has undergone significant digital transformation in recent years, including the adoption of mobile applications, online check-in, digital boarding passes, and self-service kiosks. With over 10 million passengers served in 2024 alone, EgyptAir operates a wide range of domestic and international routes, providing a large and diverse sample for analysis. Its ongoing modernization efforts and strategic role in the region make it an ideal model for studying the relationship between technostress and passenger satisfaction in the context of digital aviation services. As part of its broader digital transformation strategy, EgyptAir has implemented a variety of technological solutions designed to improve both operational efficiency and passenger satisfaction. Key innovations include its official website, a user-friendly mobile application, and self-service kiosks available at airports. Together, these tools streamline the travel process, reduce reliance on traditional service counters, and offer passengers greater flexibility and convenience throughout their journey (Ministry of Civil Aviation, 2025; Abdel Moghny et al., 2024).

#### 2.4.1. EgyptAir's Official Website

EgyptAir's official website (www.egyptair.com) offers comprehensive services, including flight booking, check-in, and flight status updates. The website aims to provide seamless user experience, reducing the need for in-person interactions and streamlining travel procedures (Khallaf et al., 2022). The author found also a significant positive correlation between passengers' attitudes toward digital flight practices and their perceived value of the digital flight experience. The study emphasized the importance of enhancing passenger awareness and promoting self-service techniques through digital platforms. Furthermore, a study by Abdelaziz et al. (2010) highlighted the relevance and impact of self-service technology on consumers, particularly in the context of airline check-in procedures. The research underscored the benefits of digital platforms in improving efficiency and customer satisfaction.

#### 2.4.2. EgyptAir Mobile Application

EgyptAir's mobile application empowers passengers to book flights, manage reservations, and check in via their smartphones, enhancing accessibility and convenience in line with the growing demand for mobile-based services in the airline industry. Khallaf et al. (2022) emphasized that end-to-end digital techniques, including mobile applications, contribute to a seamless passenger experience. Their research recommended that EgyptAir intensify awareness of digital practices and promote self-service techniques through its digital platforms. Further supporting this, Abdel Moghny et al. (2024) conducted a quantitative study involving 384 EgyptAir passengers. The study revealed a strong positive correlation between the use of airline mobile applications and passenger satisfaction. The researchers highlighted the application's flexibility, ease of use, and availability as key factors enhancing the passenger experience. They recommended that EgyptAir continue to develop its mobile application, promote it through various channels, and provide staff training to maximize its benefits.

### 2.4.3. Self-Service Kiosks

EgyptAir has introduced self-service kiosks at various airports, enabling passengers to check in, select seats, and print boarding passes without assistance. These kiosks aim to reduce wait times and improve the overall efficiency of airport operations (Khallaf et al., 2022). The author reported that automated kiosks are among the digital practices positively influencing passenger experience. The study found a significant positive correlation between the use of automated kiosks and the perceived value of the digital flight experience. Moreover, Abdelaziz et al. (2010) emphasized the benefits of self-service technologies in airports, noting their role in enhancing operational efficiency and passenger satisfaction.

## 3 Research Methodology

### 3.1. Research Design

This study employs a quantitative research design to assess the impact of technostress on passenger satisfaction in the context of EgyptAir. The study focuses on EgyptAir, the national carrier of Egypt, which serves a high volume of both domestic and international passengers. EgyptAir's digital transformation strategy includes the use of various technologies such as mobile applications, self-service kiosks, online check-in, and digital notifications. As these technologies have become a standard part of the travel experience, evaluating their psychological impact on passengers is increasingly important.

### 3.2. Data Collection

The questionnaire was designed and distributed using Google Forms. It was shared with EgyptAir passengers through online travel groups, digital communities, and social media platforms. A brief introduction was provided at the beginning of the questionnaire to explain the purpose of the study and ensure participants' informed consent. Respondents were assured that their participation was voluntary and that all responses would remain confidential and anonymous. The online format was selected to maximize accessibility and reach a broader audience who had experience with EgyptAir's digital systems from 4 March to 13 April 2025.

### 3.3. Sampling Method

A non-probability convenience sampling method was adopted for this study, as it allowed for easy access to respondents who had experience with EgyptAir's digital systems. The target population includes passengers who traveled with EgyptAir during the year 2024. According to EgyptAir's operational statistics, the airline transported approximately 10.289 million passengers in 2024 (Ministry of Civil Aviation, 2025). The researchers was used Stephen K. Thompson's equation to calculate the sample size; a sample size of 385 was determined as statistically representative with a 95% confidence level and a 5% margin of error. Due to the practical limitations of contacting passengers randomly, the survey was distributed via online platforms, EgyptAir-related forums, social media, and travel communities. Participants were selected based on their availability and willingness to respond, with efforts made to include passengers of different ages, travel frequencies, nationalities, and digital skill levels.

### 3.4. Questionnaire Design and Measure

The questionnaire was developed based on a thorough review of academic literature on technostress and digital service experiences in the airline industry. It was carefully structured to capture a comprehensive understanding of how EgyptAir's digital environment affects passenger satisfaction, particularly under conditions of technostress. The questionnaire consists of four main sections:

- **The first section** includes demographic information such as gender, age, educational level, travel frequency, travel purpose, level of digital proficiency, the type of digital services used, and the devices commonly used to access those services. This background information helps in segmenting the data and understanding differences across demographic groups.
- **The second section** explores passengers' experience of technostress, with items measuring five key dimensions: techno-overload (e.g., completing many digital procedures), techno-invasion (e.g., excessive connectivity and data sharing), techno-complexity (e.g., challenges with login procedures and kiosks), techno-insecurity (e.g., fear of making mistakes or losing data), and techno-uncertainty (e.g., app updates and information changes). This section evaluates the psychological pressures passengers face when interacting with EgyptAir's digital services. The section items were developed based on established models and scales proposed by Tarafdar et al. (2007, 2015) and Fischer and Riedl (2017).
- **The third section** assesses EgyptAir's strategies for reducing technostress and the perceived usability of its digital systems. It includes questions related to training and guidance, technical support availability, ease of use of digital tools such as the mobile app and self-service kiosks, effectiveness of communication, and the strength of privacy and data security policies. It also examines the flexibility offered by allowing passengers to choose between digital and in-person service channels. The development of the research instrument was informed by the models of technostress and digital experience outlined in Tarafdar et al. (2015) and contextualized through the findings of Khallaf et al. (2022).
- **The fourth section** measures passenger satisfaction with EgyptAir’s digital experience. Respondents evaluate how technology has contributed to convenience, comfort, trust, problem-solving, and overall satisfaction during their travel. This section aims to determine whether positive digital experiences mitigate the negative effects of technostress. This section was developed based on themes and variables identified in previous studies by Yang and Zheng (2019), Shiwakoti et al. (2022), and Abdel Moghny et al. (2024), particularly those related to usability, digital stressors, and satisfaction outcomes.

