Digital Transformation in the Airline Industry - Case study of Aegean Airlines Digital Products

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ΤΗΣ
ΜΑΡΙΑ ΠΟΛΥΞΕΝΗ ΖΑΧΑΡΑΚΗ

ΙΩΑΝΝΗΣ ΧΑΡΑΛΑΜΠΙΔΗΣ, Επιβλέπων

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Πανεπιστήμιο Αιγαίου, Εθνικό Μετσόβιο Πολυτεχνείο

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Acronyms

AI	Artificial Intelligence
AIA	Athens International Airport
AR	Augmented Reality
ASE	Athens Stock Exchange
ATSB	Architecture and Technology Strategy Board
AUD	Australian Dollar
B2C	Business-to-Customer
CAD	Canadian Dollar
CBP	Customs Border Protection
CHF	Confederatio Helvetica Franc
DIDs	Digital Decentralized Identifies
DKK	Danish Krone
DT	Digital Transformation
DTAC	Digital Transformation Advisory Council
FAQ	Frequently Asked Questions
GBP	Great Britain Pound
HDM	Head Mounted Display
IATA	International Air Transport Association
ILS	Israeli New Shekel
IoT	Internet of Things
KPI	Key Performance Indicators
MCP	Multiple Currency Payment
PII	Personally Identifiable Information
PoC	Proof of Concept
Q&A	Questions & Answers
RBD	Reservation Booking Designators
SEK	Swedish Krona
UAT	User Acceptance Test
UI	User Interface
UMNR	Unaccompanied Minors
USD	United States Dollar
VC	Verifiable Credentials
VR	Virtual Reality
W3C	World Wide Web Consortium

Περίληψη

Ο ψηφιακός μετασχηματισμός αφορά το σύνολο των νέων τεχνολογιών, που υιοθετούνται απο έναν οργανισμό, με στόχο να βελτιώσουν την εσωτερική τους λειτουργία και να ικανοποιήσουν τις συνεχόμενα μεταβαλλόμενες απαιτήσεις των πελατών, των συνεργατών και του προσωπικού τους. Τα τελευταία χρόνια, η ψηφιοποίηση αποτελεί το φάρο της αεροπορικής βιομηχανίας για τη δημιουργία νέων στρατηγικών που οδηγούν στη βελτίωση της ταξιδιωτικής εμπειρίας του επιβατικού κοινού. Οι αεροπορικές εταιρείες έχουν σημειώσει σημαντική πρόοδο στον τομέα αυτό, εισάγοντας νέα ψηφιακά εργαλεία για την ενίσχυση της αποδοτικότητάς τους και νέα ψηφιακά προϊόντα για την ικανοποίηση των συνεχώς μεταβαλλόμενων αναγκών των πελατών τους. Η Aegean Airlines πρωτοστατεί στο ταξίδι του ψηφιακού μετασχηματισμού στην Ελλάδα. Ως εκ τούτου, διεξήχθη έρευνα, με σκοπό την καλύτερη κατανόηση και τη διερεύνηση των ψηφιακών προϊόντων και υπηρεσιών που προσφέρονται σήμερα.

Ως αποτέλεσμα της ερευνητικής μεθοδολογίας, πραγματοποιήθηκε βιβλιογραφική ανασκόπηση προκειμένου να εκτιμηθούν οι τομείς που εστιάζει ο Ψηφιακός Μετασχηματισμός, να εξεταστούν οι προοπτικές των ήδη εφαρμοζόμενων ψηφιακών στρατηγικών στον κλάδο των εμπορικών αερομεταφορών και, τέλος, να παρασχεθεί ένα σύνολο προτάσεων των μελλοντικών κατευθύνσεων, αναφορικά με τις βέλτιστες πρακτικές.

Λέξεις Κλειδιά: *Ψηφιακός Μετασχηματισμός, Αεροπορική Εταιρία, Αεροπορία Αιγαίου Α.Ε., Ψηφιακά Προϊόντα, Ικανοποίηση Πελατών.*

Abstract

Digital Transformation refers to the way the new technologies' adoption, transforms the business culture and operational activities, in aspects to optimize the expectations of its partners, clients and personnel. Recent years, Airline Industry is driven by digitalization, in order to build new strategies, leading to the improvement of passengers' experience. Airlines have made significant progress, in this field, launching new digital tools to boost their efficiency and new digital products to satisfy their customers changing needs. Aegean Airlines is spearheading the digital transformation journey in Greece. As such, research has been performed, in order to deep dive and explore the digital products currently offered and a comparative competition analysis covering three different areas of customer journey.

As a result of the research methodology, literature review was performed in order to assess the focus areas of DT, examine the prospects of already implemented digital strategies in the Airline Industry and finally provide a set of recommendations and future directions regarding best practices on the way forward.

Keywords: *Digital Transformation, Aegean Airlines, Airline Industry, Digital Products, Customer Satisfaction.*

1 *Introduction*

New technologies are constantly inundating us and have become an essential part of our daily life. It is almost unthinkable to live without our electronic devices and without the usage of electronic applications. However, how were we driven to reach this point? Digitalization of daily services accompanied by technological necessities and the modern way of life, are all factors that contribute to an appeal to the business and public sector stakeholders for digital transformation.

Airline industry is of particular interest, considering that airlines are innovative in nature. Aviation was created to bring the world closer. According to Eddie V. Rickenbacker, "*Aviation is proof that given, the will, we have the capacity to achieve the impossible*" (V.Rickenbacker, 2023), as such, a journey that someone needed many hours or even days to accomplish with other means of transport, has been minimized (in terms of time) to a few hours via flights.

In the airline industry, Digital transformation (DT) can be specified as a procedure that relates to all synergies, leading to the calibration of the existing operating workflows and data-driven decision-making methods (Kıyıklık, Kuşakcı, & Mbowe, A digital transformation maturity model for the airline industry with a self-assessment tool, 2022), particularly those closely associated with airline passenger experience, by utilizing digital technologies. DT process in the airline industry is extraordinary. Owing to the aforementi oned, airline companies are being forced to discover or invent innovative offerings in order to stay afloat in today's extremely competitive business landscape.

Capitalizing on the plethora of the available data volume that airlines collect and consolidate regarding their client base, there are significant value drivers that can be tapped, so as to strengthen the technological capabilities, resulting into higher profitability. More specifically, airline companies can identify value drivers in the following concepts:

- Access to customer Personally Identifiable Information (PII) provides the ability to offer more personalized products and services.
- Consumer behavior can be further investigated as a method to enhance the cross-functional communication mechanism between airline officials and the passenger public, thus maintaining and expanding the customer base.
- Cultivation of strong relationships pertaining to customer support prior and after the flights.
- Finally, by forecasting consumer trends via the effective utilization of business analytics.

Despite the significant efforts already taken by airline companies, in order to optimize their internal business processes in areas such as Finance, Safety and Security, only a few attempts have been made to examine particular case studies on the basis of the client-facing angle (Kıyıklık, Kuşakcı, & Mbowe, A digital transformation maturity model for the airline industry with a self-

assessment tool, 2022). Therefore, scope of this master thesis is to perform a thorough analysis of the current and previous business practices relating to Greece and specifically for her biggest flight carrier, Aegean Airlines S.A, underscore the challenges and explore the prospects, arising from the applied digital initiatives, based on the Business-to-Customer (B2C) approach.

2 *Thesis Scope*

Principal objective of this research is to analyze the business practices of Aegean Airlines S.A, surrounding the implementation and application of digital products and services for the passenger public. Furthermore, steps shall be taken, in order to shed light regarding the challenges faced along with the corresponding prospects, arising from such digital initiatives, from the client perspective. Owing to the aforementioned, this research has three fundamental goals:

❖ Examine the available academic and corporate literature by highlighting the focus areas and trends of DT in the Airline industry.

❖ Evaluating the fertile ground concerning already implemented digital products in the Airline landscape.

❖ Providing recommendations by valuable lessons learned and insights, in order to streamline and finetune future digital initiatives, with reference to digital products, tailor-made for the passenger public of Aegean Airlines S.A.

3 *Literature Review*

3.1 *Digital Transformation Definition*

Nowadays, we encounter the terminology of Digital Transformation (DT) very often - in professional environments, in education, in public administration, in articles and the media. The term is accompanied, in most of the cases, by the concept of digitalization. As such, the rapid development of digital technology calls the various stakeholders for change and adaptation. In order to fully grasp the concept of digital transformation, first we need to define it.

What is digital transformation?

It is hard to provide a single definition of what DT is, as many definitions have been given to this term. Studying the international literature, we could argue that digital transformation consists of two (2) pillars: digital technology and customer's experience (Henriette, 2016). According to Gerald C. (Jerry) Kane, "*Digital transformation is about how technology changes the conditions under which business is done, in ways that change the expectations of customers, partners, and employees.*" (Kane, 2017)

In this dynamic and competitive environment, companies must find ways to adapt to new trends, redesign their strategy and products, in line with the continuously evolving customer needs. DT, as a vehicle, is spearheading the need to redefine business entities' policies, create new products, analyze customers' behavior, and provide more personalized and innovative services.

3.1.1 *Trends of Digital Transformation*

According to the European Commission's DESI index (Comission, 2022), the key digital transformation technologies are:
- Social media
- Mobile technology services
- Cloud technologies
- Data analysis
- Internet of Things (IoT)
- Robotics and Automation
- 3D printing
- Artificial Intelligence (AI)
- Cybersecurity

Digitalization offers to new and traditional businesses numerous advantages. The aviation industry could not be an exception. The industry was, from the beginning, intertwined with innovation and technology, mainly in the field of aeronautics. However, the airlines would be characterized as traditional, in terms of their structure, their culture, their strategies and the way they offered their

products and services. This has changed in the last two decades and particularly during the last three years, in the Covid era, when the airlines were forced to find ways to overcome the crisis, and to arise stronger.

3.1.2 *The importance of digitization for the aviation industry*

During the recent years a focus in digitalization is observed with the airline industry being one of the primary followers. Aviation industry is one of the most competitive industries globally. The main goal of any airline is to attract the largest market share, compared to its operational capacity and by keeping operating costs as low as possible. Due to the fact that, airlines are not providing a standardized tangible product, but services to the passengers, they twist their efforts to passenger's satisfaction throughout different phases of the flight experience. The companies were impelled to digitalize their procedures, strategies, marketing, products, so as to enhance their effectiveness, appeal to more customers and more efficiently compete with other airlines. Digital transformation could be characterized as trend, considering that 58% of airlines and 35% of airports have already implemented a digital strategy (Lampathaki, Sesana, & Alexandrou, 2019).

We could summarize three main drivers for digital transformation in the airline industry (Iryna, et al., 2022):

- **Operational costs**
  The airline companies are facing high standard costs, such as aircraft purchases and maintenance, Research and Development activities, numerous and qualified staff etc. Besides these costs, the airlines are coping with unforeseen expenses, such as potential fuel increases and flights' irregularities. (Gillen, Oum, & Tretheway, 1990). Although, these expenses are difficult to reduce, Digital Transformation can be a positive force of improving revenue streams, in such a way that the company remains sustainable and profitable. (Tapscott & Tapscott, 2017).
  By launching new technologies, AI and IoT driven tools, airlines are achieving to reduce distribution, tickets' issuing and reconciliation expenses. At the same time, passengers' related insights can be collected leisurelier and instantly, benefiting companies in their aim of adapting to the ever-changing necessities.

