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TECHNOLOGY-ENABLED INNOVATION IN AIRLINE DISTRIBUTION CHANNELS

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DECLARATION OF RESEARCH ETHICS / METHODS OF DISSEMINATION

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This work entitled TECHNOLOGY-ENABLED INNOVATION IN AIRLINE DISTRIBUTION CHANNELS prepared by NAGİHAN DOĞAN has been judged to be successful at the defense exam on the 15th of August 2018 and accepted by our jury as MASTER'S THESIS.

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TECHNOLOGY-ENABLED INNOVATION IN AIRLINE DISTRIBUTION CHANNELS

ABSTRACT

In the past, airline distribution process, which was between airline companies and customers, was under the control of intermediaries such as GDSs. After the advancement of internet technology in airline distribution, online players emerged, and airline companies established their websites to bypass the intermediaries. Since new technologies have still been emerging to meet the key factors such as customer expectations, technological innovations and technical insufficiency of the intermediaries in distribution industry, the structure of airline distribution will continue to evolve in the next decade.

In this study, we aimed to understand how the industry evolved according to the emerged players and developed technologies by utilizing secondary data such as relevant literature and industry reports. As a result, we constituted an integrated framework for analyzing the industry in timeline including three phases (past, present, future) and from four aspects (market forces, technology trends, ecosystem players, ecosystem canvas).

Keywords: airline distribution industry, market pull, industry forces, airline ecosystem, ecosystem canvas

HAVAYOLU DAĞITIM KANALLARINDA TEKNOLOJİNİN ETKİNLEŞTİİRLMESİ

ÖZET

Geçmişte havayolu şirketleri ile müşterileri arasındaki havayolu dağıtım süreci Küresel Dağıtım Sistemleri gibi aracıların kontrolü altındaydı. Havayolu dağıtımında internet teknolojilerinin gelişimiyle birlikte çevrimiçi oyuncular ortaya çıktı ve havayolu şirketleri aracıları atlayarak kendi internet sitelerini kurdular. Müşteri beklentisi, teknolojik gelişmeler ve dağıtım endüstrisindeki aracıların teknik yetersizlikleri gibi temel etmenleri karşılamak adına yeni teknolojiler ortaya çıkmakta olduğundan, havayolu dağıtımının yapısı önümüzdeki on yıl içerisinde gelişmeye devam edecektir.

Bu çalışmada, ortaya çıkan yeni oyuncularla gelişen teknolojilerle birlikte endüstrinin nasıl geliştiğini ilgili kaynaklar ve endüstri raporları gibi ikincil veriler kullanarak anlamayı amaçladık. Sonuç olarak, endüstriyi üç fazlı zaman çizelgesinde (geçmiş, şimdiki, gelecek) ve dört açıdan (piyasa güçleri, teknoloji eğilimleri, ekosistem oyuncuları, ekosistem kanvası) analiz etmek için entegre bir çerçeve oluşturduk.

Anahtar Sözcükler: havayolu dağıtım endüstrisi, piyasa çekimi, endüstri güçleri, havayolu ekosistemi, ekosistem kanvası

ACKNOWLEDGEMENTS

To my family

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LIST OF SYMBOLS/ABBREVIATIONS

CRS	Computerized Reservation System
GDS	Global Distribution System
LCC	Low-Cost Carrier
IBM	International Business Machines
PARS	Programmed Airline Reservation System
CAB	Civil Aeronautics Board
DOT	Department of Transportation
ICT	Information and Communication Technology
IT	Information Technology
TPF	Transaction Processing Facility
OTA	Online Travel Agency
ATPCO	Airline Tariff Publishing Company
URL	Uniform Resource Locator
GNE	GDS New Entrant
CTO	City Ticket Office
ATO	Airport Ticket Office
E-Commerce	Electronic Commerce
FFP	Frequent Flyer Programs
CRM	Customer Relations Management
TMC	Travel Management Company
FSC	Full-Service Carrier
OIS	Organizational Information Systems

dbCommerce	data-based Commerce
MRSP	Manufacturers' Suggested Retail Price
VCH	Value Creation Hub
AI	Artificial Intelligence
AR	Augmented Reality
VR	Virtual Reality
IATA	International Air Transport Association
NDC	New Distribution Capability
PNR	Passenger Name Record
EMD	Electronic Miscellaneous Document
JV	Joint Venture
SITA	Societe Internationale de Telecommunications Aeronautiques
API	Application Programming Interface
PSS	Passenger Service System
FRP	Full Retailing Platform
RM	Revenue Management
DCM	Distribution Channel Manager
BSP	Billing and Settlement Plan

1. INTRODUCTION

In early years of airline distribution industry, the travel agents in off-center offices were processing reservations manually (Wardell, 1991). Because of the increasing demand, the computerization era began. In 1962, the first CRS (Computer Reservation System), Sabre, was developed as the earliest example of e-commerce in travel industry (Smith et al., 2000). In time, more CRSs were established and given under travel agents' use. In this structure, airlines were paying fee per ticket sold by travel agents. However, it was understood that this system wasn't working fairly for non-owner airline companies. To overcome this problem, CRSs regulated strictly. After the regulations, airlines transferred the ownerships of reservations systems to the intermediary's itself.

When reservation systems became more common and involved a wider range of products and services, reservation systems transformed as Global Distribution System (GDS) by including the services like hotel bookings. This situation gave suppliers the ability to trade their products and services to customers remotely (Gasson, 2003). When GDSs monopolized the airline distribution industry, they increased their support fees which were paid by airlines.

Airlines were paying booking fee to GDSs per ticket sold, commissions and overrides to travel agents. These payments constituted the airlines' third largest operating expense. The increasing distribution cost and the loss of profits caused airlines to search for ways to increase their margins (Clemons and Hann, 1999; Shaw, 2007). As a result, airlines sacrificed travel agencies by reducing commissions paid to them. GDSs answered this reduction in airline commission payments by significantly increasing incentives paid to travel agents since they were important for GDSs in reaching many customers. From the perspective of airlines, these changes have enabled major airlines to reduce their total distribution costs by 25.8% from an average $732.9 million in 1999 to $543.6 million in 2002. However, airlines still need to subscribe to each GDS to reach more travel agencies and potential customers (GAO, 2003).

The emergence of the internet technology damaged the monopolistic situation of GDSs since new distribution channels such as Supplier Link Portals and meta-search companies came into existence. Since then LCCs (Low-Cost Carriers) which were the pioneer of investing on their online channel arose, the airline business models were mainly divided into two types (Vinod, 2009). While the long-established airlines, FSCs (Full-Service Carriers), aimed to meet the customers' requirement by providing in-flight entertainment, free food and drink, LCCs cut costs significantly by providing no-frills service and online sales. Since LCCs attracted price-sensitive customers, FSCs reshaped their distribution strategy to remain their competitiveness and focused on direct distribution through their websites (Sismanidou et al., 2008; Hunter, 2006). Major airlines started to compete with the LCCs from the point of the distribution cost by investing heavily their direct web business and bypassing GDS. Hence, the internet was also identified as a major opportunity for major airlines (Sismanidou et al., 2008; Sismanidou et al., n.d.).

Consequently, the overall structure of the industry has been transformed since Internet has been the essential communication tool for the industry. Several new developments occurred as summarized below (Shanker, 2008).

- Direct distribution of airline companies developed.
- New intermediaries emerged with the advancement of internet technology.
- Customers accessed to ticket prices through internet easily and started to compare them.
- The transparency and relationship between customer and airlines improved.

The internet technology in airline distribution has been adopted easily by most of the customers even they are expecting further developments in the areas such as mobile distribution channel. The main reason of this rapid adoption is the accessibility of the internet all the time by anyone from anywhere (Muradyan, 2005).

It is inevitable that because of the key factors such as customer expectations, market growth and technical insufficiency of the players in distribution industry, new technologies will emerge and evolve the airline distribution structure in the next decade.

Accordingly, we aim to find out the current issues in airline distribution industry and potential disruptive factors that affect the future by benefiting from the studies and reports made. The integrated framework will be constituted based on Ecosystem Canvas which is adapted from Business Model Canvas.

1.1. Motivation and Challenges

There is a need for this research since the future of airline distribution industry is an uninvestigated phenomenon. The ongoing technological developments and external forces create a complex environment for airline distribution players. Accordingly, this thesis proposed strategic roadmap of airline distribution industry based on key components of Ecosystem Canvas which is adapted from Business Model Canvas, technology trends in the industry and market forces. The roadmap can be validated by receiving the future distribution roadmap obtained from airline distribution players.