All statements were assessed using a five-point Likert scale ranging from “Strongly Disagree” to “Strongly Agree,” allowing for nuanced responses and detailed quantitative analysis.

### 3.5. Data Validity and Reliability

According to Surucu (2020) the concepts of validity and reliability are closely related but describe different characteristics of measuring instruments. In order to minimize the probability of having the response, it is important to pay attention to two basic

aspects of research design: validity and reliability (Ezzat, 2013). Gamal (2018) claimed that the reliability and validity of the researchers' results were important to their research's credibility and performance.

**Table (1) Cronbach's Alpha Value**

| Section | Dimension | No. of items | Cronbach 's Alpha | Validity Coefficient * |
|---|---|---|---|---|
| **Passengers' experience of technostress** | Dimension 1: Techno-Overload | 5 | 0.841 | 0.917 |
| | Dimension 2: Techno-Invasion | 3 | 0.747 | 0.864 |
| | Dimension 3: Techno-Complexity | 4 | 0.759 | 0.871 |
| | Dimension 4: Techno-Insecurity | 4 | 0.786 | 0.887 |
| | Dimension 5: Techno-Uncertainty | 4 | 0.802 | 0.896 |
| **EgyptAir's strategies for reducing technostress** | Dimension 1: Training and Guidance | 5 | 0.767 | 0.876 |
| | Dimension 2: Technical Support | 3 | 0.814 | 0.902 |
| | Dimension 3: Ease of Use | 4 | 0.857 | 0.926 |
| | Dimension 4: Communication and Security | 7 | 0.896 | 0.946 |
| **Passenger satisfaction** | Section Four: Passenger Satisfaction | 9 | 0.950 | 0.975 |
| **Total** | | **48** | **0.913** | **0.956** |

* Validity coefficient = $\sqrt{}$ Reliability coefficient

To assess the internal consistency and reliability of the questionnaire, Cronbach's alpha was calculated for the entire instrument. The overall Cronbach's alpha value obtained was 0.913 across 48 items, indicating excellent internal consistency. This value exceeds the commonly accepted threshold of 0.70, demonstrating that the instrument used in this study is highly reliable for measuring the intended variables. According to Nunnally (1978), a Cronbach's alpha above 0.90 reflects a very high level of reliability, which confirms the stability and coherence of the measurement tool. Therefore, the results obtained from the questionnaire can be considered both valid and dependable for academic analysis and interpretation.

### 3.6 Data Analysis

Data analysis was conducted using IBM SPSS Statistics (Version 24). A combination of descriptive and inferential statistical methods was employed to achieve the study's objectives, in alignment with the design and structure of the questionnaire. Descriptive statistics were used to summarize the demographic characteristics of the participants, including gender, age, education level, travel frequency, and level of digital proficiency. Frequencies and percentages were presented to provide a clear overview of the sample's profile. Descriptive analyses were also applied to examine responses in the main questionnaire sections, particularly those measuring technostress dimensions, as well as digital support and usability factors, and passenger satisfaction. This provided valuable insights into passengers' experiences with EgyptAir's digital systems and the psychological effects of interacting with technology during their travel journey. In terms of inferential analysis, Pearson correlation was used to assess the strength and direction of relationships between technostress dimensions and passenger satisfaction. Additionally, regression analysis was conducted to determine

the predictive power of technostress factors in explaining variations in satisfaction levels. Where appropriate, independent samples t-tests and ANOVA were applied to explore differences between demographic groups in relation to technostress experiences and satisfaction outcomes. These methods helped reveal underlying patterns and significant associations within the data.

## 4. Results and Discussion

### 4.1. Descriptive Analysis of Research Variables

The reviewed literature establishes that technostress is a multidimensional psychological phenomenon arising from individuals' interactions with digital technologies, particularly in highly automated environments such as the airline industry. Five key dimensions of technostress have been widely recognized: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty (Tarafdar et al., 2007; Fischer and Riedl, 2017). These dimensions reflect distinct stressors that passengers may encounter during digitally mediated travel experiences.

Although digital transformation initiatives—such as mobile applications, online check-in systems, and biometric services—offer notable improvements in operational efficiency and convenience, the literature indicates that they may also impose unintended burdens on specific passenger segments. In particular, individuals with limited digital literacy or familiarity with technological systems often experience difficulty navigating these platforms, leading to confusion, anxiety, or a diminished sense of control (Salman et al., 2018; Yang and Zheng, 2019).

Moreover, studies highlight that excessive notifications, constant connectivity, and the perceived intrusiveness of data requests contribute significantly to techno-invasion, leading to reduced mental well-being and increased passenger discomfort (Pielot and Rello, 2016). Privacy concerns are especially prevalent in contexts involving biometric authentication and online payments, where a lack of transparency regarding data protection may exacerbate technostress (Ives and Etter, 2018).

To mitigate these challenges, the literature recommends the implementation of user-centered design principles that emphasize intuitive interfaces and accessibility across user groups (Tarafdar et al., 2015). Designing digital tools that cater to the needs of low-proficiency users can enhance usability and reduce cognitive overload. Additionally, the adoption of a hybrid service model—one that combines digital platforms with human assistance—has been suggested as an effective strategy to accommodate different user preferences and comfort levels (Alam, 2016). This approach not only reduces reliance on fully automated systems but also supports more inclusive passenger experiences.

In summary, the theoretical framework emphasizes the necessity of balancing technological advancement with human-centered design and support mechanisms. Understanding the nuanced dimensions of technostress is essential for airlines like EgyptAir to ensure that digital transformation strategies enhance, rather than hinder, the passenger experience.

## Section One: Demographic Information of respondents

Fig.1 shows the sample consisted of 64% male and 36% female respondents. This indicates a higher participation rate among male passengers in the study.