- **Security necessity**
  Security and safety are prerequisites for the very existence of the airline and its operations. For this reason, the companies invest heavily in these elements of paramount importance. Considering that every airline maintains its own website and through it, its passengers provide their personal information for ticket booking or flight check ins, main goals are: the safeguarding of the sensitive personal data and the processing of secure transactions. Digital processes, Automations and AI technology were put into effective use so as to achieve the aforementioned purpose. Additionally, Augmented Reality (AR) could be integrated to the aircrafts' preventive and corrective maintenance, in order to increase passengers' safety. (Haritos & Macchiarella, 2005)

- **High Competition**

   Aviation industry has a sizable customer base. In 2022, according to IATA (Quarterly Air Transport Chartbook, 2022) more than 3.8 billion passengers travelled by air, signaling full – recovery after Covid-19 period. Often, the existence of such wide customer base, lead to weak competition, nevertheless in an industry consisting of 302 operating airlines, globally, the competition is rather stiff. Considering that, in 2022, we had 39 new established airlines (IATA, 2023), the companies are forced to deploy new technologies and apply digital strategies, in order to differentiate themselves and

1 Source: IATA Economics' Chart of the Week *(IATA, Europe accounts for half of all new airline ''births'' in 2022, 2023)*

obtain competitive advantages in the market. It is not a coincidence that the aviation industry is the market, where the companies build alliances, in the direction of concentrating their forces to enhance customers' satisfaction.

3.2 *Importance of digital products for the passengers*

In a fast-changing world, airlines cannot stay backwards. They are obliged to synchronize themselves with the passengers' growing needs and expectations, if they intend to stay in the scene. Digital world is present and as such, there is no return point. This is not a movement, it's a mindset. Passengers wish to maintain absolute control of their travel experience, literally in the palm of their hands. The era demands personalized services, simultaneous information, purchasing ancillaries, safety of personal information, secure and fast transactions. Headlights have turned to passengers and the optimum customer service is the priority for the airlines (Leopold, 2019).

In the recent years, digital services have been adopted that provide autonomy and self-management to customers. Web check-in, the online booking and rebooking of their flight, liberated passengers from time-consuming procedures and brought them one step closer to their desire – to fly to their destination uninterrupted-.

Additionally, in-flight digital products, such as access to the internet or the introduction of entertainment platforms – offering movies, music, and games – have positive impact to the passengers and strengthen the possibility of preferring the same operator in the future (Alamdari, Journal of Air Transport Management).

Most of the airlines have created mobile applications, in which, passengers can have immediate access to flight booking, find all the necessary information concerning the flights and stay informed about the latest offers and/or new destinations. Moreover, passengers are able to create accounts for loyalty programs and submit their preferences and personal details, allowing for gaining member-only privileges. These initiatives bring passengers, a step closer to buying tickets and develop an immense relationship with the company. Presence in social media facilitates the airline, to collect important data of its clientele, their opinions, recommendations and intentions. Through social media, business entities can understand traveler's needs, calibrate their strategies according market segmentation and create personalized products to attract more passengers and enhance their loyalty and satisfaction (a & Ermagun, 2018).

4 *Methodology*

Concerning the research methodology, primary and secondary sources will be pursued. Owing to this specific research topic, the case study method was selected as the most appropriate. Therefore, this master thesis will proceed with reviewing the existing academic literature relating to the topic of Digital Transformation (DT) in the airline industry. As such, acquiring bibliographic references from search engines including Google Scholar, ResearchGate and ScienceDirect, is the first step. Also, existing literature includes conference proceedings, book chapters and articles published in academic journals. Furthermore, corporate and industry reports, issued by International Air Transport Association (IATA) – the main regulatory body – will be used as reference pertaining to the state of play, practices and lessons learned from similar digital strategies and initiatives.

Considering that the research focus will be based on the existing corporate entity of Aegean Airlines S.A., attention will be provided into obtaining information, by conducting deep dive interviews with key company personnel and subject matter experts from the Digital Department of the company so as to gain a deeper understanding of the current situation, with reference to digital products, from the perspective of client utilization and satisfaction. Additionally, efforts will be taken to extract valuable insights, such as Key Performance Indicators (KPIs) and other metrics, regarding the company's Business-to-Customer (B2C) approach for each digital initiative with extensive analysis of the initial ideas, strategies and all the implementation stages.

5

Aegean Airlines Case Study

5.1   History of the company

Aegean Airlines is the biggest airline company in Greece, established in 1999. The first flights were performed by two aircrafts, which initially operated from Athens to Thessaloniki and Heraklion. High standards of passenger services were noticed immediately and were acknowledged right away by the customers. This acknowledgement encouraged the company to add five more domestic routes, till the end of the calendar year. In next year, company continued to expand and by July 2000, the number of flight destinations reached eleven (11) cities, within Greece, with more than eighty (80) flights on a daily basis. In 2001, the company acquired Kronos airlines and welcomed eleven (11) new domestic destinations and seven (7) international ones. Business class services were initiated during the same time period.

Major milestone year is 2003, when Aegean becomes the first and only company in Greece that launches the e-ticket and provides to the passengers, the capability to book and issue their ticket at the same time. Historically, it's the first time that the company goes digital and commences its journey beyond limits. In the years that followed, company's development was leaps and bounds. The collaboration with Lufthansa in 2005, the acquisition of the first Airbus in the same year, the entry to the Athens Stock Exchange (ASE) in 2007, the achievement of ISO 14001 certification for environmental protection in 2008, the purchase of 27 Airbus A320/A321 by the end of the 2008, the corporate agreement of merging with Olympic Airlines and the entrance to the Star Alliance network in 2010, are some of the greatest accomplishments.

In June 2013, Aegean was awarded, for the third time in a row, as the best regional airline by Skytrax International Awards. In October of the same year, Aegean Airlines launches the new category of Economy class tickets, European Commission gives the green light for Aegean's buyout of Olympic Air and by the end of month Olympic Air becomes a subsidiary company of Aegean Airlines Group.

By the August of 2015, the international routes were more than one hundred (160), spreading in twenty-eight (28) countries across twelve (12) airports in Greece. Beyond any doubt, it is rightfully recognized as the national carrier of Greece.

In 2018, the decision was made to renew its fleet, and a contract was signed with Airbus for the delivery of thirty (30) A320Neo aircrafts with GTF engines. One year later, the first aircraft of the New Era lands to Aegean's base and in December 2020, eight (8) more aircrafts joined its fleet.

During the Covid period, company finds ways to cope with the international crisis, always staying true to its values and aiming to satisfy the needs of its customers. Emerging stronger, more competitive and innovative, in line with the rejuvenating spirit of the post-covid era.

The company, always guided by its client-oriented strategy, proceeds with radical changes of its structure by automating processes, using new digital tools across all departments, strengthening digital marketing, and introducing new online services for its passengers, throughout the stages of the journey experience. Latest service, is the Wi-Fi On Board service, the high-speed inflight broadband Wi-Fi, launched in February 2022.

5.2   The digital era

In this paper, we will concentrate to digital products, that Aegean Airlines has launched during the years, and we will analyze their impact to both the airline and its passengers. Digital transformation is not risk-free. Deployment of new technologies is costly factor, so their adoption is the result of strategic data-driven decisions. It is difficult to invest in digitalization, without a proper modus operandi of evaluating the success and profitability of project realization.

It is widely known that the spread of the Internet connectivity worldwide, has modified the way airlines approach their customers. Social media and the digital applications shaped the new economy and gave airlines the chance to recognize customers' needs. As a result of the new economy, multiple buyer personas were developed by the marketing departments. Airlines achieve higher revenues by creating services and products closer to them and giving them the opportunity to shape the final travelling experience. At the same time, the digitalization of the procedures and automations, lead to costs reduction. Aegean established tools to analyze the data which are available, by assessing their capabilities to proceed with DT, setting the perspective of acting proactively for customers and concurrently remaining ahead of the curve.

Online booking, web check-in, manage my booking, credit voucher, seat selection, digital ID, the upgrade challenge, are some of the digital products, that Aegean launched in the recent years. Then we will analyze each of them, from the initial idea phase to the stage of implementation and we will evaluate the extent that were accepted by the passenger public.

5.2.1   Online Booking

Back in the 90's till the early 2000s, purchasing an airline ticket was not a simple procedure. The customer had to contact the call center of the company or his travel agent or to physically go at the company ticketing office. The ticketing agent had to check the availability of the flights, find the lowest available published fare and proceed with booking of the seat. In the end, the paper ticket was issued by a printer, which included the itinerary, the date, the passenger's name, the fare and tax analysis. (Al-Khubaizi, 2019)

This paper was used as single source of truth that the passenger had paid the fare for the specific flight and could be boarded. Ticketing agents were 24/7 and 365 days on duty, the queues at the ticketing offices were endless and passengers waited for hours, in order to obtain the relevant paper, which allowed them to fly to their destination.

In 2003, Aegean was the first airline company in Greece, which launched the online booking service (Airlines, Aegean Group History - Milestones, 2023).

The massive usage of Internet and the new distribution, quoting and ticketing platforms adaptation, allow for the customers to book their flight and issue their tickets online, updating the seat and fare availability in the airline's system (Sheivachman, 2017). The issued ticket is sent via email to the passenger and includes a scannable barcode and it stores all the passenger's and itinerary's details. Following diagram describes the linkages of the distribution system.
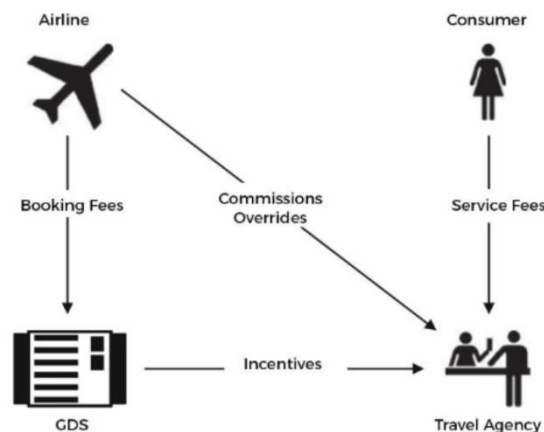
2 Source: GDS System
The Future of Blockchain in Travel Distribution 2018 (Bujarski, 2018)

The initiative was more than welcome from the Greek and international clientele of the company.

A large proportion of customers use the company's official webpage to book their ticket within a few minutes, without fees or extra commissions. As they became familiar with the online booking process, new requirements of the passenger public for more online services, were identified. The company, aware of these needs, gradually introduces new services during the booking procedure, either implemented purely by the airline, or in collaboration with other companies, with the aim of providing an active comprehensive travel experience.

5.2.1.1 Early steps

The first version of this new digital product was a lean interface with basic options for the user. The user could select the destination, the date, and the number of the passengers. In the next step, he had to fill in the personal details (title, surname, first name, mobile phone and email) and then he completed the reservation, by passing to the final step, where he could perform the payment via credit or debit card. Following these actions, the page revealed the reservation code and the summary of the booking and then an email was sent with all the above information.

The following years, the product was enriched with more options, such as the mileage membership account set as optional passenger detail value field, new fare families selection, and the analysis of the price as a summary box during the flight selection step.

3. Online Booking, First Interface
Source: Aegean Airline's Digital Department

5.2.1.2 First upgrade of the service

In June 2016, a significant upgrade took place, that was designed by ATCOM S.A. regarding the connectivity capabilities of Aegean Airlines online services. More specifically, the current interoperability framework of Aegean with Oracle Cloud, Amadeus ticketing and loyalty systems, banks' collection and redemption points, Hertz Rental Car and Sitecore CRM data collection, was enriched with more features (ATCOM CASE STUDY, 2023).