1.2. Summary of Contributions

The research questions of this thesis are as follows:

- What are the current issues that the airline distribution industry faced?
- How can the possible disruptive factors and technological innovations affect future?
- What can be the strategies for airline distribution players to adapt to potential future developments?

1.3. Structure of Thesis

The thesis is organized as follows. Section 2 describes the historical evolvement, challenges and future disruptive factors of airline distribution industry based on the relevant research. Section 3 describes our method to create our integrated framework and the original models. Section 4 provides the findings obtained from content analysis and propose strategic roadmap. Finally, conclusions and recommendations for future work are given in Section 5.

2. AIRLINE DISTRIBUTION

2.1. Key Developments in Airline Distribution

2.1.1. Early Reservation Systems

In early years of airline distribution industry, reservations were managed manually using record books by travel agents. The agents in off-center offices were receiving reservation requests from customers to transmit to the central facility on the telephone or via teletypewriter. Upon the receipt, they were processing the reservations manually (Wardell, 1991). In this booking process, travel agents were responsible for informing customers about travel destinations, receiving and recording reservations by acting as a middleman between customers and airlines (Gasson, 2003). The structure of this early airline distribution industry is shown in Figure 2.1 (Clemons and Hann, 1999; Wardell, 1991).
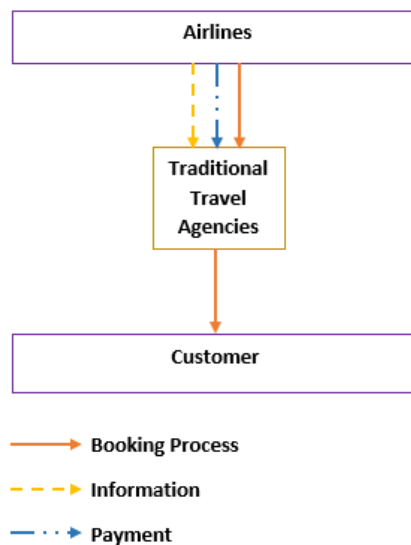
Figure 2.1. The Structure of Early Airline Distribution Industry

(Adapted from Clemons and Hann, 1999)

With increasing customer demand in air travel, the manual solutions became outmoded since airlines faced information-processing problems as follows.

- It became hard to track the number of seats sold because of the increasing number of flights.
- It became hard to communicate with reservation agents to check the seat availability since they were located widely.

Airlines tried to solve these problems using existing technology, but these solutions were expensive and not enough to meet their requirements completely.

2.1.2. Development of CRS

Because of the increasing demand and insufficient reservation process, the computerization era started with support of some airline companies. In 1953, American Airlines and IBM began working together to develop the first CRS. In 1962, the Sabre system was implemented for American Airlines' use as one of the earliest examples of e-commerce in travel industry (Smith et al., 2000).

In 1968, American Airlines made an agreement with Eastern Airlines to modify and implement Eastern's Programmed Airline Reservation System (PARS) on its system. PARS and Sabre were working in different orders from each other. Meanwhile, other airlines launched similar development projects. However, they adopted the basic PARS system by modifying it to meet their own needs since their projects became unsuccessful. Since then, no significant development occurred in the infrastructure of the reservation systems. Most of the airline reservation systems are still based on PARS in terms of concept and design (Wardell, 1991).

In the meantime, United Airlines introduced the Apollo system in 1971, based on IBM's PARS. In 1976, United Airlines created the Apollo Services Division to manage the Apollo system and connected it to travel agencies. Finally, these two pioneer systems, Sabre and Apollo, were brought into travel agents' use in 1976 (Kärcher, 1996).

CRSs were under some airlines' ownerships and were including several important functions such as scheduling, reservations, inventory and ticketing (Fiig et al., 2015). Airlines which subscribed to one or more CRS(s) were paying the agent a commission

fee per ticket sold while customers were paying no additional price. Commissions were 10% of ticket price (Clemons and Hann, 1999). Moreover, while airlines were paying commissions to travel agencies based on the price of the purchased tickets, they also encouraged travel agents to make additional ticket sold by paying an extra commission called "overrides" (GAO, 2003). These overrides were given to the specific markets, and every travel agency that could meet the criteria was awarded a pre-negotiated percentage of the revenue (Clemons and Hann, 1999).

Both airlines and travel agencies had to subscribe to CRSs. Participating in one CRS was not enough to remain competitive with the other airlines. Figure 2.2 shows the relationships that CRSs had with travel agencies, and the airlines' dependence on each CRS to reach more customers (GAO, 2003).
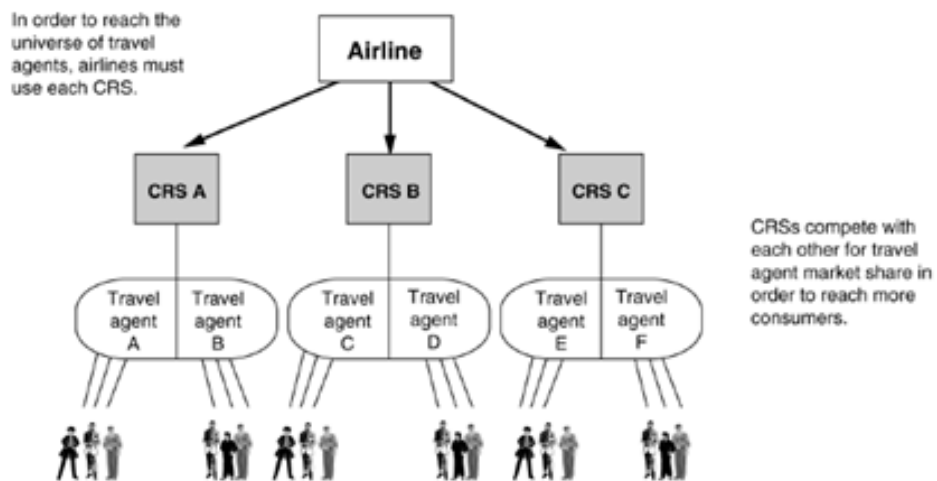
Figure 2.2. CRS Relationship between Travel Agencies and Airlines

(GAO, 2003)

CRS owner airlines were not paying commissions for booking through their own CRS. Furthermore, these owner airlines developed "co-host" agreements with the airlines, which was in an important point in their region. These co-host airlines also received discounts on the booking fee made on that CRS as well as displaying of their flight information more prominent than other airlines. In return, the co-host airlines were marketing the owner airline's CRS to its local travel agencies. In this scenario, subscriber

airlines were paying higher fees per booking made on that CRS and had been affecting the biased display of their availability (GAO, 2003).

In practice, CRSs were being used to provide information and available booking capabilities of all participant airlines. However, the truth emerged that CRS usage created competitive disadvantages for non-owner airlines since CRS often did not display consumers to all available airline options and prices (GAO, 2003).

Finally, in 1984, the competent authority, Civil Aeronautics Board (CAB) enacted CRS rules to protect customers' rights and provide fair competition among airlines. The aim was to limit the power of the CRSs and owner airlines not to allow them to manipulate the competition. In 1992, DOT (Department of Transportation) took over the CAB's duties and confirmed the validity of the rules. Figure 2.3 shows the flow of payment among the distribution players before the enactment of CRS rules (GAO, 2003).
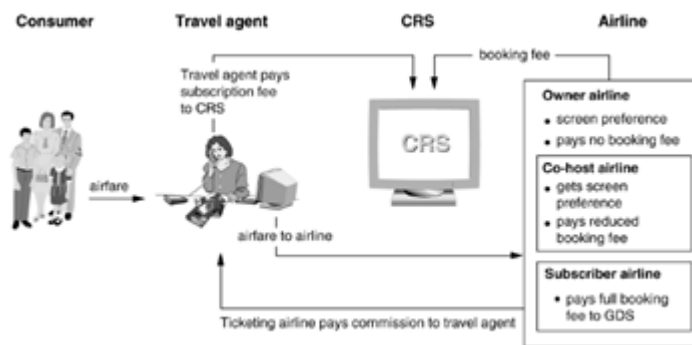
Figure 2.3. Airline Distribution Industry before the Enactment of CRS Rules

(GAO, 2003)

The CRS rules forbid biased screen displays and price discrimination among the owner, co-host and subscriber airlines. Additionally, it is decided that booking fees to be paid by owner airlines depend on an airline's participation level in CRS. Figure 2.4 shows that airline distribution industry changes after the CRS rules (GAO, 2003).
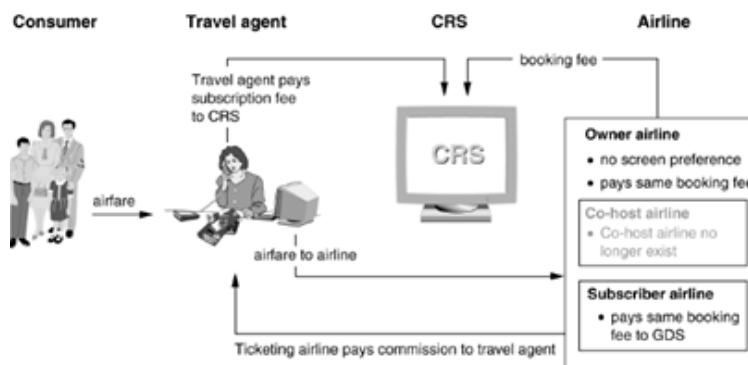
Figure 2.4. Airline Distribution Industry after the CRS Rules

(GAO, 2003)

2.1.3. CRS Transforms to GDS

With increasing demand, reservation systems spread widely and included services such as hotel bookings and car rentals as well as providing airline tickets in their systems. The transformed system was called GDS (Gasson, 2003).