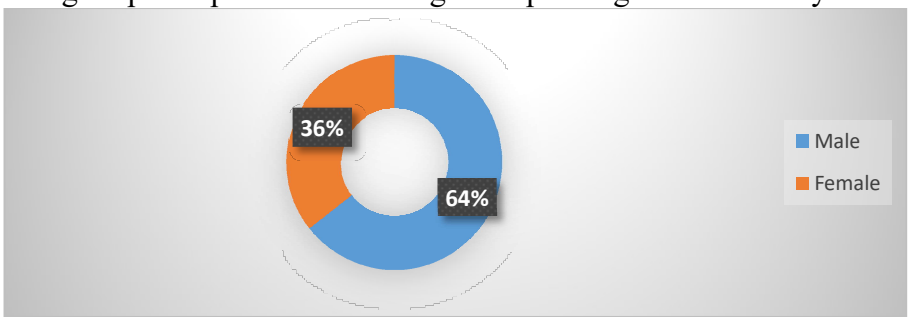


**Figure 1. Gender distribution in the sample %.**

Fig. 2 shows that the majority of respondents (52%) were aged between 21–30 years, followed by 31% aged 31–40 years. Participants under 21 years and those aged 41–50 represented smaller portions at 6% and 11%, respectively.

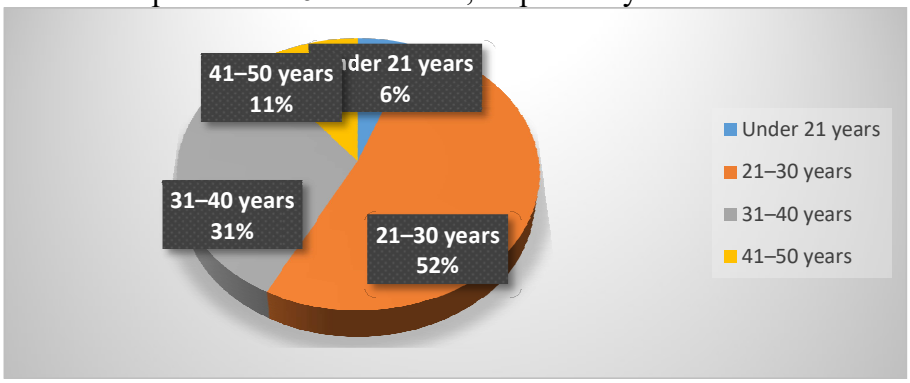


**Figure 2. Age group distribution in the sample (%).**

Fig.3 displays that More than half of the respondents (57.7%) held a university degree, while 25.2% had a doctorate and 17.1% held a master's degree.

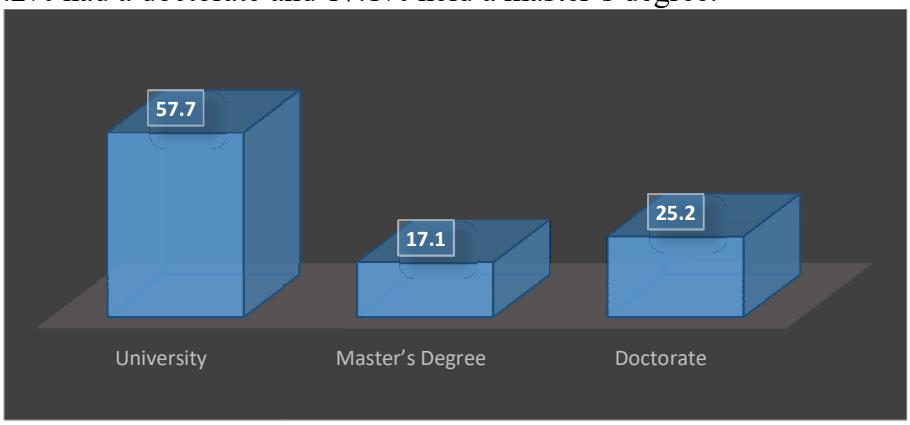


**Figure 3: Educational qualifications distribution in the sample%**

In fig.4 the chart shows that 55.6% of respondents reported flying with EgyptAir only once, while 30.4% traveled 2–4 times, 8.6% flew 5–7 times, and only 5.5% had more than 7 flights. This indicates that the majority of participants were occasional flyers, with fewer frequent travelers in the sample.

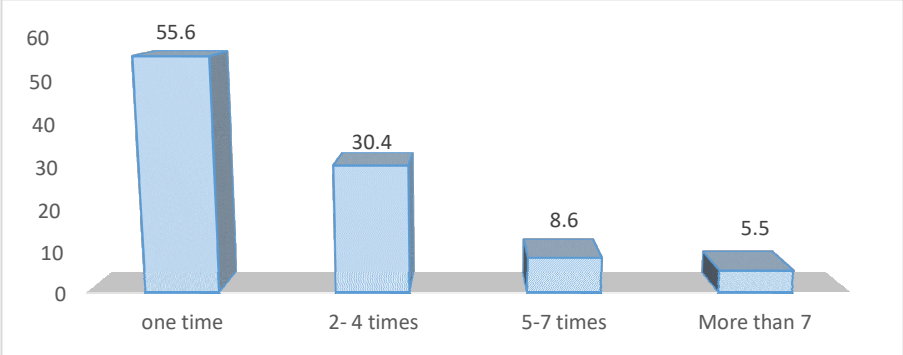


**Figure 4: Times of flying on EgyptAir last year distribution in the sample%**

The chart in figure 5 shows that 45.2% of EgyptAir passengers traveled for business purposes, making it the most common reason for flying. Leisure travel accounted for 24.9%, while 29.9% selected other purposes. This suggests a strong presence of corporate travelers among the surveyed group.