The new interface has a modern and user-friendly design, providing a consolidated and unified user experience across all electronic devices (desktop, smartphones & tablets). A series of significant changes is presented below:

- Single page flow, that enabled users to stay focused on each step of the booking process
- Ability to review and edit all the previous steps before the payment
- Option for a user who has an Aegean account to login and automatically has his personal details submitted as main passenger's details
- Introduction of a new step "Baggage & Extras" offering all current & possible future air ancillaries.
- Share booking event to social media or add it to the calendar
- Display transfer time for connecting flights
- Special meals selection
- Weekly calendar flow, in order to find the ideal combination of flights, taking into account budget alternatives

- Car and Hotel accommodation provided by the network of collaboration companies, in order to offer complete travel experience
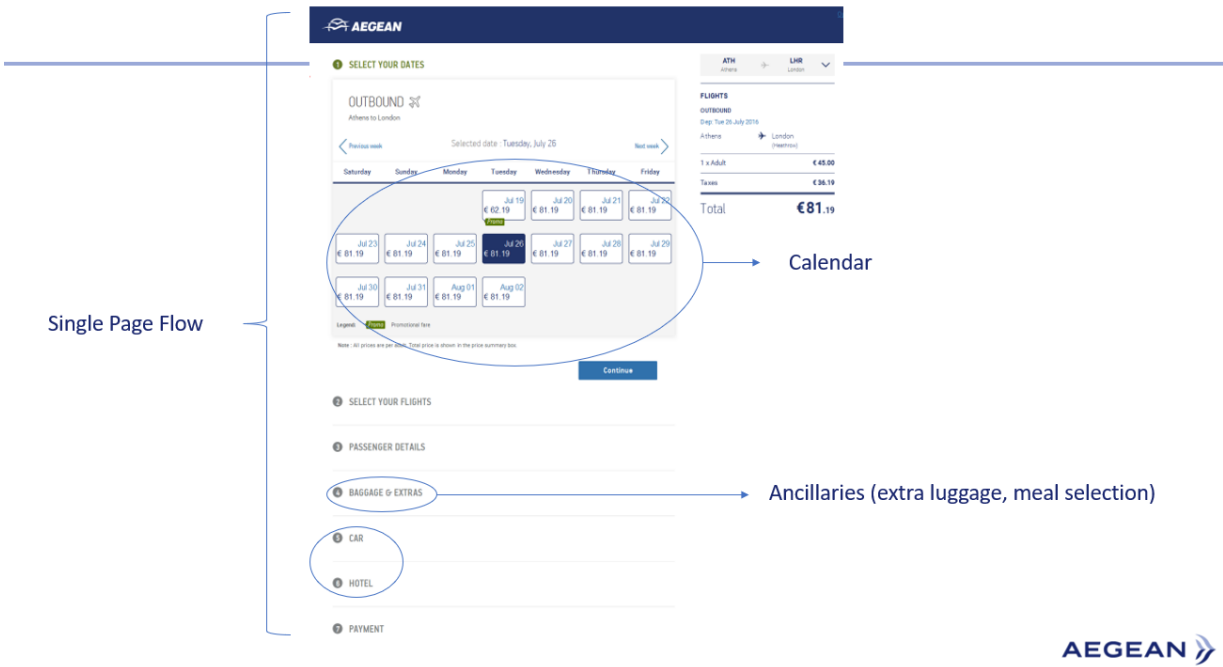
4. Online Booking, 2016
Source: Aegean Airline's Digital Department

5.2.1.3 Special assistance

Seven months later, in January 2017, the company, offers more autonomy and options to its clients, by adding to the booking flow the special assistance request, that can be performed online. Passengers with disabilities, for instance, moving disability, impaired vision, or hearing, can request for an assistance through the airport to aircraft cabin, free of charge.
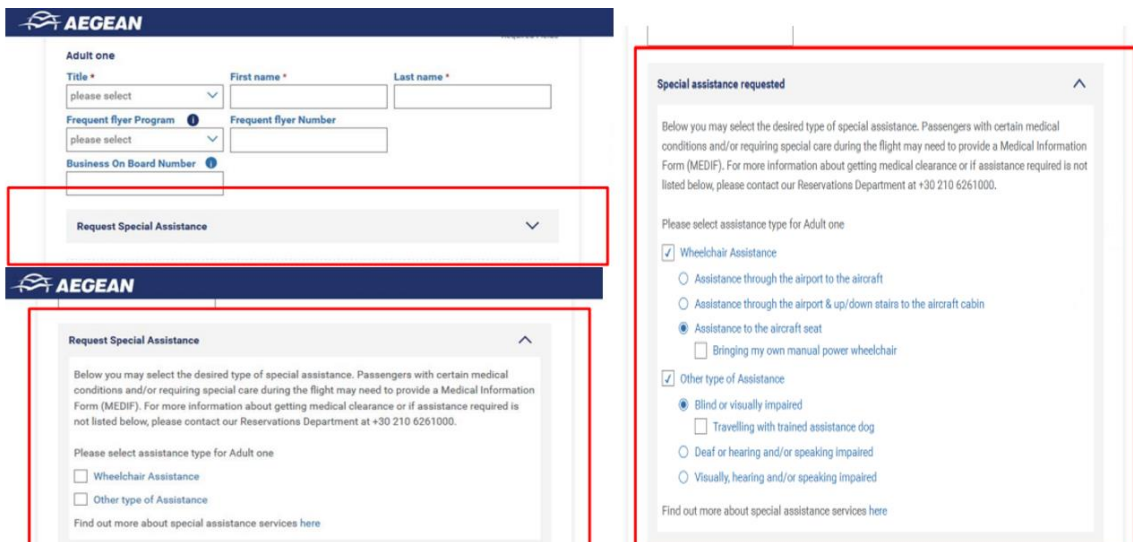
5 Special Assistance
Source: Aegean Airline's Digital Department

5.2.1.4 Multiple Currency Payment

In February 2021, the airline, comprehending and respecting its international clientele, is adding a new service (MCP), that enables users to price and pay for a booking in their preferred currency.

The default currency is the euro, however in a drop- down menu, the customer is able to select between the alternative currencies offered (USD, GBP, AUD, CAD, CHF, DKK, SEK and ILS). The currency converter is available in the main booking steps, the calendar, the flight selection, and the payment. The service offers benefits to both customers and the company. Customers can benefit by knowing exactly how much they are spending in a currency they understand and feel more comfortable with. At the same time, MCP can bring additional revenue for the company at no additional cost to their customer.
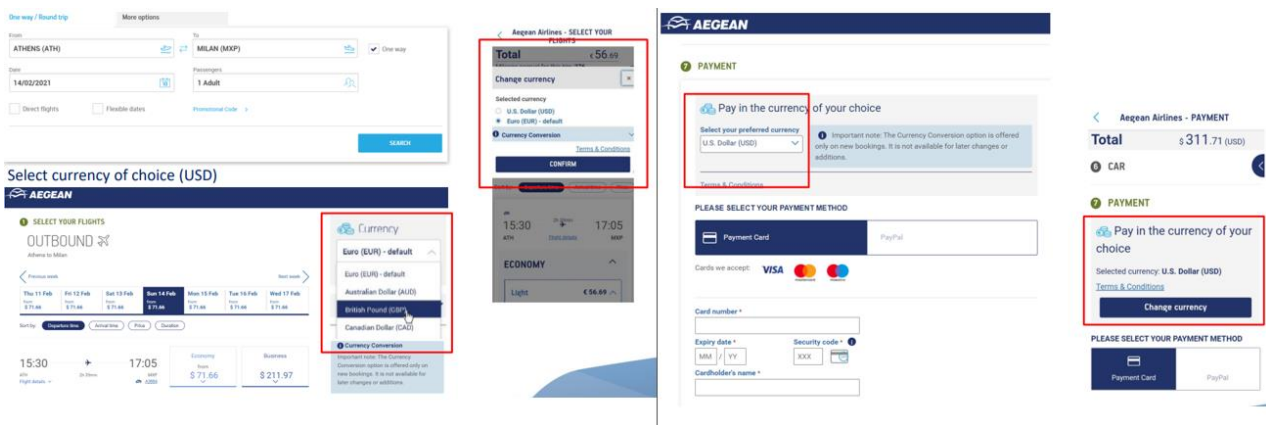
6 Multiple Currency Payment
Source:Aegean Airline's Digital Department

5.2.1.5 Miles & Cash

In November 2021, a new payment method is activated with which an airline loyalty member may redeem the miles and pay a part of the ticket and ancillaries. By mapping all revenue booking classes - Reservation Booking Designators (RBDs) in miles, applying a conversion rate and via a converter tool user interface (UI), providing customer the capability to divide the tickets' cost into miles and/or cash, based on his miles balance.
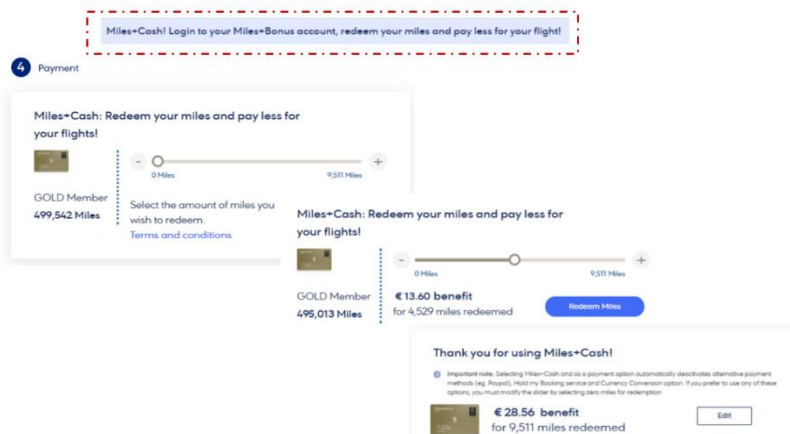
7 Miles and Cash
Source: Aegean Airline's Digital Department

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5.2.1.6   Current Booking Flow

Current interface is even more improved, as even more tools and services have been added. The last redesigning was performed in April 2022. New, clean design & navigation, enhancing the user experience making the booking process even faster, with emphasis on mobile experience. Using clear & descriptive navigation bars on the top and bottom of the page, passengers:

a) know exactly where they are in the Booking process

b) can easily move to the next steps or

c) edit previous selections

Along with the redesign, Discover credit card for US Market & JCB for Japan were initiated, in order to facilitate the constant increasing international customers around the world.
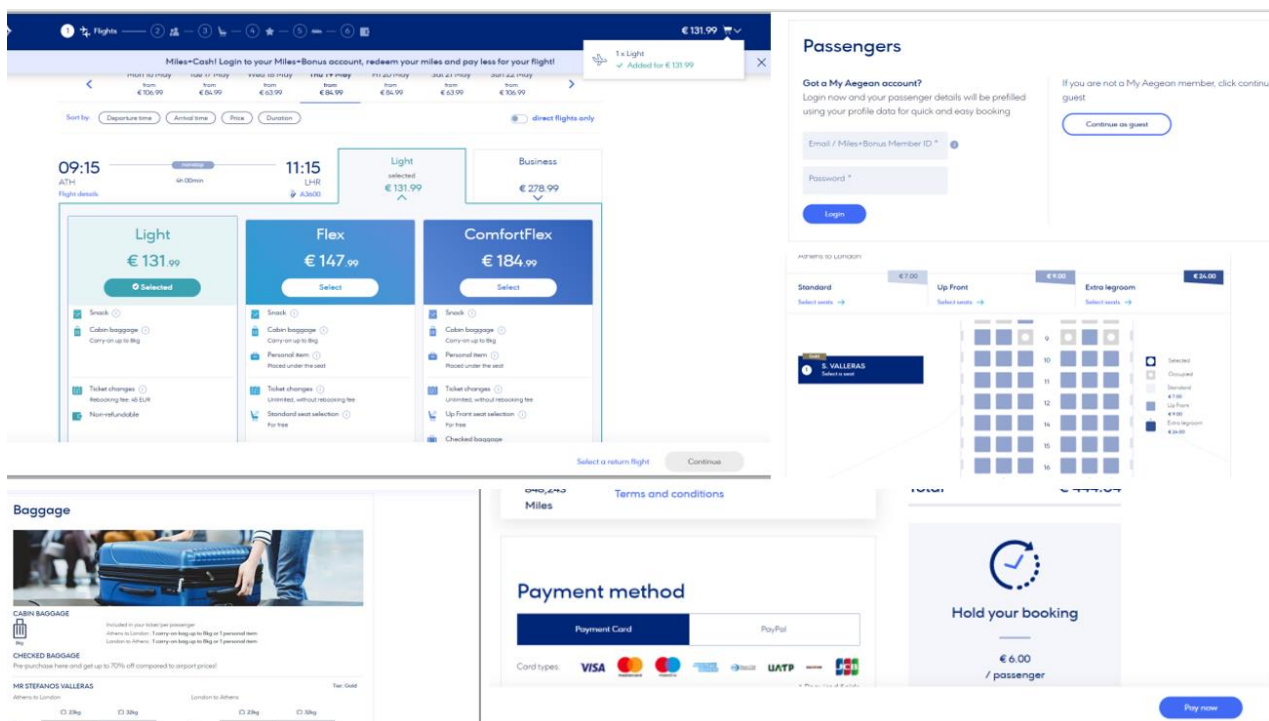
8 Online Booking, Current Interface
Source:Aegean Airline's Digital Department