While the purpose of CRSs was to sell the seats of the individual airlines according to availability, GDSs were able to govern a complicated process by aggregating information from many airlines and allowing travel agents to market through one point remotely (Smith et al., 2000).

GDS evolved the role of the travel agent from informed travel and destination consultant to an intermediary who was saving the customers' time and effort in booking a travel package (Gasson, 2003).

Airlines were making payment to the GDS companies per ticket sold as well as the commissions and overrides which were paid to travel agents. These costs were among the airlines' operating expenses as distribution cost by constituting their third largest operating expense (Clemons and Hann, 1999). When airlines decided to reduce their distribution cost, travel agents faced an important threat (Gasson, 2003)

Accordingly, the first attempt was made by American Airlines to eliminate agency-based fare negotiation, but this attempt failed because of the insufficient support of other airline companies. However, it was realized that airlines were not satisfied with ongoing structure of the industry (Clemons and Hann, 1999).

The second, and successful, attempt made by Delta Airlines in 1995 by limiting the peak of the existing 10% commission as $50. Then, in 1997, United Airlines took a step further by cutting the commissions to either 8% of ticket price or $50, if which one was less. With this attempt, the airline company could save approximately $80-$100 million annually. This move was followed by many major airlines around the world (Clemons and Hann, 1999).

While airlines were reducing commissions paid travel agents, GDSs protected their intermediaries, travel agencies, and answered this reduction by significantly increasing incentives paid to travel agents. From the perspective of airlines, these changes enabled major airlines to reduce their total distribution costs by 25.8% from an average $732.9 million in 1999 to $543.6 million in 2002. However, these attempts have not eliminated the airlines' dependence on the GDSs on distributing airline tickets. Airlines still needed to subscribe to each GDSs and pay fees to reach potential consumers routed by travel agents (GAO, 2003).

The main purpose of GDSs was to compare the ticket prices to find the lowest by the means of ATPCO (Airline Tariff Publishing Company) and SITA (Airline Tariff Publishing Company) that work as fare aggregators and distributors. They were consolidating fares received from airlines and distributing them to all participating airline reservation systems including major GDSs such as Sabre, Galileo, Amadeus and regional GDSs such as TOPAS (South Korea), AXESS (Japan) and TravelSky (China) (Vinod, 2010).

2.1.4. Emergence of GNE

Before the last decade, the main source of revenue for GDSs was fees paid by the airlines. GDSs were charging high booking fees per transaction to an airline (InterVISTAS, n.d.).

In 2005, GDSs faced a threat which could jeopardize their existence. In an environment where airlines were complaining about the cost of distribution and the monopoly of GDSs, the GDS New Entrants (GNEs) such as G2 SwitchWorks, ITA and Farelogix emerged by offering more flexible and functional distribution technology as well as less distribution fees (Sismanidou et al., 2009; Kracht and Wang, 2010).

GNEs received considerable attention when they announced an estimated pricing for airlines at a considerable discount from GDS fee levels of $2-$2.5 per booking. G2 SwitchWorks promised savings upwards of 75% of GDS costs, while ITA suggested pricing could start around 40 cents per segment for its alternative GDS offering. Furthermore, they promised improved product, service and flexible systems with customer-centric functionality (Sismanidou et al., n.d.). Nevertheless, the GDSs resisted against new entrants by making correct attempts at the right time.

GNEs could take attention in the beginning. However, they were not comparable with GDSs in terms of levels of content, service and market reach. Furthermore, they did not attempt to convince travel agencies which had an important position in the distribution chain. Travel agencies would not use their technology without incentives, and airlines would not contact with GNEs unless they provided access to travel agents (Sismanidou et al., 2008).

Research suggests that airlines used the GNE as a negotiation tool in their contract negotiations with the GDSs instead of considering adopting GNEs. Major FSCs received 30-40% discounts in these negotiations as expected. GDSs also made innovations by migrating their programs to open access as well as developing new products and functions to adapt to the dynamic needs of the industry (Sismanidou et al., 2009; Sismanidou et al., n.d.). For instance, Amadeus signed an agreement with the fifty top airline companies in US and Europe, including LCCs, by proposing discounted booking fees in return for accessing ticket fares of airlines (Longhi, 2008).

Hence, the GDSs overcame this threat too by negotiating contracts with the airlines. GDSs have continued the technological developments that had begun before the arrival of the GNEs. However, the new-entrant threat may be the reason of this development.

Travelport GDS even acquired the intellectual property and software of one GNE, G2 Switchworks (Wang and Pizam, 2011).

Anyway, GNE companies have contributed to increase the role of intermediation in the airline distribution industry (Wang and Pizam, 2011). New entrants, such as Farelogix, entered the distribution market by picking off e-distribution services for the low-cost carriers such as JetBlue (Granados et al., 2008). Farelogix offered a cost-efficient value by adding global travel distribution to merchandising technology provider. In November 2014, Farelogix was awarded as Innovation of the Year in the Ancillary Revenue & Merchandising because of the success of Farelogix FLX Merchandise product. According to United Airlines, FLX helped them to increase their ancillary revenues by $3 billion in the same year (Farelogix, 2014; Okura, 2015).

It is obvious that the main reason behind the failure of GNEs is the first-mover advantage of GDSs. However, if the GNEs contracted with major TMCs, this would jeopardize the GDSs' main business when the large share of corporate travel transactions is considered. Alternatively, if GNEs' distribution strategy could be applicable into the complex structure of travel agency systems, especially for fulfilment, reporting and other back-office functions in the corporate travel, their chance would increase to become a significant distribution player (Sismanidou et al., n.d.).

2.1.5. Advent of Internet Technology in Airline Distribution

The internet has been a powerful tool for the travel industry as of its emergence. By utilizing the internet, travel suppliers can eliminate the obstacles arise from distance and location since it enables them to communicate directly with potential customers through their own websites in order to trade. This is a mutualist relationship since customers can receive correct, comprehensive and reliable information rapidly with minimum effort (Online Travel Industry and Internet (Accessed 5 Mar 2018)).

ICTs (Information and Communication Technologies) have always played a profound role in the airline sector. However, with the advancement of the internet technology, their

effect has been becoming increasingly more significant and obvious (Sismanidou et al., 2009; Sismanidou et al., n.d.).

ICT solutions can be used in airline management effectively in the areas such as network planning, code sharing, revenue management and distribution. Figure 2.5 summarizes the functions of ICT for airlines (Sismanidou et al., 2009; Sismanidou et al., n.d.).

Administration & Finance
•Mid-office and back office
•accounting/invoicing/clearing
•treasury
•HR
•CRM
•Procurement
Yield and Revenue management software
Capacity management & Inventory systems (hosting)
Market Intelligence Systems
Frequent Flyer Management

Airline sales offices
Front, mid and back-office
Ticketing

Distribution/ Reservation
Distribution through the GDS
Direct distribution
Ticketing

Operations
Route scheduling
Flight/Crew/Maintenance software
Boarding & Departure Control Systems

Figure 2.5. ICT Supported Airline Functions

(Sismanidou et al., 2009)

Distribution is among the primary elements of airlines' competitiveness, since it affects the operational cost and the accessibility of consumers directly (Buhalis and Jun, 2011). The emergence of the internet has presented new choices for consumers. Until then, consumers could only access major airline brands via call center, ticket offices or travel agencies. Consumers can now use the internet to evaluate alternative opportunities and to compare ticket prices (Wang and Pizam, 2011).