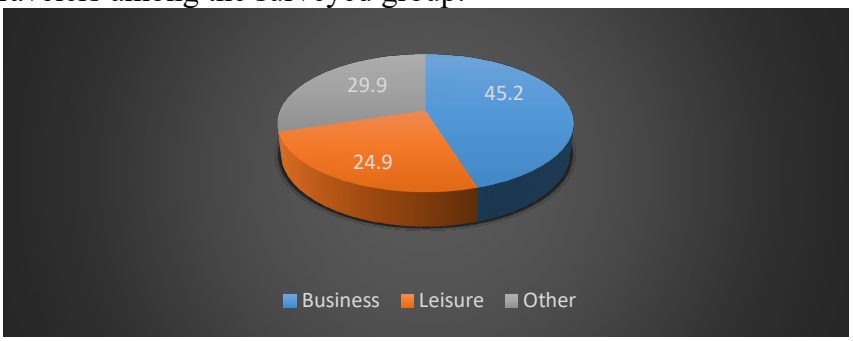


**Figure 5: Main purpose of travel distribution in the sample%**

The chart in figure 6 shows that 75.3% of respondents consider themselves advanced in digital proficiency, while 19% are intermediate and only 5.7% are beginners. This indicates that the majority of EgyptAir passengers surveyed are highly comfortable using digital technologies.

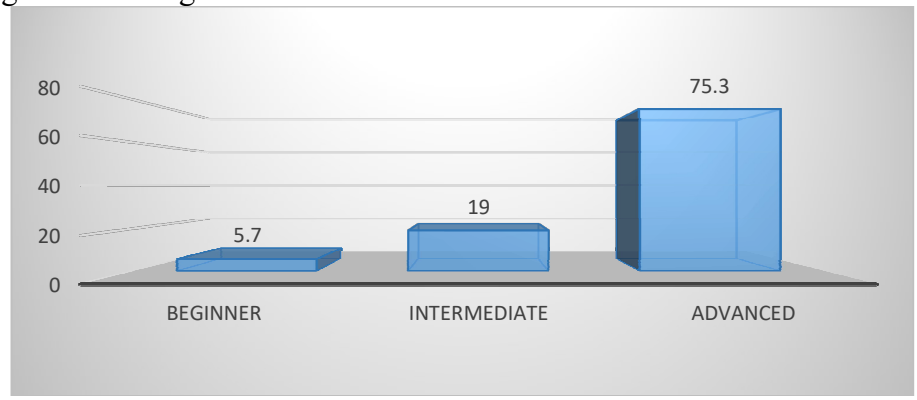


**Figure 6: level of digital proficiency distribution in the sample%**

The chart in figure 7 shows that 58.7% of passengers use EgyptAir's website, making it the most preferred digital platform. The mobile app is used by 30.1%, while only 11.2% use self-service kiosks. This indicates a strong reliance on online platforms over in-airport digital tools.

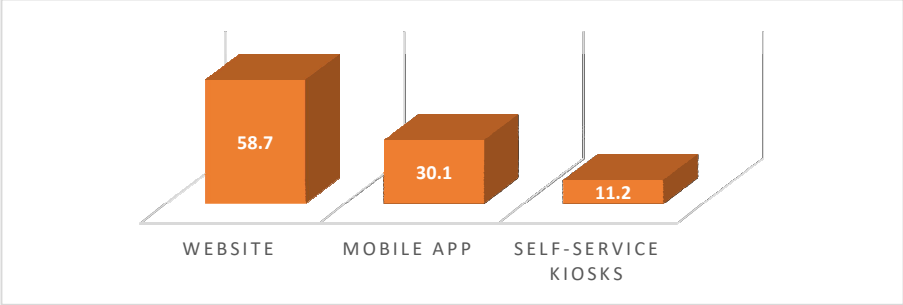


**Figure 7: Digital services use while traveling with EgyptAir distribution in the sample %**

The majority of respondents in Fig. 8 show (69.1%) reported using smartphones to access EgyptAir's digital services, followed by laptops or computers (28.1%), while only 2.9% used tablets. This indicates a clear preference for mobile-based interactions among passengers.

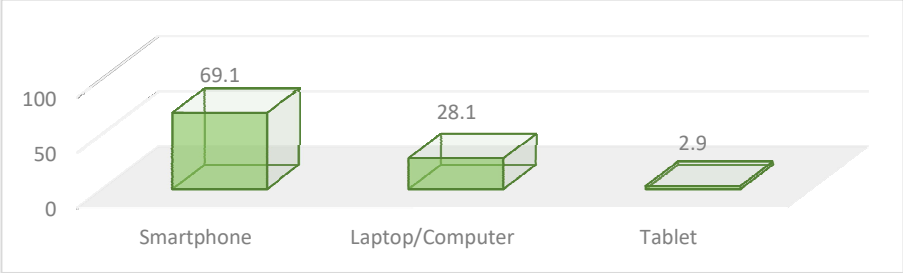


**Figure 8: Type of device usually use to access EgyptAir's digital services distribution in the sample %**

## Section Two: Passengers' Experience of Technostress

**Table (2) Techno-Overload**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| I am required to complete many procedures myself using technology before my flight. | **3.64** | **.891** | **1** | **Agree** |
| Technology makes me feel like I must rush to meet flight deadlines. | **3.42** | **1.115** | **3** | **Agree** |
| EgyptAir's applications require additional time before travel. | **3.14** | **1.112** | **5** | **Neutral** |
| I feel like I am performing tasks that should be handled by the airline staff. | **3.48** | **1.150** | **2** | **Agree** |
| Technology places additional responsibility on me instead of simplifying travel. | **3.17** | **1.330** | **4** | **Neutral** |
| **Total Mean** | **3.42** | | | **Agree** |

The overall mean for the Techno-Overload dimension was 3.42, indicating that participants generally agreed that digital technologies increased their workload during the travel process. The highest-rated item was "I am required to complete many procedures myself using technology before my flight" (M = 3.64), followed by "I feel like I am performing tasks that should be handled by the airline staff" (M = 3.48). These responses suggest that passengers feel a shift of responsibility toward them due to technology. However, lower ratings for items such as "EgyptAir's applications require additional time before travel" (M = 3.14) reflect a neutral perception,

indicating that some passengers do not strongly associate digital tools with delays or extra burdens.

**Table (3) Techno-Invasion**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| I stay connected online throughout my trip and receive too many notifications. | **3.62** | **.948** | **1** | **Agree** |
| EgyptAir's digital systems require more personal information than I prefer to share. | **3.27** | **1.102** | **3** | **Neutral** |
| I do not feel in control of who sees my personal data. | **3.44** | **1.206** | **2** | **Agree** |
| **Total Mean** | **3.44** | | | **Agree** |

With an overall mean of 3.44, the Techno-Invasion dimension reflects a general agreement among passengers that digital services affect their privacy and online presence. Most concern centered on frequent notifications (M = 3.62) and lack of control over personal data (M = 3.44), while views on data-sharing requirements were more neutral (M = 3.27).