5.2.1.7   Aegean Beyond

In an effort to expand the existing network, increase its connectivity and enhance its ever-growing revenue tide, Aegean launched in November 2022 a new Virtual Interline online booking service, Aegean Beyond. This service was developed in partnership with Dohop and offers connecting flights, operated by different flight carriers, without the necessity for interline or codeshare

ticketing agreements. Passengers can select between fifty-four (54) new routes, operated by collaborating carriers, having the capability to select the active fare products along with extra luggage. Passengers go by the same interface flow throughout the entire journey and at the end, receive separated booking references, by each airline. During the booking process, important information is provided, such as baggage connectivity, connection airport time and cost analysis per airline. It's an innovation based on technical interoperability standards between different
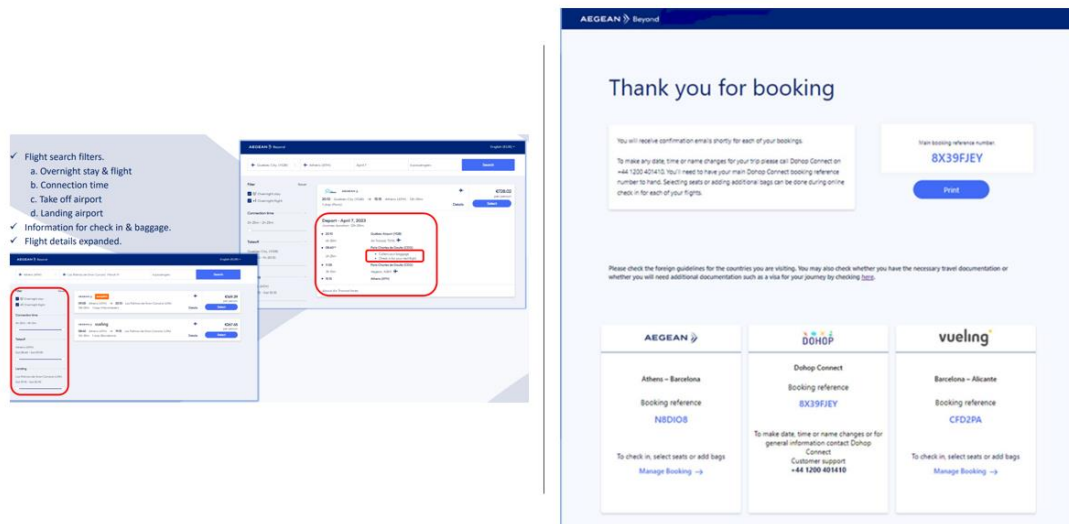
9 Aegean Beyond
Source:Aegean Airline's Digital Department

airlines and airports that portends the new era in the online booking.

5.2.1.8   Impact to the passengers

The online booking, the digital tool of Aegean Airlines, made a nice impression to the public. According to company's internal KPIs, 65% of the overall customer base opted to proceed with online booking. Moreover, according to ATCOM's case study of Aegean Airlines (ATCOM CASE STUDY, 2023), concerning the period from 2016 until present, a significant rise is observed regarding the following elements:

- Number of Visits → 30%
- Volume of Transactions→ 29%
- Volume of Mobile transactions → 170%

The website counts an average of more than 5 million website visitors (SITECORE, 2016) per month a tangible metric underscoring that it has gained customer's satisfaction and loyalty.

Finally, the latest launching of Aegean Beyond has already excited the website visitors, highlighting its strong footprint.

5.2.2 Web Check-in

Check-in is the procedure, with which, the airlines companies approve passengers to board on a flight. Originally, check-in was carried out exclusively at the airport counters and was handled by the airline or by the airport's handling agent. The passenger provided his ticket along with his travel documents (passports, identity card, visa etc.) to the agent. Then the agent checked the passengers in the relevant flight's passenger list, checked the relevant luggage to aircraft's hold and issued the boarding pass. The duration of the check-in was estimated between 15 minutes up to 2 hours depending on the airport, the destination, the number of personnel etc.

In December 2011, Aegean launched the online check-in system and since then, offers to passengers the ability to receive their boarding pass, by using one of the two available tools: Web check-in and mobile check-in. The web check-in is available 48 hours up to 30 minutes, prior to the scheduled time of flight's departure. Following the seat selection, passengers can receive their boarding pass either by email and subsequent printout it or in their mobile phone in two-dimensional bar code format (More ways for you to check-in, 2011).

5.2.2.1 Passbook

In April 2013, the mobile check-in was further developed, in an effort to expand the online check-in service, by introducing the "Passbook" application, available for iOS and Android phones. Passenger can download the boarding pass, having instant access to it, even offline. Client using the app, may see his mobile phone screen for the boarding pass, as a QR code which is immediately accessible and easy to be scanned at the airport during embarkation (Lock screen) (AegeanAir, 2013).

10 Aegean Passbook Source : (News, 2013)

5.2.2.2   Passport & ID scanning during check-in

A new digital service for the activity of the online check-in, was launched in September 2016. Passengers using the Aegean app had the option to scan their passports or identity cards upon request and automatically fill the relevant fields of the document details. The scanning service supported travel documents issued by more than one hundred (100) countries. The app uses the device's camera to capture passport or ID information, saving time by accelerating the check-in process and minimizing human data entry errors.
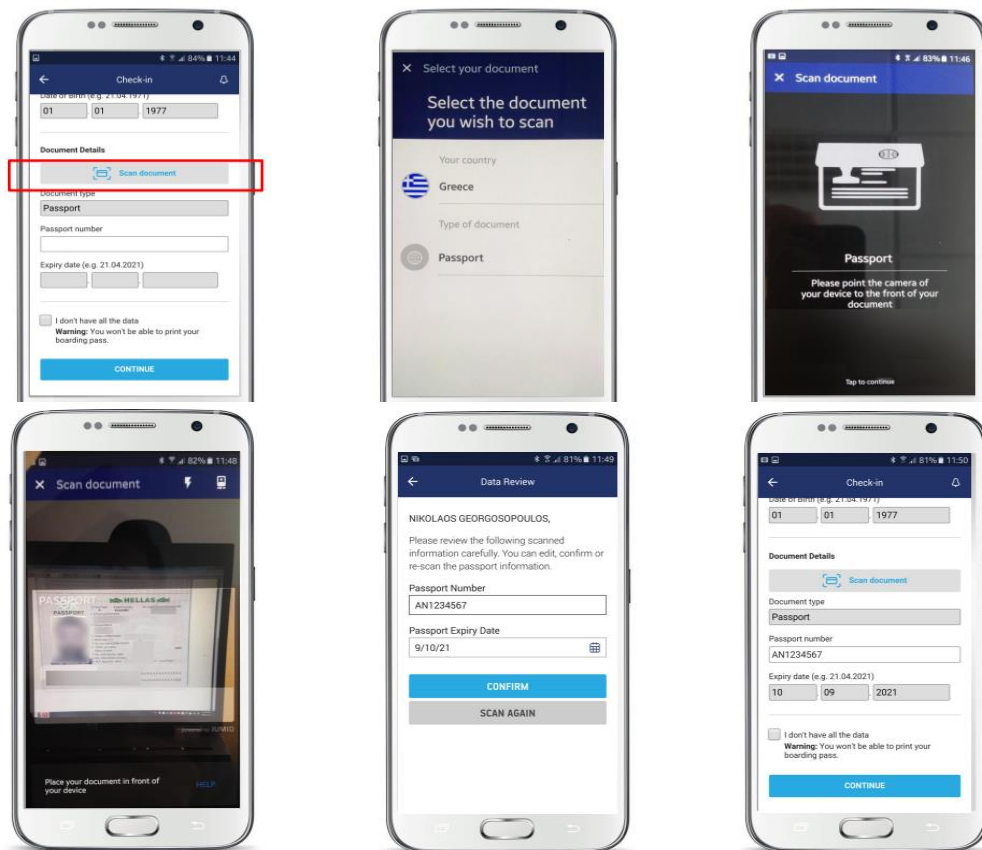
11 Passport Scanning
Source:Aegean Airline's Digital Department

5.2.2.3   Digital ID

Latest initiative of the company regarding the online check-in process is the Digital ID service, which was launched in February 2023. Service allows for the app users to insert their digital ID on their mobile boarding pass. Thus, ground control operations staff may perform a visual check without the need of the travel document, resulting into speeding up the boarding process. At the moment, the service is available only for domestic flights, as it requires the installation of the Greek Gov.gr wallet smartphone application. Roll-out of this service was of paramount importance, considering that the airline capitalized on the existing interoperability framework with Gov.gr. Respecting personal passenger data, the process is safeguarded by the one-time verification code, received on Gov.gr wallet. This process can be completed in four simple steps.

- Selecting the passenger
- Submitting the Greek ID number
- Inserting the one-time password, received by Gov.gr
- Obtaining the boarding pass
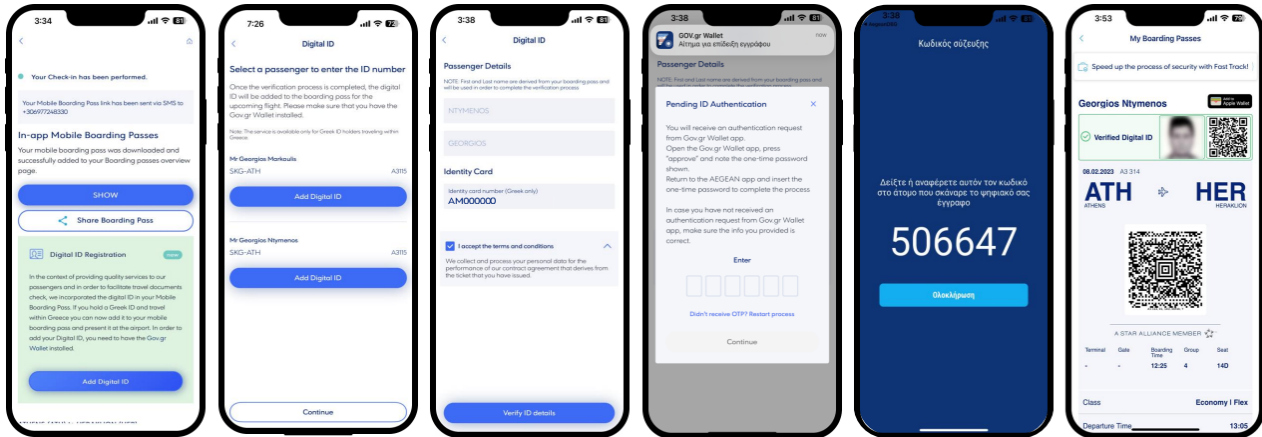
12 Digital ID
Source:Aegean Airline's Digital Department

5.2.2.4   Impact to the passengers

The web check-in is, by far, considered as the most successful digital service of the company, perceived by the passenger angle. More specifically, 70% of the public proceed with online check-in, highlighting the significant benefits that the customers receive. As such, the passengers can go directly to the departure gate as there is no need to wait in long queues of check-in desks.