The common use and rapid adoption of the internet endangered the presence of travel agencies. The threat was the deactivation of the 'middleman' (Gasson, 2003). This rapid adoption allowed airlines to develop their websites for marketing and to bypass the traditional distribution players such as travel agencies (Sismanidou et al., n.d.).

Consequently, airlines could reduce their distribution cost since GDS fees and travel agencies' commissions could be eliminated (GAO, 2003; Vergote, 2001).

During the thesis, we have mentioned about some terms which were called by researchers as 'intermediaries' and 'cybermediaries' instead of 'middleman'. 'Intermediaries' refers to a physical channel which helps distributing the product or service from the supplier to the consumer (e.g. travel agencies in airline distribution industry). 'Cybermediaries' has the same meaning with 'intermediaries' except this term is used for the electronic intermediaries arose with the internet technology (e.g. meta-search engines as we will see in the following parts) (Granados et al., 2007; Buhalis and Licata, n.d.; Wang and Pizam, 2011; Chircu and Kauffman, 2000; Granados et al., 2011).

Similarly, 'reintermediation' is the business of 'Cybermediaries' except it is used for existing but re-structured intermediaries (e.g. online travel agencies which we will see in the following parts) (Online Travel Industry and Internet (Accessed 5 Mar 2018)).

Finally, the key term, 'disintermediation' means the deactivation of intermediaries by distributing the product or service from the supplier to the consumer directly. Accordingly, in an ideal electronic market, consumers communicate directly with suppliers for trading (Anckar, 2003). From the perspective of airlines, the benefits of deactivating the 'middlemen' are to decrease distribution costs and to interact with consumers directly for understanding their requests and complaints better (Bennett and Lai, 2005).

After the pioneer GDSs had become monopolized in airline distribution around the 1980s by reaching 80% of the industry, it became hard to enter in this sector for any other companies since the big four GDSs (Sabre, Galileo, Worldspan and Amadeus) had already made significant capital investments in their distribution platform for years for maintenance and upgrade. GDS model was reliable for both travel agencies and airlines, and capable of supporting massive workloads to provide too many options for consumers. However, developments in the internet technology changed the balance of the industry and the golden era of GDSs ended (Granados et al., 2008; Sismanidou et al., 2008).

The theory of newly vulnerable market can be used to explain the situation of the airline distribution industry better. Newly easy to enter is an essential component of this theory. Markets can become easy to enter if technological changes decrease the barriers to entry as the internet made airline distribution industry newly easy to enter by offering low-cost and online distribution channels (Granados et al., 2008).

It was inevitable for GDSs to be affected by the changes emerged from advent of the internet, since they did not allocate enough attention, financial resources and effort for technological innovation by underestimating the situation at first.

After the emergence of new entrants, GDSs started to erode on customer base. For example, in 2005 the bookings through GDS was 54% in airline distribution, but it was down about 30% market share than the 1980s (Granados et al., 2008). GDSs understood the importance of the situation and reacted against these threats in three ways: first, they developed internet-based technology to provide the infrastructure for the online travel portals. Second, they extended their technology for proving themselves to airlines and offered new ICT services. Finally, GDSs tried to manipulate the websites of airlines by establishing their own OTA (Online Travel Agency) websites (Sismanidou et al., n.d.).

The first OTAs, Travelocity and Expedia, emerged in 1996 to transform the information provided by GDSs into user-friendly interfaces for customers at a low cost. They became another disintermediation threat for traditional travel agents which had been performing an intermediator role in airlines, GDSs and consumers chain (Granados et al., 2008).

Airlines responded OTAs by establishing a new online portal with co-opetition. In 2001, five airlines - United, American, Delta, Northwest, and Continental – launched "Orbitz" as a rival of Expedia and Travelocity (Granados et al., 2007). Orbitz is based on the search technology developed by ITA Software which uses the same database with ATPCO. Hence, when a ticket is booked via Orbitz, the GDS can be bypassed and the booking request accesses each participating airline's reservation system directly. This technology is called Supplier Link Portals. To sum up, Orbitz is working like GDSs from the perspective of technology, but unlike GDSs, it offers lower price for participating airlines. It is estimated that participating airlines can save up to $12 per ticket sold by using Orbitz

technology (InterVISTAS, n.d.). Similarly, in Europe, nine airlines launched Opodo in Germany, the UK, and France in 2002 which has the similar technological infrastructure to Orbitz. Table 2.1 shows the ownership of these two systems (Buhalis, 2004).

Company	Owners
Opodo	Aer Lingus, Air France, Alitalia, Austrian Airlines, British Airways, Finnair, Iberia, KLM, Lufthansa, and Amadeus (GDS)
Orbitz	American, Continental, Delta, Northwest, and United

Table 2.1. Orbitz and Opodo Ownership

(Buhalis, 2004)

In 2000, the pioneer of cybermediaries emerged when SideStep launched its meta-search web-browser toolbar plug-in product. Later, in 2005, SideStep later launched its meta-search engine (Granados et al., 2007).

Meta-search engines don't aim to sell the products or services directly. The purpose of meta-search engines is to search the websites of airlines and online travel portals such as Orbitz and Travelocity to combine, sort and organize information offered by these websites. Then, they direct customers to the OTAs or airline companies for a fee (Brown and Kaewkitipong, 2009). Kayak, which now owns SideStep, is an example of meta-search engines (Kayak.com, 2007).

2.2. Airline Distribution Players

When the internet technology leaded emergence of online players, it was adopted by many airlines to disintermediate travel agencies. Moreover, new online travel intermediaries emerged such as OTAs and Supplier Link Portals. Since then airline companies have been distributing their tickets to end-consumers through direct and indirect channels. Direct channels of them are their ticket office (CTO / ATO), call centers and own websites / mobile channels. Indirect channels are traditional travel agents, Online Travel Agents (OTAs) such as Travelocity and Expedia, Supplier Links such as Orbitz in the US and Opodo in Europe. Most of these indirect channels are still

dependent on GDSs (Alamdari, 2002). Figure 2.6 shows the players in airline distribution industry (Vinod, 2009; Granados et al., 2011).
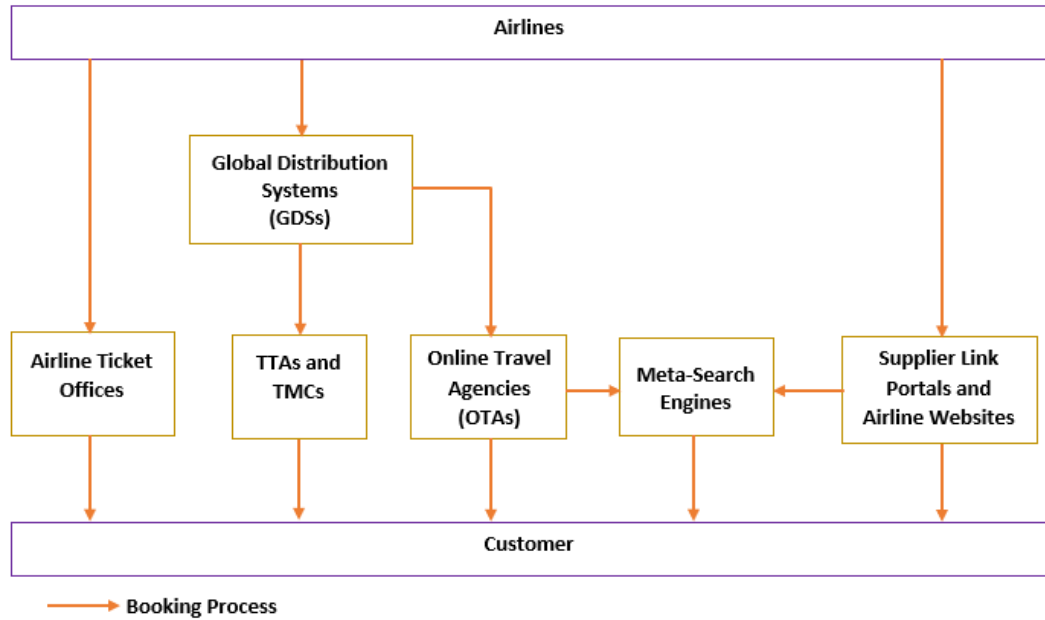
Figure 2.6. Airline Distribution Channels

(Vinod, 2009; Granados et al., 2011)

2.2.1. Direct Distribution Channels

Direct distribution channels of the airline companies comprise of call center, airline website / mobile channel, ATO (Airport Ticket Office) / CTO (City Ticket Office). Before the development of internet, call center and ATO / CTO were only communication channels with customers for airline companies. There was only one carrier type which is FSC.