**Table (4) Techno-Complexity**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| Online login procedures are more complicated than necessary. | **2.55** | **1.178** | **4** | **Disagree** |
| I must learn new things every time I travel. | **4.20** | **1.021** | **1** | **Strongly Agree** |
| Using self-service kiosks at the airport is confusing for me. | **3.26** | **1.192** | **2** | **Neutral** |
| I often need detailed explanations for each step. | **3.19** | **1.106** | **3** | **Neutral** |
| **Total Mean** | **3.2** | | | **Neutral** |

The overall mean for Techno-Complexity was 3.20, indicating a neutral perception of technological difficulty. While passengers strongly agreed that they must learn new things before traveling (M = 4.20), they disagreed with the idea that login procedures are too complex (M = 2.55). Other items showed moderate responses, reflecting mixed experiences with the usability of EgyptAir's digital tools.

**Table (5) Techno-Insecurity**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| I'm afraid of making mistakes while using digital systems that could affect my travel. | **3.54** | **1.190** | **3** | **Agree** |
| I don't fully trust the digital systems to manage my reservation. | **3.76** | **1.007** | **1** | **Agree** |
| I prefer interacting with human staff instead of using digital platforms. | **3.11** | **1.125** | **4** | **Neutral** |
| I worry about losing my data or ticket due to a technical glitch. | **3.55** | **1.070** | **2** | **Agree** |
| **Total Mean** | **3.49** | | | **Agree** |

The results in Table (5) indicate that respondents generally expressed agreement with most statements in the Techno-Insecurity dimension. The highest mean was recorded for the item "I don't fully trust the digital systems to manage my reservation" (M = 3.76), reflecting notable concerns about reliability. Similarly, fear of data loss or making errors also scored high. In contrast, the preference for human interaction

received a slightly lower mean (M = 3.11), suggesting a moderate inclination toward traditional service options over digital systems.

**Table (6) Techno-Uncertainty**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| Frequent changes in the app make me feel lost. | **3.68** | **1.104** | **1** | **Agree** |
| I'm not always confident in the accuracy of digital information. | **3.36** | **.920** | **4** | **Neutral** |
| I find it hard to follow all the digital updates related to travel. | **3.46** | **1.136** | **2** | **Agree** |
| Sudden app updates make me doubt my travel readiness. | **3.42** | **1.214** | **3** | **Agree** |
| **Total Mean** | **3.48** | | | **Agree** |

Table (6) shows that passengers experience a noticeable level of uncertainty due to technological changes. The highest concern was related to frequent app changes (M = 3.68), followed by difficulties in keeping up with updates and sudden changes that impact travel confidence. While three items reflected agreement, one item — confidence in the accuracy of digital information — scored slightly lower (M = 3.36), indicating a more neutral stance.

**Section Three: EgyptAir's Strategies for Reducing Technostress**

**Table (7) Training and Guidance**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| I received clear instructions on how to use digital services. | **3.40** | **1.160** | **1** | **Agree** |
| The app's usage instructions were easy to understand. | **3.14** | **1.207** | **3** | **Neutral** |
| EgyptAir provides guides or video tutorials to help with digital procedures. | **3.19** | **1.153** | **2** | **Neutral** |
| Staff are available to assist travelers with digital systems. | **3.07** | **1.140** | **5** | **Neutral** |
| I feel confident using technology thanks to the guidance provided. | **3.08** | **1.143** | **4** | **Neutral** |
| **Total Mean** | **3.18** | | | **Neutral** |

As shown in Table (7) the overall mean for the Training and Guidance dimension was 3.18, indicating a neutral perception among passengers. The highest-rated item, "I received clear instructions on how to use digital services" (M = 3.40), was the only one that reached the "Agree" level. Other items scored moderately, suggesting that passengers recognize some support efforts but see room for improvement in guidance and instructional clarity.

**Table (8) Technical Support**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| It is easy to contact support through phone, app, or website. | **3.25** | **.989** | **1** | **Neutral** |
| Live chat services helped me resolve issues instantly. | **3.25** | **1.043** | **1** | **Neutral** |
| Technical support was present near self-service kiosks at the airport. | **3.15** | **1.097** | **2** | **Neutral** |
| **Total Mean** | **3.22** | | | **Neutral** |

Table (8) shows that the Technical Support dimension received a neutral overall assessment (M = 3.22). Passengers rated ease of contact and live chat support equally (M = 3.25), reflecting a moderate level of satisfaction with available technical assistance. However, support presence at kiosks received the lowest score (M = 3.15), suggesting potential for enhancing on-ground technical assistance at airports.

**Table (9) Ease of Use**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| EgyptAir's app is user-friendly and easy to navigate. | **3.24** | **1.098** | **3** | **Neutral** |
| Digital check-in steps are clear and organized. | **3.36** | **1.059** | **1** | **Neutral** |
| Self-service kiosks provide clear instructions. | **3.33** | **1.181** | **2** | **Neutral** |
| Digital tools helped me complete my travel procedures faster. | **3.20** | **1.245** | **4** | **Neutral** |
| **Total Mean** | **3.28** | | | **Neutral** |

Table (9) indicates that the Ease-of-Use dimension was evaluated as neutral overall (M = 3.28). The highest mean was for "Digital check-in steps are clear and organized" (M = 3.36), followed closely by clear kiosk instructions. While participants generally acknowledged usability, none of the items reached the "Agree" level, suggesting that there is still room to enhance the simplicity and intuitiveness of EgyptAir's digital tools.