5.2.3   *Manage my Booking*

5.2.3.1   Early Steps

Manage my booking is one of the first digital tools that Aegean Airlines launched, contemporaneously with Online Booking. Passenger, following ticket purchasing, maintains access to the booking, as many times as he needs, providing only his booking reference and his family name in the relevant field. At its first version, the tool had only informative usage. Passenger could retrieve flights details, such as departure time and estimated arrival, itinerary, price along with the baggage allowance. Even though there were no additional actions to be taken, the existence of this tool, created a sense of trust and comfort to the client, on the basis of non-hardcopies of the actual booking, until the day of the flight. It was just the forerunner of what would follow.
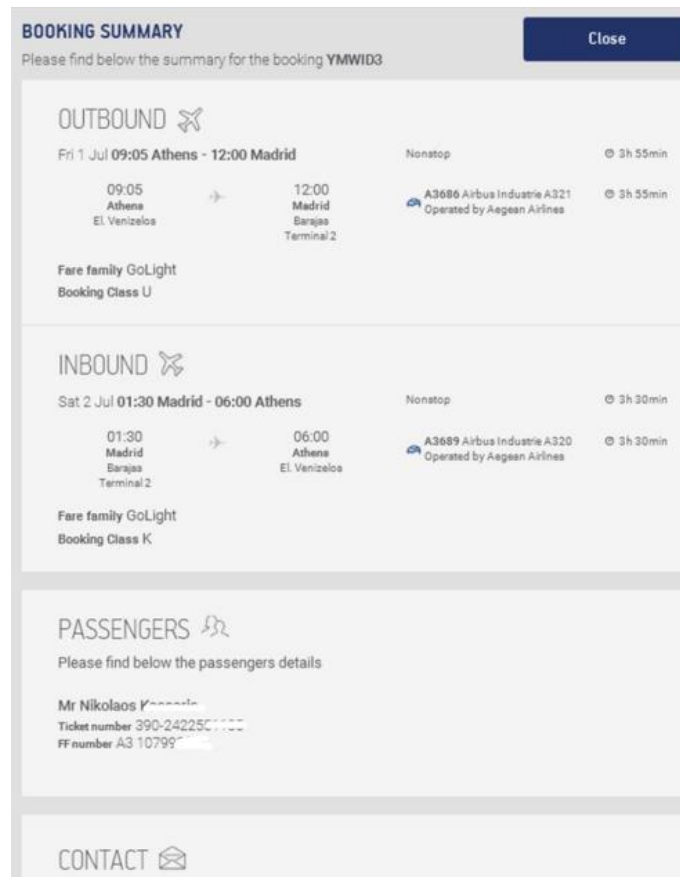
13 My Booking, First Interface
Source:Aegean Airline's Digital Department

5.2.3.2   First upgrade of the service

In June 2016, important website upgrades were undertaken resulting into significant updates of the services pertaining to Manage My Booking. Additional features added were various and significant. Still, they are available until present.

* End-user can store and share the booking in three different ways. Download the booking summary in his desktop or mobile phone, add the booking to the outlook calendar or share the booking to the social media.
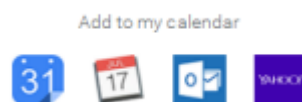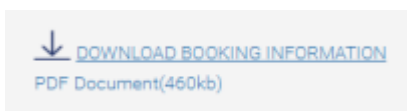
14 My booking, 2016
Source:Aegean Airline's Digital Department

- A countdown meter is now displaying the time until flight's departure and a second until the check-in (48hours before the departure)
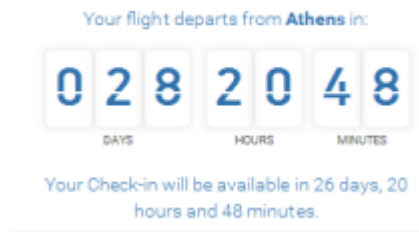
15 Flight Counter
Source:Aegean Airline's Digital Department

- The most important and useful element is the *flight change.* The user has for the first time the capability to rebook his flight, following a procedure similar to the online booking. Prior to this, the passenger had to contact the airline or the travel agency or visit the ticketing office at the airport to proceed with rebooking, paying the reissue fees and wasting time. The online rebooking offers an immediate rearrangement of his journey from the comfort of his electronic device, without service fees and most of all maintaining the option to check the date with the minimum fare difference (depending on his flexibility). After the new flights confirmation, the user completes the rebooking, paying the relevant amount and his reservation is now updated.
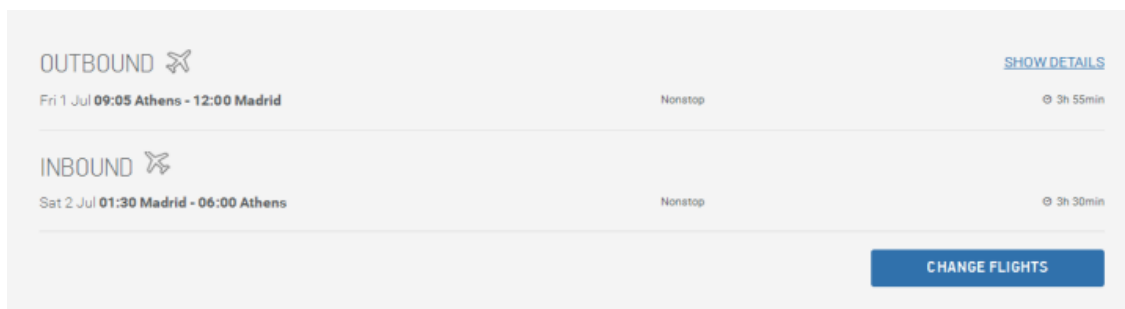
16 Edit Flights, My Booking
Source:Aegean Airline's Digital Department

- The purchase of extra luggage is the next important option, offered as a result of the upgrade. Passengers can request and pay, until three hours before their departure, for additional baggage. This service provenly reduces the ancillaries cost up to 40%, since the airport charges are high and at the same time decongest the airports desks from the heavy passenger traffic workflow.

17 Extra Baggage Option
Source:Aegean Airline's Digital Department

- Edit details allows the user to modify his personal contact details (mobile phone, email) and add his mileage membership number to the reservation, in order to obtain his air miles without supplying the membership card in the check-in desk.

18 Edit Passenger's Details
Source: Aegean Airline's Digital Department

- Finally, additional ancillaries were introduced which, until then, were available only during online booking flow, for instance, car rental services, hotel accommodation booking, travel insurance addition and parking reservation at the Athens International Airport (AIA).

5.2.3.3   Current State

The following years, the digital product of "*My Booking*" has been enriched, providing the ability to the end-user to manage his booking, in various cases and cover many of the after-sales needs. Other worth-mentioning options, that have been launched over the years are the seat selection, the adding of pet in cabin or in aircraft's hold, the meal selection, the sport equipment, and the special assistance request. The idea behind this, is to give the option to the passenger to book his flight without anxiety, knowing that he will be able to modify it at any given time and be able to act immediately and independently in line with his travel plan necessities. Apart from increasing customer's satisfaction, the product offered significant revenue streams to the company, as a result of the ancillaries and the extra services provided.

5.2.4   Self Re-accomodation

Digital service, was launched in November 2022, and provides to passenger the autonomy to manage an irregularity in his flight, such as a schedule change or cancellation without contacting the company.

Once the passenger receives notification via email for schedule change, he can access his booking via "*My booking*". Two options are offered, either to accept the reprotection that the airline suggests, or to rebook, free of charge, to another flight within a seven days range (+/- 7). In case of rebooking, the user follows three simple steps:

➢ Select a Flight

➢ Review the flight
➢ Booking Confirmation

Whenever *"Book"* is selected, new flights are confirmed and disrupted segments are removed from the PNR.
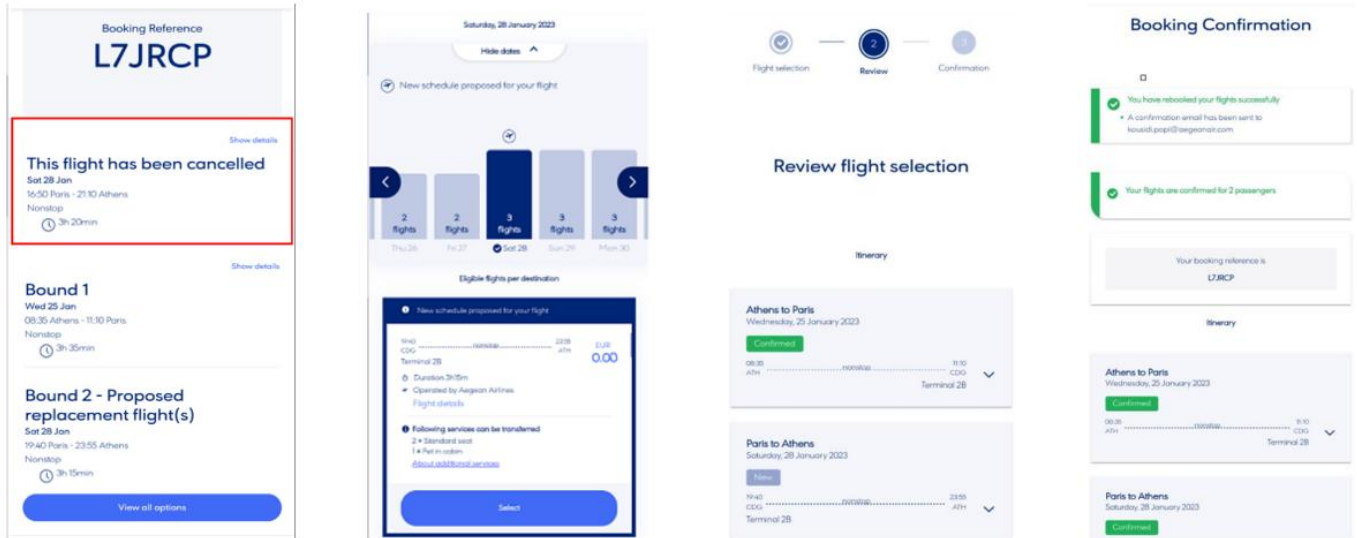
19 Self Re-Accomodation
Source: Aegean Airline's Digital Department

5.2.5   Upgrade Challenge

Upgrade challenge product allows customers to submit their bid, post-purchase, for upgrading their Economy class tickets, to Business class. Upgrade is requested and processed per passenger, but it's not confirmed immediately. The procedure consists of seven simple steps:

Customer books an economy class ticket
➢ A notification email for upgrade is sent
➢ Passenger submits the offer with his payment details
➢ Offer is stored for evaluation purposes
➢ Best offer selected by the airline in a real-time availability
➢ Passenger's credit card charges with the offered amount
➢ Passenger's gets the upgrade and enjoys a business class experience

According to company's internal insights, more than 65,000 passengers opted for bid upgrade in 2022, increasing the company's revenues and boosting customers' satisfaction. As such, clients are able to enjoy the Business class experience.