The first usage of e-commerce in airline distribution industry was the implementation of Frequent Flyer Programs (FFPs) in the 1980s. FFPs were saving detailed customer information with subscription. The data obtained from FFPs were the initial customer records as profound of customer relations management (CRM) of airline companies (Kim et al., 2009).

In the late 1990s, in Europe, Lufthansa was one of the first airline companies to develop a strategy to reduce its distribution costs and to generate higher revenues by establishing its own powerful website. The website offered many services including the ability of booking tickets through other airlines, provided hotel bookings, travel guides, baggage tracing and other travel features. Several major airlines have followed Lufthansa to offer a comprehensive travel package (Doganis, 2006).

According to PhocusWright's study which was made in 2018 (Coletta, 2018) with airline executives, airline websites represent the largest sales channel globally at 31% of all sales. LCCs reported that almost half (47%) of the consumers was booked directly through their own website in 2016 (as shown in Figure 2.7). Travel agencies and tour operators (TMCs) represent a share of bookings at 27% overall (Coletta, 2018).
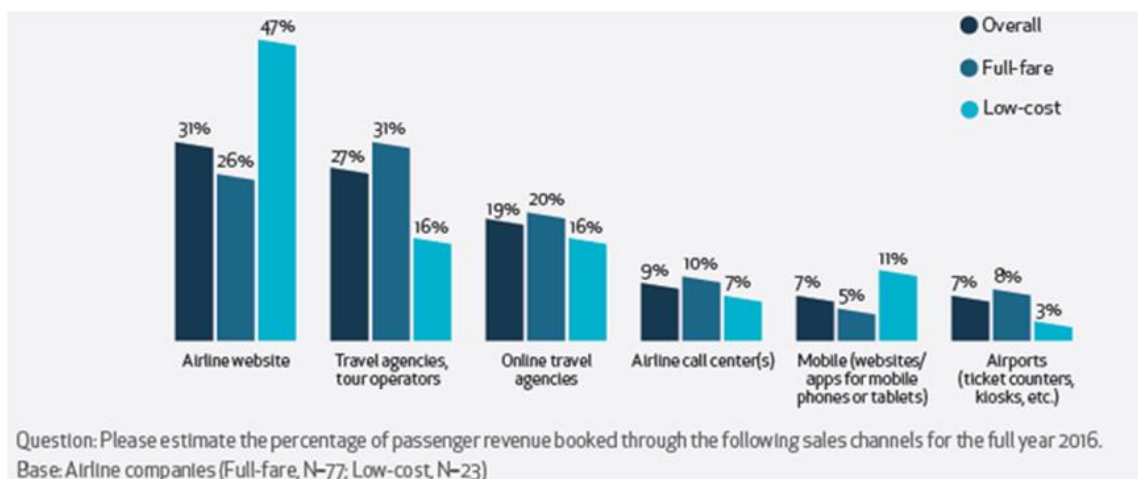
Figure 2.7. Passenger Revenue through Distribution Channel

(Coletta, 2018)

2.2.2. Indirect Distribution Channels

Indirect sales channel has affected the airlines' profits negatively in two ways. First, the presence of GDSs as intermediaries has reduced the airlines' margins because of the high GDS fees and travel agents' commissions. Second, GDSs and OTAs utilized their market power over airlines' customers by deriving extra fees, charging higher commissions, and

even manipulating search results to influence consumer choice. The airlines have been facing diminished control of distribution (Granados et al., 2011).

2.2.2.1. TTA (Traditional Travel Agency)

Traditional travel agencies (TTAs) utilize the main functions of GDSs which are reservations, information search, client management and reporting. Additionally, many travel agencies have implemented an internal computer-based OIS that includes applications such as accounting, billing, reporting and record management designed to support operations, management and decision-making. These applications are in the form of packaged software (Raymond and Bergeron, 1997).

There are two types of consumers. First type of consumers does not mind the changes and they are able to adopt the developments. The rapid accessibility of information, which is the reason of e-commerce development around the world, gives these consumers the possibility to quickly book flights much more easily than before (Santis, 2013). However, the second type of consumers does not want to arrange the travel without a professional support especially if it is their first time in the destination. These consumers do not often have the familiarity with recent technological innovations and do not want airlines to attempt to serve them themselves (Clemons and Hann, 1999). Consequently, we can conclude that traditional travel agents will still have great importance in the future since they will still be attractive to this consumer type (Lee and Cheng, 2009). Figure 2.8 supports this idea by illustrating the percentage of this consumer type according to a survey made (Blutstein et al., 2017).
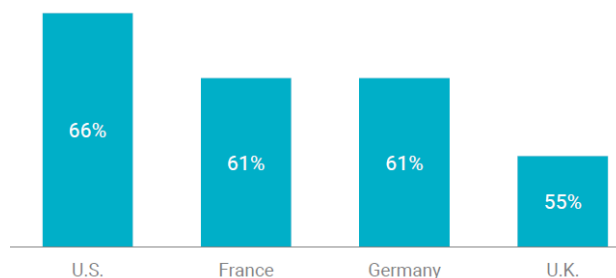
Figure 2.8. Offline Travel Booking

(Blutstein et al., 2017)

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2.2.2.2. TMC

After airlines started eliminating commissions paid to travel agents, agencies began to charge consumers service fees for booking tickets (GAO, 2003). Hence, some travel agencies changed their business model from being agents for the airlines to Travel Management Companies (TMCs) that provide service to consumers (Vinod, 2009).

The purpose of TMC is providing management and consulting services for corporate travel programs, which may include contract management, expense reporting, as well as travel agency services such as booking and fulfillment of travel (Quinby, 2009). They also support their customers by giving information related to travel safety, visa regulations and the political situation of the destination (Okura, 2015).

2.2.2.3. GDS

The duty of GDS in airline distribution industry is to aggregate schedules, fares, availability and booking capability for hundreds of airlines through a single point of access. By means of GDS, traditional travel agencies and OTAs are able to provide comprehensive flight information and selling capability without building connections from their reservations system to the reservation and inventory systems of all airlines. GDS combines the content and information received by aggregating too many requests and transaction 7/24 in a short response time. Travelport, which is one of the major GDSs, states that its system aggregates 65 million price and availability requests daily (Quinby, 2009).

Airlines started to reduce their high distribution cost encouraging their customers to purchase tickets directly through their own websites (Belobaba et al., 2009). Accordingly, British Airways could reduce its distribution cost to £15 per passenger by 2004 (Alamdari and Mason, 2006).

Meanwhile, airlines had been no longer paying to travel agents' commissions for tickets sold in the United States. Hence, airlines' distribution cost dropped dramatically (Figure

2.9). This was resulted in a reduction of reservation and sales cost to 10% of total operating cost (Figure 2.10) (Global Aviation Associates, Ltd., 2002).
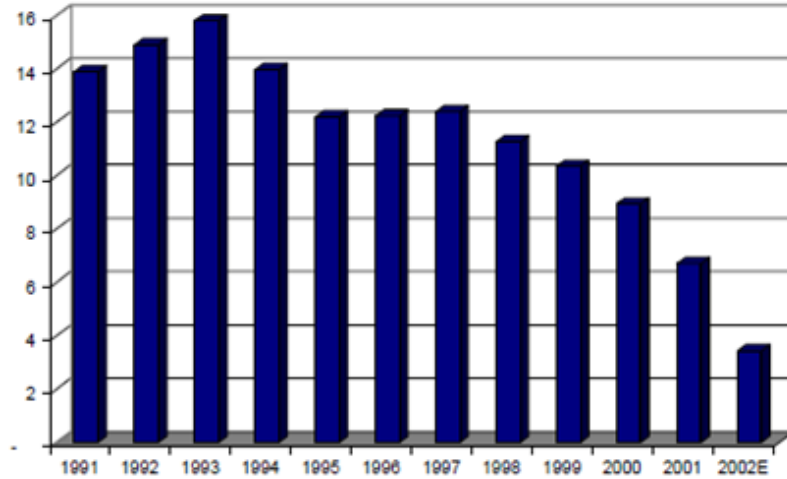
Figure 2.9. Commission Costs of Major U.S. Airlines