**Table (10) Communication and Security**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| I am informed immediately about gate or schedule updates. | **3.23** | **1.085** | **5** | **Neutral** |
| Boarding and check-in instructions are clear and complete. | **3.53** | **.924** | **1** | **Neutral** |
| EgyptAir has strong policies to protect personal data. | **3.30** | **1.099** | **4** | **Neutral** |
| The company uses secure systems to protect online payments. | **3.16** | **1.237** | **6** | **Neutral** |
| Only necessary information is requested during online travel procedures. | **3.31** | **1.098** | **3** | **Neutral** |
| Privacy and security policies are available and easy to find. | **2.59** | **1.027** | **7** | **Disagree** |
| I have the choice between using digital services and speaking to a staff member. | **3.39** | **1.038** | **2** | **Neutral** |
| **Total Mean** | **3.2** | | | **Neutral** |

The overall response to the Communication and Security dimension was neutral (M = 3.20). While participants agreed that boarding instructions were clear (M = 3.53), the lowest-rated item— "Privacy and security policies are available and easy to find" (M = 2.59)—fell into the Disagree range, suggesting uncertainty or dissatisfaction with the visibility or clarity of EgyptAir's data protection policies.

**Section Four: Passenger Satisfaction**

**Table (11) Passenger Satisfaction**

| Variables | Mean | SD | Rank | Attitude |
|---|---|---|---|---|
| Technology made my experience with EgyptAir more convenient. | **3.23** | **1.162** | **9** | **Neutral** |
| I felt comfortable using EgyptAir's app and website. | **3.55** | **1.069** | **1** | **Agree** |

| | | | | |
|---|---|---|---|---|
| Technical support helped reduce stress when using digital services. | **3.50** | **1.097** | **2** | **Agree** |
| I experienced a technical problem that negatively affected my satisfaction. | **3.33** | **1.136** | **7** | **Neutral** |
| Clear digital instructions enhanced my overall experience. | **3.39** | **1.215** | **5** | **Neutral** |
| Having digital and non-digital options increased my comfort. | **3.47** | **1.220** | **3** | **Agree** |
| EgyptAir's digital updates increased my trust in the company. | **3.36** | **1.187** | **6** | **Neutral** |
| Using apps for check-in and boarding was easy and comfortable. | **3.36** | **1.086** | **6** | **Neutral** |
| Overall, digital services with EgyptAir enhanced my satisfaction. | **3.38** | **1.198** | **4** | **Neutral** |
| **Total Mean** | **3.40** | | | **Agree** |

The overall mean for the Passenger Satisfaction dimension was 3.40, placing it in the Agree range. The highest-rated item was "I felt comfortable using EgyptAir's app and website" (M = 3.55), followed closely by technical support and the availability of both digital and non-digital service options. This indicates a generally positive satisfaction level with EgyptAir's digital services, though some items remain in the neutral zone, highlighting areas for further enhancement.

## 4.2. Pearson Correlation

**Table (12): Pearson Correlation Matrix between Technostress Dimensions and Passenger Satisfaction**

| | | Dimension 1:Techno-Overload | Dimension 2: Techno-Invasion | Dimension 3: Techno-Complexity | Dimension 4: Techno-Insecurity | Dimension 5: Techno-Uncertainty | Passenger Satisfaction |
|---|---|---|---|---|---|---|---|
| Dimension 1:Techno-Overload | Pearson Correlation | 1 | .572** | .696** | .536** | .418** | -.163** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 | .001 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 2: Techno-Invasion | Pearson Correlation | .572** | 1 | .809** | .629** | .598** | -.165** |
| | Sig. (2-tailed) | .000 | | .000 | .000 | .000 | .001 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 3: Techno-Complexity | Pearson Correlation | .696** | .809** | 1 | .694** | .574** | -.338** |
| | Sig. (2-tailed) | .000 | .000 | | .000 | .000 | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 4: Techno-Insecurity | Pearson Correlation | .536** | .629** | .694** | 1 | .767** | -.183** |
| | Sig. (2-tailed) | .000 | .000 | .000 | | .000 | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 5: Techno-Uncertainty | Pearson Correlation | .418** | .598** | .574** | .767** | 1 | -.259** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Passenger | Pearson | -.163** | -.165** | -.338** | -.183** | -.259** | 1 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Satisfaction | Correlation | | | | | | |
| | Sig. (2-tailed) | .001 | .001 | .000 | .000 | .000 | |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |

Pearson correlation analysis revealed significant negative relationships between all technostress dimensions and passenger satisfaction. The strongest negative correlation was found between Techno-Complexity and satisfaction ($r$ = –0.338, $p$ < .01), indicating that greater perceived complexity is associated with lower satisfaction levels. Weaker but significant negative correlations were observed for Techno-Uncertainty ($r$ = –0.259) and Techno-Insecurity ($r$ = –0.183). All correlations were statistically significant at the 0.01 level, supporting the conclusion that higher technostress generally leads to reduced satisfaction with EgyptAir's digital services.

**Table (13): Pearson Correlation Matrix between Technostress Dimensions and Digital Proficiency**

| | | **Rate Level Of Digital Proficiency** | **Dimension 1:Techno-Overload** | **Dimension 2: Techno-Invasion** | **Dimension 3: Techno-Complexity** | **Dimension 4: Techno-Insecurity** | **Dimension 5: Techno-Uncertainty** |
|---|---|---|---|---|---|---|---|
| Rate Level Of Digital Proficiency | Pearson Correlation | 1 | -.245** | -.568** | -.395** | -.278** | -.405** |
| | Sig. (2-tailed) | | .000 | .000 | .000 | .000 | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 1:Techno-Overload | Pearson Correlation | -.245** | 1 | .572** | .696** | .536** | .418** |
| | Sig. (2-tailed) | .000 | | .000 | .000 | .000 | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 2: Techno-Invasion | Pearson Correlation | -.568** | .572** | 1 | .809** | .629** | .598** |
| | Sig. (2-tailed) | .000 | .000 | | .000 | .000 | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 3: Techno-Complexity | Pearson Correlation | -.395** | .696** | .809** | 1 | .694** | .574** |
| | Sig. (2-tailed) | .000 | .000 | .000 | | .000 | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |
| Dimension 4: Techno-Insecurity | Pearson Correlation | -.278** | .536** | .629** | .694** | 1 | .767** |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | | .000 |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Dimension 5: Techno-Uncertainty | Pearson Correlation | -.405** | .418** | .598** | .574** | .767** | 1 |
| | Sig. (2-tailed) | .000 | .000 | .000 | .000 | .000 | |
| | N | 385 | 385 | 385 | 385 | 385 | 385 |

Pearson correlation analysis revealed statistically significant negative relationships between passengers' digital proficiency level and all five technostress dimensions, at the 0.01 significance level. The strongest correlation was with Techno-Invasion ($r = –0.568$, $p < .001$), suggesting that passengers with higher digital skills felt significantly less invaded by digital systems. Notable negative correlations were also found with Techno-Complexity ($r = –0.395$), Techno-Uncertainty ($r = –0.405$), Techno-Insecurity ($r = –0.278$), and Techno-Overload ($r = –0.245$). These results indicate that as digital proficiency increases, perceived technostress decreases, supporting the idea that digital skill levels play a protective role in managing technology-related travel stress. So passengers with stronger digital skills are more likely to adapt to airline technologies with less stress, especially in terms of privacy, complexity, and uncertainty.