20 Upgrade Challenge
Source : (AegeanAirlines, Upgrade to Business Class, 2023)

5.2.6 Live notifications

Another significant digital service, existing since September 2016, is the flight's live notifications. An initiative that demands connectivity and data exchanging among airports, check-in, baggage tracking and passenger's information. Passengers are automatically notified in real-time in their mobile phone about gate information for the opening of check-in, boarding time, gate change, delayed departure, baggage claim belt in airport of arrival via push messages in their app, email, and SMS. This service allows for the passengers to have a less stressful and more harmonious travel experience (Langholz, 2022). Aegean counted 500,000 active users for February 2023, underlining the importance of the service for the passengers and the company.

Receiving live notifications, passengers feel more confident about their flight and appreciated by the airline they have chosen to travel with. As such, Aegean airlines, is showcasing its care for the customers. At the same time, launching live notifications, company avoids probable complaints by its clientele, increases the chances for future bookings from satisfied clientele and develops a loyalty with them (OAG, 2023).

5.2.7 Low Fare Calendar

The two basic criteria that influence the customers' decision regarding the purchase of an airline ticket is the Safety and the Price. More specifically, a good safety record attracts more than 90% of the passengers, whilst 50% is attracted by ticket pricing (Liou & Tzeng, 2010). Considering that that Aegean's first priority is the highly standardized set of procedures and the high quality of services, is reflected on ratings. More specifically, in accordance with the Airline Ratings (COMPARE AIRLINE SAFETY RATINGS, 2023), Aegean scored seven out of seven (7/7) in Safety Rating among all the airlines globally.

Since the company already meets one of the two essential criteria set by passengers, it had to remain competitive so as to fulfill the second criteria, namely the price. In an effort to attract the passengers with low budget or whoever has set the price as the main prerequisite, Aegean launches in June 2013 the "Low Fare Calendar". Essentially it is a digital tool, updated on a regular basis and indicates eleven calendar months. It offers the capability to identify the lowest fare for their preferred destination. Low fare calendar is connected with the booking services, so once the passenger finds the appropriate combination, he proceeds directly to the booking. The service has
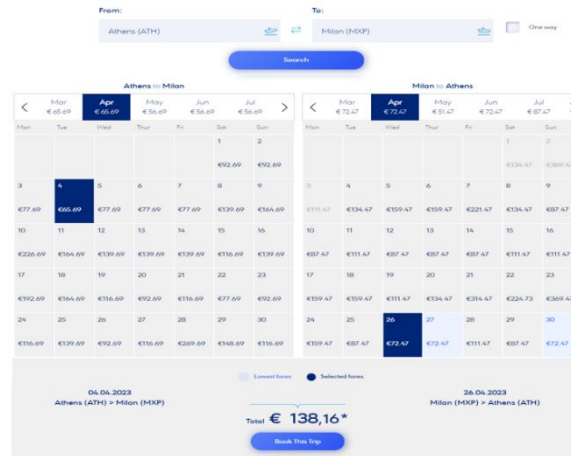
21 Low Fare Calendar
Source: (AegeanAirlines, Low Fare Calendar, 2023)

been well received by the passenger public, from the first operational day until today. According to the internal company insights for the year of 2022, "low fare calendar" received more than 3,5 million views.

5.2.8   Digital Products during Covid-19

5.2.8.1   Credit Voucher

COVID-19 pandemic had a remarkable impact on the airline industry. After the international lockdowns and the travel restrictions that were announced in March 2020, the airlines were forced to perform massive flight cancellations. As a consequence, the flight cancellation obliged the airline to fully refund passengers. Considering that Aegean Airlines is one of the most significant airlines in Europe noting passenger traffic record of 15 million individuals for 2019 and a promising 2020 round the corner, the refund of all cancelled tickets would result to severe liquidity problems for the airline. As such, the credit voucher was introduced, a credit document that exchanges the value of a purchased ticket and the relative services. It offered the capability of the company to roll-over its short-term financial commitments, thus avoiding a potential liquidity crisis. Additionally, it offered the ability either to exchange the value for a new booking or to refund it after one year of its issuance. Even though, in the beginning the customers were suspicious about this product, later they started realizing the benefits of its usage. More specifically, the use of the credit vouchers offered a 10% top up for the future booking and the voucher could be used either for the same passenger or as a gift to a third person.

Passengers could request it easily online by submitting only their ticket number, their family and first name and their email address. Requests were evaluated by the airline and the customer received the credit voucher within 24 hours. Even though the product was created to be used in the period upon active travel restrictions, customer acceptance played a major role for the decision to deploy it in the future. Since 2020, 700k credit vouchers have been issued.

5.2.8.2 Pre check of Covid-19 documents

In February 2022, having already gone through two years in pandemic, check-in was enriched with the upload of the vaccination certificate or negative rapid test or proof of recovery in order to speed up the boarding process and at the same time strengthen the commercial hygiene protocols.

22 Covid Documents
Source: Aegean Airline's Digital Department

Passengers, after the uploading, received an email that Covid-19 uploaded documents are valid or feedback they are invalid. Upon document verification, booking is updated, and passengers receive confirmation. After this, no further documents are required at check-in desks and boarding gates by ground control operations personnel. Existing Interoperability framework with Gov.gr, offers instant confirmation of Covid-19 documents, which are issued by the public service.

5.2.8.3 Purchase Covid-19 PCR Test

In December 2020, and while the travel restrictions were still valid, Aegean in collaboration with medical centers in Greece and abroad, with a sense of responsibility and realizing its customers' needs, decided to offer a new digital product to them. Clients had the option to purchase a Covid-19 PCR test at a discounted price, regarding the forthcoming flight. Passenger could simply, fill-in his booking reference and his family name, book his appointment to one of the collaborating laboratories and finally pay the service either by credit card or by redeeming miles collected through the membership card. After the purchase, passenger received and extra 10-EUR discount for his next flight.

5.2.9 **Wi-Fi on board**

In February 2022 Aegean developed a new Inflight Entertainment platform offering media content, travel related services and high-speed internet access so that passengers can stay always connected for business or entertainment purposes. This digital product is the result of an effort to

create a joyful flight and make the travel experience even more pleasant. In an era, when the usage of the internet is necessary for our lives, the ability to maintain internet access, even during the flight is substantial. Although, it is still early to have a clear picture of passenger response to this new service, so far relevant benchmarking suggests that approximately 20% of passengers purchase internet access throughout the flight duration means, a positive indicator.

Internet access is provided by EAN and uses Deutsche Telecom's network and satellite, in order to offer High Speed Internet access. Passenger during the flight, connecting to the Aegean Wi-Fi network, obtain platform access to the following categories:

✓ Music
✓ Games
✓ Series
✓ Destination Guide
✓ Moving Map
✓ Documentaries & TV news

Furthermore, passenger public can purchase Wi-Fi access, applicable for their social media, internet browsing browse and email exchange (Aegean, 2022).
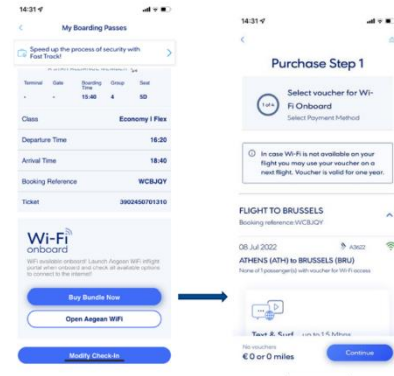
23 Wi-Fi on Board
Source: Aegean Airline's Digital Department

6

New Digital Trends and Ideas

6.1 Digital Trends

In the past, the airlines were trying to stay competitive in line only with the needs of the business landscape, whilst nowadays they have even to strive according to the digital trends. The pandemic accelerated the digital adaption for all of us. Customers acquired new online shopping habits, initially as a necessity and then as a desire. Customers' expectations are related to the digital tools, that the companies offer. Awareness of a brand is defined by its digital accessibility. Airlines realized that the digital products offered, function as differentiator in the market.

In the literature research undertaken for this paper, many digital trends have been examined, apart from those already adopted by Aegean Airlines. In this chapter, digital products and services provided by other airline carriers will be stated and classified based on the factor of key digital transformation technologies.

Blockchain Technologies

Many airlines have identified blockchain technology's tangible benefits, in order to enhance their business activities. More specifically, there is fertile ground for the implementation of blockchain technology as a single source of truth in the form of digital ID (Robosoft Technologies, 2017). As such, there will be no need for physical verification of PII by the customers prior to flight check in. Extending equally by capitalizing on the privacy and confidentiality concepts, client data administration can be more resilient in terms of data security (Robosoft Technologies, 2017). For instance, Air France has invested in developing a digital application (Dom Galeon, 2017) for blockchain-based passenger health passports, indicating negative Covid-19 tests (Finbrief - Team Blockchain, 2021). Additionally, British Airways in collaboration with Zamna technologies have developed blockchain-powered facial recognition software by using cryptographic algorithms for ID validation (Remus Brett, 2019). Finally, from the commercial perspective Singapore Airlines utilizes blockchain technology as an essential ingredient of its mileage loyalty program by providing promotions to clients via KrisPay, a digital application for mileage conversion to money amounts and vice versa, made for consumer products and services (Mainly Miles, 2020).

Biometry

Biometrics technology has been leveraged, in order to finetune the check-in process (Robosoft Technologies, 2017). For instance, Delta Airlines has deployed biometric-aided self-service luggage drop procedure. More specifically, following travel document scanning, a passenger face snapshot

is taken and then the passenger is allowed to proceed with luggage weighing and drop, directly to the air cargo (DeltaAirlines, 2021). Recently, Air New Zealand relieved its passengers from boarding passes usage, by deploying biometric tools. After performing the registration to Customs and Border Protection (CBP), provide their biometrical data. Upon their arrival at the airport, they pass from airport self-boarding kiosks, and are identified by utilizing facial recognition (Goodbye boarding passes, hello biometric facial recognition, 2022).

Virtual Reality and Augmented Reality

Augmented, virtual and mixed reality provide a new alternative to airlines companies, by offering and even more immersive travel experience. A large proportion of travelers, that touched base with virtual reality experience in the past, admit that this experience influenced their decision-making (Vinod, 2022).

For instance, Lufthansa and Etihad provide their clients the option, to take a virtual tour of the aircraft while they proceed with seat selection, in order to entice them to purchase chargeable legroom or an upfront seat (Lufthansa, 2018), (EtihadAirways, 2023). Moreover, Air France, is about to roll out the pilot offering of HDM (Head-Mounted Display) devices and headset during the flight. Currently HDM is under the User Acceptance Testing (UAT) phase and the passengers can watch Virtual Reality (VR) videos enjoying pleasant inflight time (Air France Begins VR Entertainment System Testing, 2023). Emirates goes a step further, by enriching the on-board entertainment with VR activities, such as playing VR games, live a lounge experience or a shower spa experience (Onag, 2021).

6.2 Digital Airline Ambition 2030

Considering that during the Covid pandemic times, airlines had to address particularly difficult challenges and different emerging priorities, the digital transformation leap was considered an imperative element of paramount importance. As such, IATA members established the Digital Airline Ambition 2030 (IATA, 2022) framework with the vision to fortify the efforts of the airline industry to reach full digital maturity and shift away from legacy systems and bureaucratic processes (IATA, 2022).