(Global Aviation Associates, Ltd., 2002)
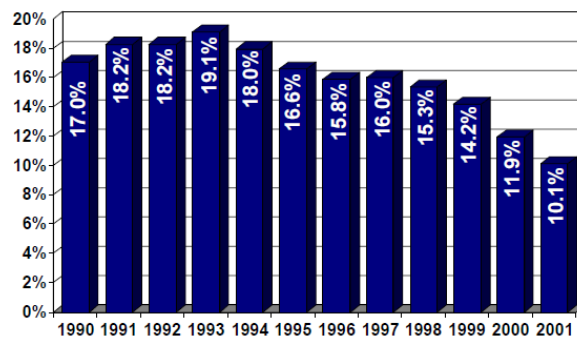
Figure 2.10. Reduction of Costs for U.S. Major Airlines

(Global Aviation Associates, Ltd., 2002)

In contrast, GDS booking fees increased due to their market power as shown in Figure 2.11. These fees still constitute a significant part of total airline distribution costs (Global Aviation Associates, Ltd., 2002).
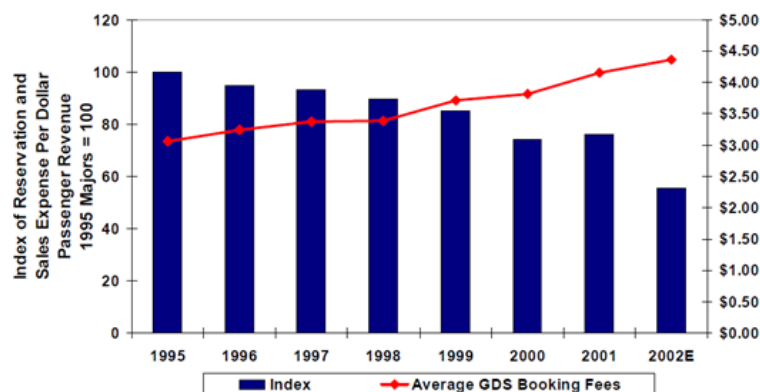
Figure 2.11. Cost of Sales per Passenger for U.S. Major Airlines

(Global Aviation Associates, Ltd., 2002)

Although airlines spent significant effort for shifting bookings to their own websites, most airlines still use GDSs for bookings, and their fees charged to airlines have remained as a problem. Because of the complexity of developing any type of reservations environment, it has been hard to implement a completely new next-generation airline inventory and distribution systems. At the same time, GDS companies have modified their fee structures and given airlines the ability to use emerging online distribution functions effectively. Therefore, GDSs remained as an important source of bookings for airlines, especially trading to the corporate and business consumers who prefer travel agencies (Belobaba et al., 2009).

Airlines adopted various approaches to reduce distribution costs. Many airlines offer access to their internal reservation and inventory systems through their own websites to reduce costs incurred by travel agents and fees to the GDSs. The pioneer airline is Lufthansa in this area. Lufthansa is regularly auctioning off selected flight tickets via its website 'Info Flyaway'. They run a full day auctions once a month (Shaw et al., 2000). Moreover, some airlines offer last minute tickets at good prices in auctions through their websites (Schulz, 1996).

Some airline companies attempted to reduce GDS cost in different ways (PR Newswire, 2003; Aviation Daily, 2002). All these attempts failed, but after GNEs arose, GDS companies realized the importance of situation and perceived to reduce their fees.

After the technological developments, GDSs also adapted to the changing business environment to survive against technological developments. They adopted the strategies below in addition to the role of distribution channel: (Muradyan, 2005)

- Providing effective solutions for LCCs while keeping support FSCs
- E-commerce development in airline industry
- Making investment in OTAs
- IT services development in long-term

Among the strategies above, the most remarkable one is IT services development. Because according to a study (Muradyan, 2005), airlines are considering outsource the IT services such the new generation inventory, departure control and e-ticketing since they are not capable to handle (Figure 2.12).
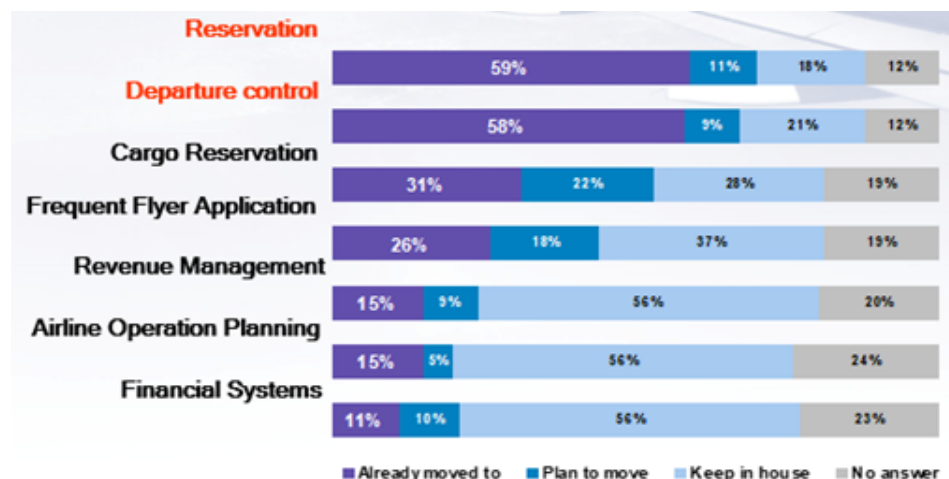
Figure 2.12. Development of IT Services

(Muradyan, 2005)

2.2.2.4. Integrated Websites

The accessibility of the internet changed how customers purchase tickets by evolving the structure of airline distribution industry. Customers were offered new distribution channels with the ability of buying tickets through either airline's own websites or OTAs. Meta-search engines brought a price transparency to the distribution industry (Fiig et al.,

2015). As a result, Orbitz increased transparency levels by displaying high number of search results through its user-friendly interface (Granados et al., 2008).

By means of ITA software, Orbitz does not have to be dependent on legacy system infrastructures and GDSs. Figure 2.13 shows the technological structure of fare distribution in the airline distribution industry from the perspective of Orbitz (Granados et al., 2007).
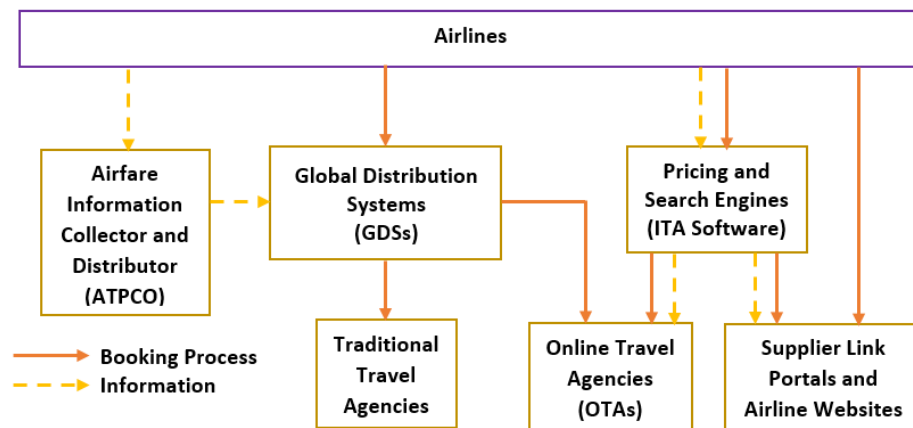
Figure 2.13. Technological Structure of Airline Distribution

(Granados et al., 2007)

To provide transparency to consumers, Sabre was the first company to launch Air Total Pricing based on publicly available ancillary fee information obtained from airlines, fares obtained from ATPCO and an internal database. With this capability, TMCs and OTAs can sell the specific ancillary services based on the preferences and calculate the total price (Vinod, 2011).

On the other hand, the other OTA category, which is called "opaque", does not reveal its content. In this system, the website accepts bids from consumers for airline tickets, but the airline company of the flight and the exact departure time are not revealed until the ticket is purchased (InterVISTAS, n.d.). Priceline and Hotwire are examples of opaque OTAs (Granados et al., 2007).

Accordingly, integrated websites such as GDS-based OTAs and Supplier Links can be categorized as shown in Table 2.2 (Granados et al., 2007).