## 4.3. Regression Analysis

**Table (14) Multiple Regression Analysis: To predict benefits or challenges based on awareness.**

| Predictor | B | SE | B | t | p |
|---|---|---|---|---|---|
| (Constant) | 3.991 | 0.187 | — | 21.29 | <.001 |
| Techno-Invasion (Dimension 2) | -0.181 | 0.055 | -0.165 | -3.28 | .001 |

**Note. R = .165, $R^2$ = .027, Adjusted $R^2$ = .025, Std. Error of the Estimate = 0.962, F(1, 383) = 10.75, p = .001.**

The results of the multiple regression analysis indicate that Techno-Invasion significantly predicts the perception of benefits or challenges related to digital services ($\beta = –0.165$, $t = –3.28$, $p = .001$). The negative beta value suggests that higher levels of perceived invasion (such as constant notifications or privacy concerns) are associated with fewer perceived benefits or greater challenges. Although the overall model explains a small portion of variance ($R^2 = .027$), the finding is statistically significant ($F(1, 383) = 10.75$, $p = .001$), indicating that Techno-Invasion is a meaningful, though modest, predictor in this context.

**Table (15) Linear Regression Predicting Technostress from Digital Proficiency**

| Predictor | B | SE B | β | t | p |
|---|---|---|---|---|---|
| (Constant) | 4.885 | 0.161 | — | 30.422 | .000 |
| Digital Proficiency | –0.578 | 0.058 | –0.452 | –9.916 | .000 |

**Model Summary: R = .452, $R^2$ = .204, Adjusted $R^2$ = .202, Std. Error of the Estimate = 0.653**
**ANOVA: F(1, 383) = 98.330, $p < .001$**

A simple linear regression was conducted to examine whether digital proficiency predicts passengers' experience of technostress. The model was statistically significant $F(1, 383) = 98.330$, $p < .001$), and explained approximately 20.4% of the variance in technostress ($R^2 = .204$). The results indicated that digital proficiency was a significant negative predictor of technostress ($B = –0.578$, $\beta = –0.452$, $t = –9.916$, $p < .001$). This suggests that passengers with higher digital proficiency tend to experience lower levels of technostress when interacting with EgyptAir's digital systems.

### 4.4. T-test Analysis

**Table (16) Independent Samples T-test for Gender Differences in Technostress**

| Group | N | Mean | SD | t | df | p-value | Mean Difference |
|---|---|---|---|---|---|---|---|
| Male | 248 | 3.29 | 0.791 | | | | |
| Female | 137 | 3.40 | 0.602 | –1.482 | 383 | 0.139 | –0.115 |

**Levene's Test**: $F$ (1,383) = 5.485, $p$ = .020 (equal variances **not** assumed)
**T-test result (adjusted)**: $t(345.844) = -1.601$, $p = .110$

An independent-samples t-test was conducted to compare **technostress levels** between male and female passengers. Although females (M = 3.40, SD = 0.602) reported slightly higher technostress than males (M = 3.29, SD = 0.791), this difference was not statistically significant, $t(345.844) = -1.601$, $p = .110$. Therefore, gender was not a significant factor influencing passengers' perceived technostress in this sample.

## 4.5. ANOVA Analysis

**Table (17) One-Way ANOVA – Differences in Passenger Satisfaction by Age Group**

| Passenger Satisfaction | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | Df | Mean Square | F | Sig. |
| Between Groups | 29.494 | 3 | 9.831 | 11.190 | .000 |
| Within Groups | 334.725 | 381 | .879 | | |
| Total | 364.218 | 384 | | | |

**Note: $p < .001$, indicating a statistically significant difference.**

A one-way ANOVA was conducted to examine whether passenger satisfaction varied significantly across different age groups. The results revealed a statistically significant difference in satisfaction levels, $F$ (3, 381) = 11.190, $p < .001$. To further explore these differences, a Tukey HSD post hoc test was performed. The test showed that passengers under 21 years old reported significantly higher satisfaction than all other age groups ($p < .05$). Additionally, passengers aged 21–30 also reported significantly higher satisfaction than those aged 31–40 ($p < .001$). These findings suggest that younger passengers tend to be more satisfied with EgyptAir's digital services, likely due to greater digital proficiency and familiarity with technology compared to older age groups.

**Table (18) One-Way ANOVA – Differences in Passenger Satisfaction by Educational Level Group**

| Passenger Satisfaction | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 81.696 | 2 | 40.848 | 55.231 | .000 |
| Within Groups | 282.522 | 382 | .740 | | |
| **Total** | **364.218** | **384** | | | |

A one-way ANOVA was conducted to assess whether passenger satisfaction levels differed significantly according to educational level. The analysis showed a statistically significant difference in satisfaction scores between the groups, $F(2, 382) = 55.231$, $p < .001$. To further explore these differences, a Tukey HSD post hoc test was performed. The results revealed that passengers holding a Doctorate degree

reported significantly higher satisfaction than those with a Master's degree and those with a University degree ($p < .001$ for both comparisons). However, there was no significant difference in satisfaction between those with University and Master's degrees ($p = .323$). These findings suggest that higher educational attainment, particularly at the doctoral level, may be associated with greater satisfaction with EgyptAir's digital services.