According to the Digital Airline Ambition 2030 framework there are five (5) different areas of focus, making an impact on the B2C field, as follows:

Ground Operations

Baggage

Airlines, airports, ground handlers and customers have visibility into real time bag location enabling a seamless flow across the network. Algorithms automatically resolve baggage issues like automated re-routing.

Aircraft Turnaround

Airlines, airports, ATMs and all ground service providers can digitally access and share information with each other in real-time, enabling a predictable, safe and fully coordinated aircraft turn in one globally accepted framework.

Airlines and airports share relevant data about expected and actual passenger flow in-airport to improve operational performance. All use smart resource (i.e., uniquely identified, connected and operating autonomously) allocation to ensure efficient utilization of resources.

26 Digital Ambition 2030 Framework (IATA, 2022)

End-to-end Customer Journey

Customer Identity

Airlines, and governments use digital, biometrically enabled identity to accurately identify customers and provide seamless service and enhance travel safety & security. Customers have control over personal data and visibility how their data is used incl identity, travel authorization, health information, other credentials.

Engage & Experience

Airlines seamlessly deliver end to end travel experience and provide same information on travel status through all channels. Customers are empowered to manage travel and disruption through all digital channels, including indirect channels and full contactless airport process.

Cargo Flow

Airlines and customers have visibility into real-time cargo location and state across the end-to-end supply chain via a 'digital twin'. Algorithms automatically identify and resolve cargo issues.

27 Digital Ambition 2030 Framework (IATA, 2022)

Data & Technology

Open Ecosystem

Airlines have fully optimized, real-time big data infrastructure, built on leading technologies. Comprehensive innovation program providing open but controlled access to data by 3rd parties (Open API).

Digital Identity

Airlines have implemented identity management frameworks allowing for unique digital identification of all resources.

AI & Advanced Analytics

AI & Advanced Analytics serves as the foundation of airline decision-making and provides competitive advantage in core functions.

Cybersecurity

Airlines' cyber-security capabilities are on par with digital leaders, effectively safeguarding key digital assets and proactively managing and mitigating cyber-security risks.

28 Digital Ambition 2030 Framework (IATA, 2022)

Digital Transformation Strategy & Organization

Digital Transformation Strategy

Enabled by a firm understanding of technology trends and their disruptive impact on the airline industry, the airline has a clear vision of how digital will support the airline's overall strategy, deliver business value and provide competitive advantage.

Digital Talent

Airline is among the top companies (across industries) in terms of attracting, onboarding and retaining digital talent. The airline's training and upskilling programs enable one of the most digitally skilled workforces in aviation.

Agility

Agile ways of working deployed across the airline, including outside of digital products. Teams work autonomously with a clear customer/end-user focus.

25 Digital Ambition 2030 Framework (IATA, 2022)

Although other industries have recorded significant progress in the DT field, the airline industry is the in the middle of the digital journey.

6.2.1 New Ideas

IATA is in the process of mapping the uncharted waters of the digital journey, in the form of exploring new digital initiatives for its members. One field of particular significance is identified in the concept of developing digital identity enables across the board of the travel chain (IATA, 2022). Additionally, IATA is focusing on studying consumer behavior and more specifically on the shopping habits of the travelers, by putting into perspective the look-to-book concept (IATA, 2022).

6.2.1.1 Trust me, Know My Needs

Taking into consideration the need of passengers to provide accurate verifiable credentials across the board, a global robust apparatus, taking advantage of the interoperability and scalability potentials, may provide tangible results in terms of entitlements to various airline services (IATA, 2022). In the coming years, the airline industry shall incorporate decentralized identifiers by utilizing Proof of Concept (PoC) solutions (IATA, 2022). PoC technology may add value in practical cases related to handling Unaccompanied Minors (UMNR), passengers with disabilities or specific nutritional needs (diabetics, allergies, and medication etc.) or preferences (Vegan, Cosher, Muslim) (IATA, 2022).

Digital Decentralized Identifies (DIDs) standards (World Wide Web Consortium, 2022) and Verifiable Credential (VC) data models (World Wide Web Consortium, 2022) were developed by World Wide Web Consortium (W3C). These standards along with the data models were formulated to a standardized architecture by IATA Digital Transformation Advisory Council (DTAC) and Architecture and Technology Strategy Board (ATSB) (IATA, 2022), as follows:
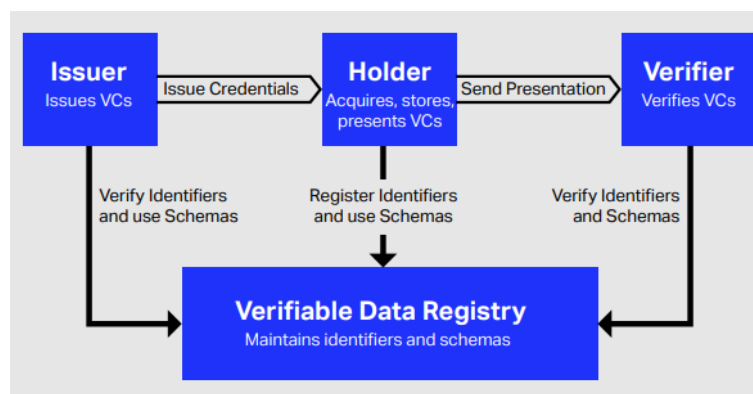
29 Source: Verifiable Credentials Architecture (IATA, 2022)

PoC technology in combination with Hyperledger and the vast interoperability potentials can bridge the gap between Governance and Technology alongside the dimensions of Technical and Human Trust, on the basis of the following architectural model.
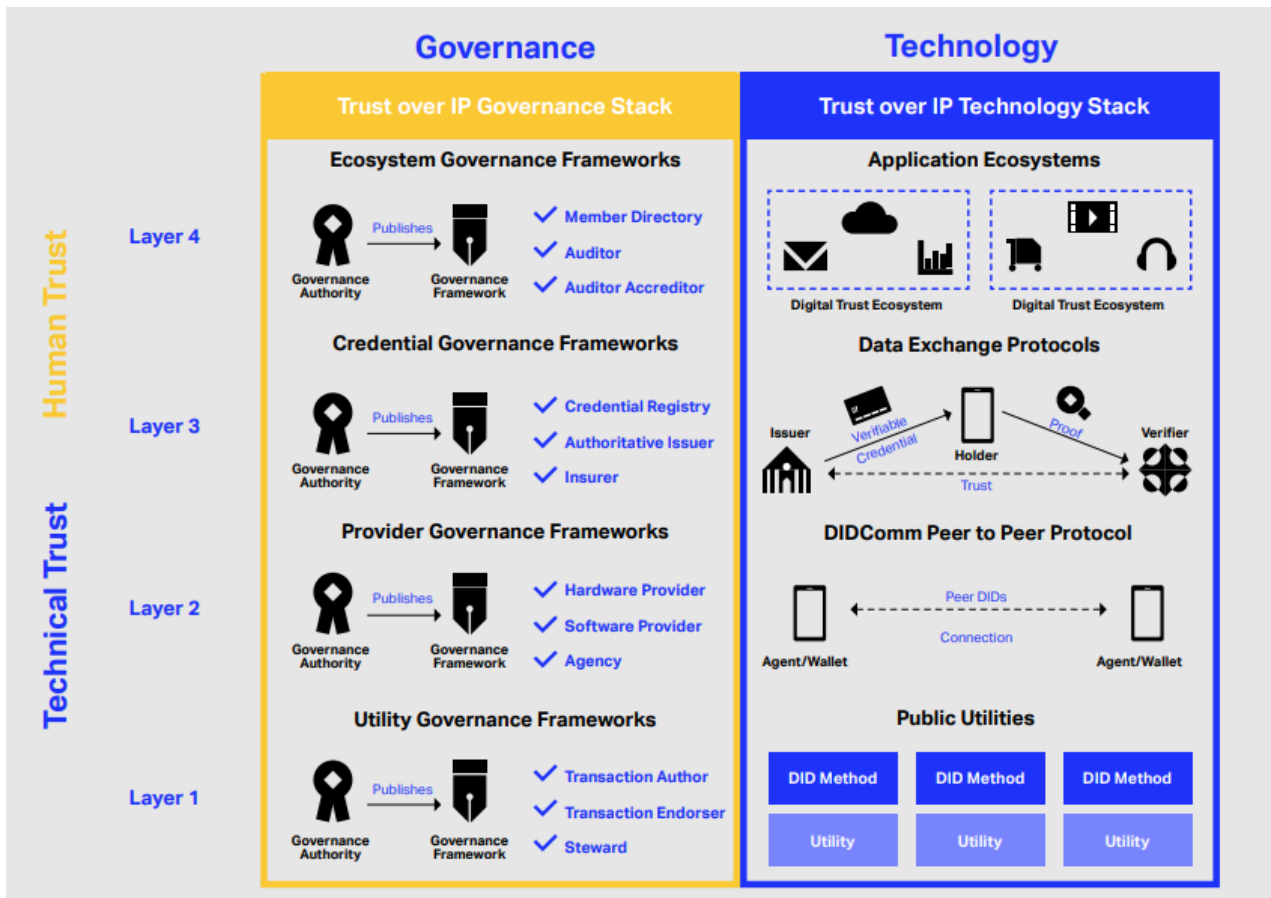
30 Digital Interoperability Trust (IP, 2021)

In conclusion, airline companies need to revitalize their efforts into exploring the possibilities of the newly founded digital ideas. Deployment of common technical standards so as to tap into the vast interoperability opportunities for the surrounding stakeholders (Governments, Travel Management Companies, Airlines, Airports) is crucial for the benefits of both the passenger public and the airline industry.

6.2.1.2   Metaverse

Metaverse is defined as an attempt to create a single shared and immersive 3D virtual space where humans can have a glimpse of the benefits of the virtual world (Linda Tucci, 2018). Metaverse may provide opportunities for live experiences beyond the limitations of the physical world (Linda Tucci, 2018). Considering this relatively new apparatus, skepticism is applied regarding the future customer needs as well as the underlying impact in fields oscillating from the delivery of airline services to the end-to-end customer journey (IATA, 2022).

Taking into account the exponential growth of Metaverse along with its evolving capacity without customer input, a mature Metaverse will reach the level of accessibility without depending on operating devices (IATA, 2022). Additionally, considering its interoperable and decentralized status, Metaverse will maintain a virtual economy potentially facilitated by digital currencies (IATA, 2022). Metaverse as a disruptive technology may bring the potential to transform traditional physical world socioeconomic norms such as shopping and working. In accordance with Gartner, at least 25% of the global workforce, may spend at least one hour in Metaverse by 2026 (Meghan Rimol, 2022). As such, its transformative nature may touch the airline industry sooner than anticipated. According to McKinsey's report regarding the value creation in the Metaverse, consumer behavior is highly focused towards travel activities (McKinsey & Company, 2022). As such, there is fertile ground for applications within the traditional airline commercial ecosystem (IATA, 2022) as follows:

I) Cultivate the relationship between passenger public and the airline industry: with the vast usage of Internet, social platforms such as TikTok, Instagram may be used in order to enhance brand awareness and loyalty programs for client benefits. For instance, the creation of a virtual shop for products belonging to the category of "ShopOnBoard", where the client may perform a virtual visit prior to flight boarding, may enhance revenue concerning airline brand materials and other commodities.