OTA type	Transparency type		
	Price	Product	Description
Orbitz	Very high	Very high	Unbiased, numerous alternatives per request
Inter-airline (e.g., Travelocity)	High	High	Alternatives limited by GDS technology, biased by preferential agreements with airlines
Airline portals (e.g., www.delta.com)	High	Medium	Alternatives limited to airline specific offers
Opaque websites (e.g., Hotwire)	Low	Low	Price and/or product information concealed until after purchase

Table 2.2. Transparency of Integrated Websites

(Granados et al., 2007)

Accordingly, Orbitz has the highest levels of product and price transparency. Although the importance of Travelocity and Expedia was eroded because of Orbitz's success, they remained as the top OTAs, with market shares above 30% in 2002, excluded the airline portals. Travelocity continued to provide 7/24 customer support via telephone, and Expedia continued to sell its niche travel packages. In the same year, Orbitz was the second with a market share about 25%. Orbitz kept its position as a direct competitor of the GDSs by offering to bypass the traditional distribution channel (Granados et al., 2007).

2.2.2.5. Meta-search Engines

Meta-search companies such as Kayak, Skyscanner and Trivago are used for searching and comparing the options obtained from OTAs and airlines' websites. They use a procedure known as 'screen scraping' while doing this. They are routing the booking request to the relevant suppliers for actual booking. They have been very successful in the airline distribution industry since many consumers satisfied with comparing price options of flights (LSE Consulting Report, 2016). Metasearch has fundamentally changed the search process, expectations, and transparency of the market (EyeforTravel Ltd., 2015). The fundamental thing to note is that metasearch is not a booking channel: it's an advertising platform on which different booking channels can market themselves. A metasearch engine won't list the rate from your website, even if it's the best rate available

online, unless you are actively bidding on advertising slots. The airline company might be visible anyway when the OTAs that the airline company collaborates with will be bidding on those slots on behalf of the airline company (Triptease, 2017).

The airline company pays CPC (cost-per-click) or CPA (cost-per-acquisition) to meta-search engines. CPA ensures that you only pay when your campaign results in a booking, but to some airlines it can feel too close to an OTA-style commission model. CPC is much closer to the traditional digital marketing methods many airlines will be used to: think of it as a fee on traffic, rather than on bookings. The airline company pays a small amount every time a customer clicks through to their site from metasearch results (Triptease, 2017).

Most meta-search companies use GDS because of the speed and reliability of information to capture travel content. Both meta-search engines and GDSs are aggregators, but while GDSs are regulated to display neutrality for a fair competition, meta-search companies can display the airline on the top while listing the options in the case it is paid high advertising and referral fees (LSE Consulting Report, 2016).

2.2.3. The Share of Tickets Sold

The share of tickets sold per distribution channel is examined according to the results of some studies as follows.

Airlines have claimed that it is too expensive to distribute their products through travel agencies. The study supports this claim since there is a huge fare difference between GDSs / traditional travel agencies and online travel agencies. According to a study, Orbitz costs lower than Sabre as shown in Table 2.3 (Global Aviation Associates, Ltd., 2003).

Airline Ticket Distribution Costs Per Transaction - Summary
Orbitz vs. Sabre (June 2002 - May 2005)

Cost Category	Travel Agency	Orbitz			Percent Orbitz Total Cost Is Less Than Travel Agency:		
		Industry Average	Charter Associates	Supplier Link	Industry Average	Charter Associates	Supplier Link
Total Distribution Cost ('02-'03)	$52.75	$21.68	$21.47	$14.83	-37.3%	-38.1%	-63.4%
Total Distribution Cost ('03-'04)	$53.37	$20.77	$20.56	$13.92	-42.1%	-42.9%	-67.7%
Total Distribution Cost ('04-'05)	$54.01	$19.50	$19.29	$12.65	-48.1%	-48.9%	-73.1%

Table 2.3. Comparing Distribution Cost per Transaction

(Global Aviation Associates, Ltd., 2003)

According to the results of another survey, OTA costs less than traditional travel agencies as shown in Figure 2.14 (Quinby, 2009).
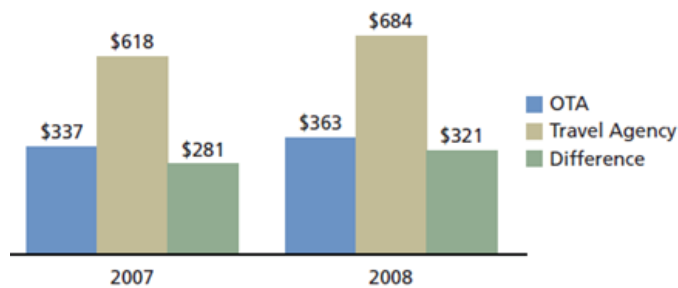
Figure 2.14. Average Ticket Prices per Distribution Channel

(Quinby, 2009)

Figure 2.15 shows Continental's top-10 markets in June 2006. It is obvious that customers who bought through OTAs paid lower average fares compared to customers who purchased tickets through traditional agencies (Brunger, 2010).
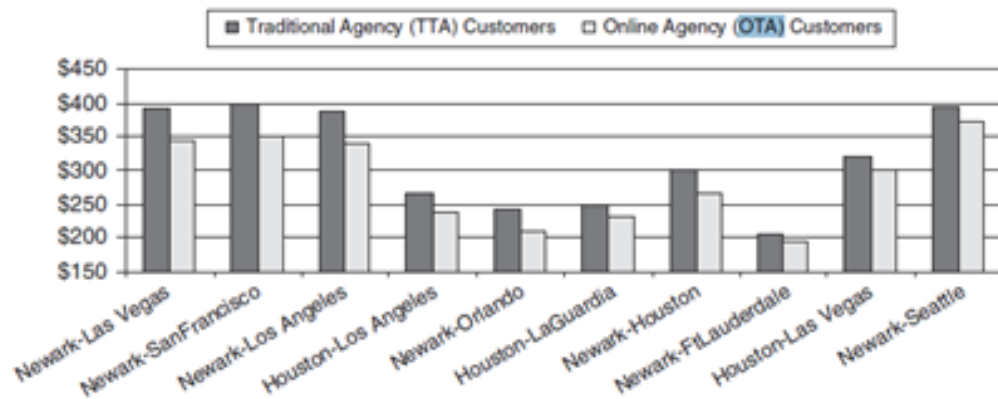
Figure 2.15. Average Fare Paid by Distribution Channel

(Brunger, 2010)

According to the relevant studies, it can be concluded that online prices of airline tickets are lower than traditional travel agencies.

2.2.4. Challenges in Airline Distribution

Airlines have faced several challenges in distribution since they did not take precaution at the first place. If they had changed their business model on paying intermediaries when they had sold their shares in GDS, they would not have paid them high commission fees and overrides afterwards (Harteveldt, 2016).

Airlines have always been complainant from high fees, which they had to pay to GDSs. On the other hand, some of them have allowed GDSs to operate much of their distribution technology to reduce their IT investment. In 2005, many airlines signed "full content agreements" with GDSs and gave them access to see how and where airlines sell their products in exchange for reduced GDS fees. Hence, the agreement forced carriers to publish all their public inventory and fares in GDSs by eliminating airlines' distribution advantage over the GDSs (Harteveldt, 2016).

Additionally, some airlines have outsourced or been considering outsourcing their IT systems such as their PSSs (Passenger Service Systems) to major GDS companies which have increased those companies' power over airlines. However, it is predicted that

airlines will spend effort to take control of the distribution channel back by the help of new technologies soon (Harteveldt, 2016).

The growth and evolution of the airline distribution systems have resulted in major IT challenges between the different GDSs, airline websites and other distribution players as well as the customer confusion which occurs because of the multiple options.

The most significant IT challenge in the airline distribution industry can be accepted as the synchronization of flight, fare and passenger information among airline reservation systems and multiple GDSs. The developments in airline industry such as pricing and alliances have been beyond the most airline reservation systems could handle. Airline alliances have seen the synchronization between their IT systems and airline reservation systems as a significant problem. Therefore, alliances attempted to solve these problems. The pioneer was the Star Alliance which undertook the development of a "common IT platform" for its airline members (Belobaba et al., 2009). The Starnet system aimed to provide a central IT hub and translate messages between partners into a convenient format that can be understood by the system of each participating airline. The initial applications developed for Starnet was related to real-time flight information and payment of frequent flyer miles on other members' flights (Doganis, 2006).

The other IT challenge in airline distribution arose from the massive requests originating from integrated websites. Airline's reservation system has already been under the huge loads because of the requests for information made by thousands of travel agents. With the establishment of OTAs, the IT capabilities of most airline reservation systems became insufficient. Airlines solved this problem in short term by displaying the information obtained from their own websites as the lowest price. However, the real-time communication will need to be developed for more accurate transaction between integrated websites and airline reservation systems (Belobaba et al., 2009).