**Table (19) One-Way ANOVA – Differences in Passenger Satisfaction by digital proficiency Level Group**

| **Passenger Satisfaction** | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | df | Mean Square | F | Sig. |
| Between Groups | 55.607 | 2 | 27.804 | 34.415 | .000 |
| Within Groups | 308.611 | 382 | .808 | | |
| **Total** | **364.218** | **384** | | | |

A one-way ANOVA was conducted to determine whether passenger satisfaction levels differed based on digital proficiency level (Beginner, Intermediate, Advanced). The results revealed a statistically significant difference, $F(2, 382) = 34.415$, $p < .001$. To further explore these differences, a Tukey HSD post hoc test was performed. The analysis showed that Beginner-level users reported significantly lower satisfaction than both Intermediate ($p < .001$) and Advanced ($p < .001$) users. Additionally, Intermediate users also reported significantly lower satisfaction than Advanced users ($p < .001$). These findings suggest that higher digital proficiency is strongly associated with increased passenger satisfaction, likely due to greater comfort and ease in using EgyptAir's digital systems.

## 5. Conclusion

The empirical findings of this study strongly align with the dimensions and implications of technostress outlined in the theoretical framework. As theorized by Tarafdar et al. (2007) and Fischer and Riedl (2017), technostress is a multifaceted phenomenon, and the statistical analysis confirmed its presence among EgyptAir passengers across all five core dimensions: techno-overload, techno-invasion, techno-complexity, techno-insecurity, and techno-uncertainty.

Quantitative data showed that techno-overload was experienced most acutely, particularly through self-managed procedures and perceived task shifting from staff to passengers—confirming the literature's suggestion that digital systems, rather than reducing burdens, may inadvertently increase them for some users. Similarly, techno-invasion emerged as a notable stressor, with participants expressing concerns about frequent notifications and a lack of control over their personal data, echoing theoretical claims about privacy intrusion and constant connectivity (Pielot & Rello, 2016).

The results for techno-complexity and techno-insecurity further reinforced the theoretical assumption that unfamiliar or poorly designed interfaces create usability barriers, especially for less digitally proficient individuals. Passengers reported uncertainty and anxiety linked to app updates and system malfunctions, validating the

literature's emphasis on the destabilizing effect of techno-uncertainty (Khalaf et al., 2022).

Statistical correlations revealed that all technostress dimensions were negatively associated with passenger satisfaction, with techno-complexity showing the strongest negative correlation ($r = –0.338$). This finding mirrors theoretical insights that complex interfaces can impair trust and diminish the overall travel experience (Salman et al., 2018; Yang and Zheng, 2019).

Furthermore, the theoretical proposition that digital proficiency moderates technostress was empirically confirmed. Regression analysis indicated that higher digital proficiency significantly reduced technostress levels ($\beta = –0.452$, $p < .001$) and was associated with increased satisfaction. This substantiates the theoretical claim that passengers' familiarity with technology acts as a buffer against the cognitive and emotional strain caused by digital platforms (Tarafdar et al., 2015).

The alignment between theory and results not only validates the conceptual model but also highlights the critical importance of user-centered design, hybrid service models, and digital literacy initiatives, as proposed in the literature. The consistency between theoretical expectations and empirical evidence strengthens the conclusion that mitigating technostress is key to enhancing digital service satisfaction in the airline industry.

Overall, the findings highlight the importance of user-friendly digital interfaces, clear instructional support, and optional non-digital service channels to reduce technostress and enhance satisfaction. The study also emphasizes the need for digital literacy support, especially for older or less tech-savvy users, to ensure that EgyptAir's digital transformation strategy aligns with the comfort and capabilities of its diverse passenger base.

## 6. Recommendations

Based on the findings of this study, the research directed the recommendation to Ministry of Civil Aviation and EgyptAir holding company.

### 6.1. Recommendations related to the Ministry of Civil Aviation

1. **Establish National Guidelines for Digital Passenger Experience:** The Ministry should issue a standardized framework to guide digital service quality across all Egyptian airlines, emphasizing usability, accessibility, and psychological well-being as core evaluation metrics.
2. **Launch Public Digital Literacy Campaigns for Air Travelers:** In collaboration with national carriers, the Ministry should initiate awareness and training programs aimed at increasing passengers' competence in using airline digital tools—especially for elderly users and those unfamiliar with modern technology.
3. **Mandate Inclusive Digital Design Standards:** Regulatory measures should encourage or require the adoption of inclusive digital design principles that accommodate diverse passenger abilities. These standards should be enforced especially at regional airports and public service points.
4. **Create a Digital Aviation Service Quality Monitoring Unit:** The Ministry is encouraged to establish a dedicated unit responsible for evaluating and auditing the quality of digital services provided by airlines. This body would collect passenger feedback, assess digital usability, and issue regular performance reports.

### 6.2 Recommendations directed to EgyptAir Holding Company

1. **Simplify Digital Interfaces Across Platforms:** EgyptAir is advised to redesign its digital platforms—including the mobile application, official website, and self-service kiosks—using user-centered design principles that prioritize clarity, intuitive navigation, and accessibility. This is particularly important for reducing cognitive load and easing use for passengers with limited digital proficiency.
2. **Implement a Hybrid Service Model:** The airline should offer flexible service delivery options that combine digital services with traditional, human-assisted alternatives. Maintaining staffed counters alongside digital check-in kiosks ensures inclusivity for passengers who may not feel comfortable using fully automated systems.
3. **Enhance Transparency and Data Privacy Communication:** EgyptAir should provide clear, accessible information regarding data collection, storage, and usage to mitigate techno-invasion and build trust in digital interactions. Simplified privacy notices and consent forms are recommended.
4. **Strengthen Technical Support Accessibility:** Real-time assistance should be readily available, particularly at digital service points such as kiosks. Enhancing the responsiveness of in-app support (e.g., live chat) and ensuring the visibility of trained staff at airports can help reduce feelings of insecurity and uncertainty related to digital interactions.
5. **Develop Multimedia Instructional Content:** To support passengers in using digital services, EgyptAir should invest in producing short, engaging video tutorials and interactive guides. These resources should be embedded in apps, displayed at airports, and shared via digital channels to promote digital literacy and reduce confusion.
6. **Integrate Technostress Indicators into Passenger Feedback Systems:** EgyptAir should systematically include technostress-related questions in post-flight satisfaction surveys. This will allow the company to monitor digital service performance and identify stress points before they escalate.

## 7. Further Research

- The Role of Artificial Intelligence in Reducing Technostress in Airline Service.
- Exploring the Relationship between Technostress and Digital Trust in Airline Mobile Applications.
- Technostress among Older Adults in Digital Air Travel: A Case Study of EgyptAir.
- The Moderating Role of Digital Literacy Programs in the Relationship between Technostress and Satisfaction.

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