II) Customer experience marketing campaign: airline companies may be able to provide a virtual preview of the actual travel experience, within Metaverse, including travel milestones in the digital storytelling, thus persuading clients to fly. Furthermore, the creation of a virtual airport roadmap, within the Metaverse, regarding the multiple points (e.g., passport control, safety checks, luggage drop-off) that the customer must navigate through, during the flight check-in process, may be an added value driver as it optimizes the easiness of the passenger public, prior to the journey. As such, airline companies could benefit by the proper allocation of human capital ground services (e.g., escorts for passengers with special needs) (IATA, 2022).

Despite the arising opportunities, it should be highlighted as crucial that Metaverse - considering its infancy - is still largely considered as a marketing value driver rather than an actual tool for commercial activities, as no existing technology can replace the five (5) senses of physical world traveling (IATA, 2022).

7

Digital Products Comparative Analysis

Following the in-depth analysis of the Aegean Airlines digital products and the overview of the new digital technologies and trends, it is highlighted as crucial to conduct a comparative analysis, in order to assess current digital product offerings of the airline competition. In order to achieve the aforementioned, research was conducted for seventeen (17) airlines and three (3) different digital fields were examined (Customer service, In-flight entertainment and Check-in) along with segment segregation, applicable for each company. Information regarding the segments was obtained from airline company websites and individual testing of the platforms.

7.1.1.1   Customer Service

In the past, customer services were provided by local ticketing offices and regional call centers. Owing to technological advancements and the Internet, provision of such services was enhanced and is now offered by the usage of digital means. A comparative analysis is illustrated below for the seventeen (including Aegean) airlines.

Customer Service Segments						
Airlines	**Call Center**	**Email**	**Social Media**	**Live Chat (Agent)**	**ChatBot**	**Cloud-based Voice Service**
Aegean Airlines	✓	✓	✓		✓	
Air France	✓		✓		✓	
Alaska Airlines	✓	✓		✓		
ANA		✓			✓	
Austrian	✓				✓	
British Airways	✓		✓	✓	✓	
China Southern	✓					
Delta Airlines	✓	✓	✓			
Emirates	✓		✓	✓		
Gol	✓	✓	✓			
KLM	✓		✓			
Lufthansa	✓				✓	
S.A.S.	✓		✓		✓	
Singapore	✓		✓		✓	
Swiss	✓		✓	✓	✓	
United	✓		✓	✓	✓	✓
Volotea	✓		✓		✓	

A series of observations is presented regarding the different segments as follows:

➢ Human factor is critical as sixteen (16) airlines maintain their call centers except for ANA which opted to temporarily suspend its call centers, as a result of the large volume of calls due to vast Covid-era response (ANA Airlines, 2023).

➢ All airlines maintain topics with Questions & Answers (Q&A) and Frequently Asked Questions (FAQ) in an effort to keep their customers informed regarding all applicable procedures (e.g. ticket cancellation and rebooking)

➢ Customer interaction via email exchange is maintained only by five (5) companies (including Aegean Airlines), on the basis of retaining their traditional personal agent-passenger way of communication.

➢ Massive usage of social media as a customer service tool, led the airlines to upgrade their services in order to achieve immediate client response rates. Social media is largely considered as a more direct, informal, and friendly communication method. Thus, airlines are more approachable to the end users and particularly to younger populations.

➢ Live chat with agents is offered on a 24/7 basis, only by five (5) companies.

➢ Chatbot is a relatively new digital tool and has been adopted by eleven (11) airlines so far. Passengers contact AI-powered service agents as they are defined as advanced chatbots. As such, clients submit their requests and questions and receive automated responses, redirecting them to the relevant digital services (IATA, 2022). In most assessed cases of this research, chatbots responded efficiently to general information and ticket-related queries.

➢ Finally, the most innovative segment is the cloud-based voice service that is currently offered by one (1) company United airlines. United in a collaboration with Amazon, has integrated their system with Alexa so as to provide voice-enabled customer service. Passengers are able to receive flight updates, perform check-in and efficient issue resolution (Travel Agent Central, 2017).

7.1.1.2   *In-flight Entertainment*

Flight time is the essential element of the customer experience and is a key factor for the overall customer satisfaction. As such, airline companies, differentiate their in-flight entertainment offerings in a pursuit to make the flight seamless and pleasant. In the past, before the digital era, newspapers were provided to the passenger public along with listening to music/radio. As the in-flight experience is a personalized and subjective passenger choice, airlines provide alternative entertainment means, taking advantage of the Internet and development of technology. Existing entertainment means are outlined in the table below.

In-flight Entertainment Segments									
Airlines	**Wi-Fi**	**Games**	**Movies**	**Music**	**News**	**On Board**	**TV**	**Special Activities**	**VR Activities**
Aegean Airlines	✓	✓	✓	✓	✓	✓			
Air France		✓	✓	✓	✓				
Alaska Airlines			✓	✓					
ANA	✓		✓	✓	✓				
Austrian	✓	✓	✓	✓	✓				
British Airways	✓	✓	✓	✓	✓	✓	✓		
China Southern		✓		✓	✓				
Delta Airlines	✓	✓	✓	✓	✓	✓	✓	✓	
Emirates	✓	✓	✓	✓	✓		✓		✓
Gol			✓	✓					
KLM	✓		✓	✓	✓	✓			
Lufthansa	✓	✓	✓	✓	✓	✓	✓	✓	
S.A.S.	✓		✓	✓			✓		
Singapore	✓	✓	✓	✓	✓	✓	✓	✓	
Swiss	✓	✓	✓	✓	✓				
United	✓		✓	✓	✓	✓	✓		
Volotea		✓	✓	✓	✓				

A few observations are demonstrated as follows:

➢ Wi-Fi, Games, Movies, Music and Newspapers are currently offered by the vast majority of airline companies through connecting to different platforms.

➢ OnBoard services correspond mainly to shopping platforms, meals purchase, GPS flight routes and local destination tour guides. These services are currently offered by seven (7) airlines.

➢ Watching satellite live-TV channels is currently supported by seven (7) airlines

➢ Special Activities relate to meditation practices like Yoga by following and attending audio podcasts. It is a relatively new digital concept, currently offered by three (3) airlines. This digital concept, helps the passenger public to cope up with anxiety and stress disorders as a result of the flight experience.

➢ Finally, the most innovative element is provision of VR Activities offered by Emirates only by providing VR headsets and reliving physical world activities in the virtual sphere for instance, games and spa (Onag, 2021).

7.1.1.3   Check-in

Nowadays, performing online check-in is the norm for all airline companies. As such, different offerings are considered to enrich this kind of service with the usage of Bag Tag, deployment of Digital IDs and usage of Biometric security methods. In the table underneath, a comparison follows with the digital applications accompanying the check-in service.

Check-in Segments				
Airlines	**Online**	**Bag Tag**	**Digital ID**	**Biometrics**
Aegean Airlines	✓		✓	
Air France	✓	✓	✓	
Alaska Airlines	✓	✓		✓
ANA	✓		✓	✓
Austrian	✓	✓		✓
British Airways	✓		✓	✓
China Southern	✓	✓		
Delta Airlines	✓		✓	✓
Emirates	✓		✓	✓
Gol	✓			✓
KLM	✓	✓		
Lufthansa	✓	✓		✓
S.A.S.	✓	✓		
Singapore	✓	✓		
Swiss	✓	✓		
United	✓		✓	✓
Volotea	✓			

➤ Bag Tags can be issued automatically by the passengers in advance and provide the capability for the automatic luggage drop-off, thus avoiding check-in kiosks and long queues. Currently nine (9) airlines offer this element.

➤ Scanning travel documentation such as passports and ID cards, prior to the flight, is an efficient way of performing check-in without the need to provide the relevant hard-copies. It is worth mentioning that this scheme runs smoothly in collaboration with Airport, Government authorities and border control agencies, on the basis of consolidated databases.

➤ Finally, application of biometric technology, gained momentum in the recent years and is used by many Airports and Airlines. Currently, nine (9) companies are using facial recognition for boarding control, offering a hands-free and efficient boarding procedure. Passengers proceed with uploading their personal photo and passport in the airline mobile phone application. PII is validated and approved in advance, thus enabling quick facial scanning at the gate (Robosoft Technologies, 2017).

8
Conclusions

8.1 Conclusions and Recommendations

As discussed, various digital products have been implemented by Aegean Airlines S.A, overtaking the previous traditional bureaucratic culture in the aviation industry and excessive expectations. Although there are already tangible results from the digital steps that the company has taken, further initiatives are required, in order to enhance customer satisfaction and new technologies so as to cultivate future fertile ground.

Digital Transformation has recently acquired the status of Holy Grail, with reference to the necessary transformative steps that business entities must incorporate in their operating mandate so as to remain competitive in the post-covid era. As a result, significant investments are required in the technological infrastructure along with capacity building of the airline personnel.

Nevertheless, lack of oversight contributes negatively towards understanding the angle of personalized customer travel experience. This is further fortified by the fact that airlines might not be able to leverage opportunities, taking into account the competition. Nonetheless, DT sets higher standards for active customer service and airline companies should capitalize on the prospects, bearing in mind the following added value drivers:

I) Establishment of continuous learning programs of airline company staff with reference to digital technologies, in order to meet the already high client expectations (Inc, 2019).

II) Introduction of Performance metrics: define standardized benchmarks, in order to measure the success of digital initiatives (Inc, 2019).

III) Further strengthening of client-oriented KPIs with reference to booking irregularities, client feedback and ticket purchasing cart abandonment (Inc, 2019).

IV) Introduction of electronic bag tag and self-drop-off desks, during the check-in process at the airport, in line with Alaska Airlines current application. Electronic bag tags have already been launched in the market. Digital Bluetooth device is positioned on the luggage. Then, the passenger during the web check-in, claims the baggage tag number and the obtained number is sent via Bluetooth to the device, therefore the passenger may track his luggage throughout the journey via GPS. In order to achieve the aforementioned, amendments are required in the existing Aegean Airlines mobile application so as to link company booking information with the electronic tag via Bluetooth technology (Alaska Airlines, 2022).

V) Deployment of agent-based live chat mechanism, allowing for economies of scale. Agent-based live chat contributes to the reduction of call center workload and to gaining sufficient insights regarding customer concerns.

VI) Establishment of biometric facial recognition devices at the airports in collaboration with Government authorities.

VII)   Further additional customer web-service of cancelling a booking, automatic refund calculation and subsequent payment. This process can be achieved by incorporating the existing Amadeus GDS algorithm in Aegean airlines back-end system, thus connecting it with the relevant client data entry in the front-end (Amadeus GDS, 2022).

VIII)   Additional calibration of Ancillary upsells, in order to increase the revenue streams and boost growth in an era characterized by low profit markups and increasing fuel costs (Inc, 2019).

Companies of the Airline industry that are capable of shifting their priorities towards digital transformation attempts, will be the principal actors of the future business stage.

8.2   Limitations

Relating to the case study, a set of limitations were noticed regarding primary and secondary sources. More specifically, with reference to primary sources one limitation concerns to the subject matter experts and officials interviewed from Aegean Airlines S.A. Deep dive discussions were held to acquire insights, hitherto it was not feasible to obtain information regarding KPIs and other metrics regarding customer satisfaction, as the employees from the Digital department were bound by corporate confidentiality, as set by the already signed non-disclosure contracts and the airline company mandate. With the exception of specific information already provided, subject matter experts referred to the already available reports published by IATA and other regulatory bodies.

With reference to secondary sources, this research was based on available academic material and references from various academic search engines, for instance: Google Scholar, ScienceDirect, ResearchGate and IDEAS Respec. Yet, corporate reports issued by IATA were used. Overall, it should be highlighted as crucial that this master thesis was created, as a result of deep dive discussions with Aegean Airlines S.A. officials and publicly available material and does not take into account digital transformation initiatives that have not been published.

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