In airline distribution system, the effective use of IT will affect both cost reduction and revenue improvement significantly. For this purpose, the effective revenue management and enhanced customer loyalty programs will be required (Doganis, 2006).

Most airlines could not develop efficient and consolidated IT structure because of several reasons such as lack of investment capital for IT and lack of support by upper management on investing IT in long term (Doganis, 2006).

The key factor for airline companies is to decide on whether outsourcing some or all of their IT functions or making a significant IT investment in long term (Doganis, 2006).

As shown in Figure 2.16, airlines have obstacles to achieving their IT strategy such as lack of investment, lack of IT staff who has experience in airline systems (Muradyan, 2005).
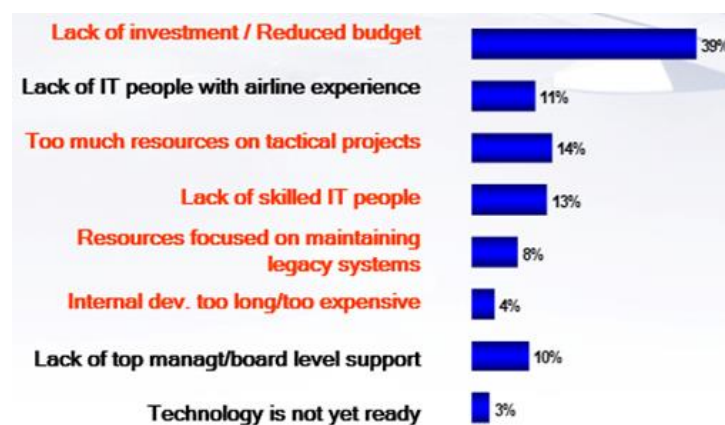
Figure 2.16. Airlines' Obstacles for Achieving Their IT Strategy

(Muradyan, 2005)

On the other hand, while they are outsourcing the IT, they may consider focusing on developing applications to provide their consumers developed services (Doganis, 2006). This is the strategy followed by British Airways. They outsourced its booking system, inventory control and their other processes to Amadeus and reduced their IT staff. Their IT staff has focused on developing new ideas and applications, while Amadeus ran the hardware and support systems. Hence, BA could reduce IT cost over 20% in two years. This strategy was followed by Qantas (Doganis, 2006).

Travel demand is based on the factors such as economic situation, travel risk and other travel options. Leisure customers are price sensitive and may use other travel options to reach their destinations such as high-speed trains. On the other hand, business customers

may replace face-to-face meetings by video conferencing. The other factor of demand is the travel risk because of the insecurity of destinations (LSE Consulting Report, 2016).

Transparency through the online distribution channels have given consumers access to multiple options, products and services (Granados et al., 2011). This resulted in that consumers assumed the airline tickets as commodity and became price-sensitive. This was beneficial from the point of LCCs and OTAs since they offered mostly lower prices compared to airlines' websites (Gasson, 2003). However, customer loyalty towards FSCs has decreased as shown in Figure 2.17 (Harteveldt, 2016).
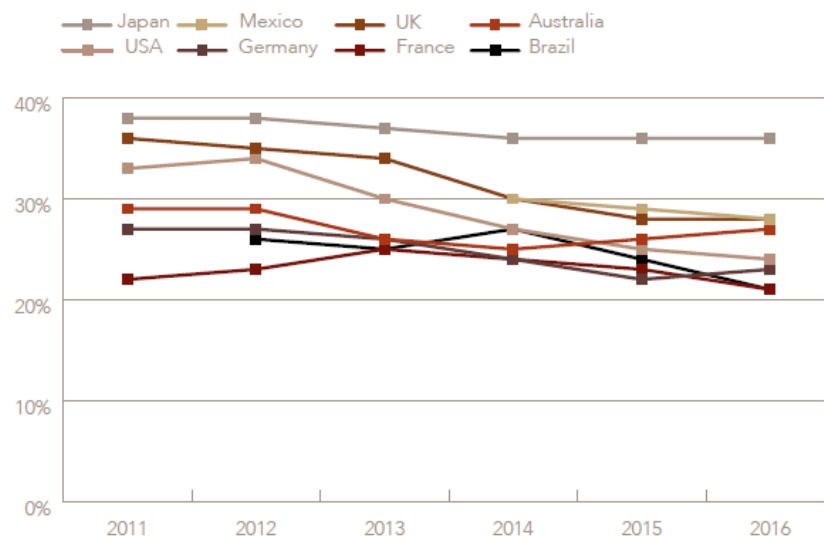
Figure 2.17. Declining Loyalty of Airline Passengers

(Harteveldt, 2016)

However, FSCs can attract consumers with customized offers. For this purpose, they will need customer data. It is encouraging that most consumers accept airlines to use their data to provide more relevant offers and better service as shown in Figure 2.18. They think that airlines don't use their personal information well right now (Harteveldt, 2016).
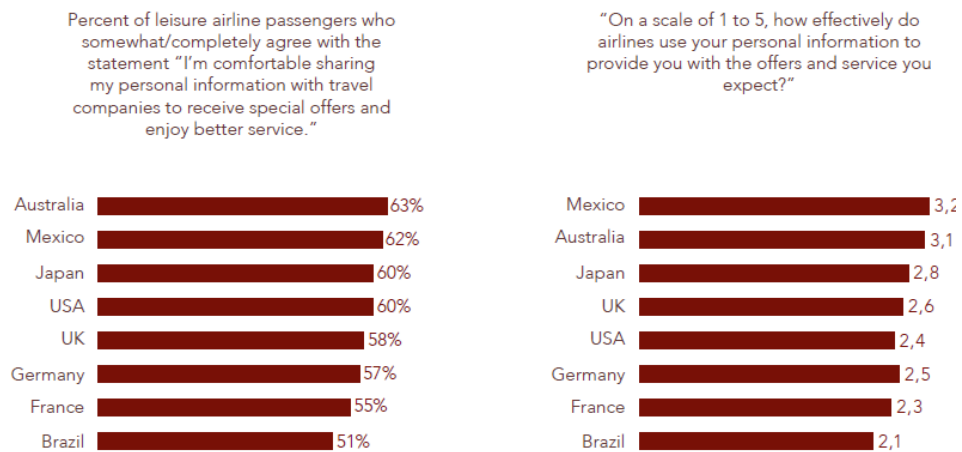
Figure 2.18. Perception of Passengers towards Sharing Data

(Harteveldt, 2016)

2.3. Airline Distribution in the Future

As mentioned in the previous section, airline distribution industry has faced several developments so far. It will continue to evolve with several important situations within the following years that will considerably affect distribution players and their business models. These potential factors obtained from the studies and reports are explained as follows.

2.3.1. ICT Development

Airlines should integrate the emerging technologies strategically in their operations to coordinate their management and business functions such as distribution, revenue management and customer satisfaction. Figure 2.19 shows the networked airlines of the future. They can use extranets to establish effective communication with their partners electronically. The developed network will be beneficial for both airlines and their partners in terms of lower cost, accurate transaction and optimized efficiency (Buhalis, 2004).

CONNECTING WITH ALL STAKEHOLDERS THROUGH THE INTERNET

Consumers
- Information, itineraries, Reservations
- Special offers, auctions
- Frequent Flyer clubs and redemptions
- Personal preferences
- Check in facilities
- Operational updates
- Baggage Systems and WorldTracer

Stakeholders
- Shareholders
- Environmental Groups
- Journalists and newsletters
- Place spotters and aviation enthusiasts
- Value added

INTERCONNECTING PARTNER SYSTEMS AND EXTRANETS

eProcurement: transactions and information flows with suppliers
- Extranets
- Reports for Air Traffic Control, Customs and Airport Authorities
- Reports for suppliers
- eProcurement tools and software
- Marketplace
- Baggage Systems and WorldTracer

Distribution, marketing and sales support with partners
- Computer Reservation Systems
- Global Distribution Systems
- Dedicated travel trade portals & systems
- General Sales Agencies systems & Extranets

Horizontal collaboration with other airlines
- Extranets between alliance members

INTERNAL AIRLINE SYSTEMS

Sales and marketing support
- Computer Reservation Systems
- Global Distribution Systems
- Reservations and Revenue Management
- Decision support systems

Operational Systems
- Flight Schedule Management Systems
- Operations Control,
- Flight Watch
- Station Control Systems
- Baggage handling and monitoring systems

Resource Management Systems
- Maintenance Control
- Crew management systems

Internet Consumers and Society

NETWORKED AIRLINE & IT STRATEGY

Intranet Intra-organisational

Extranet Inter-organisational

Figure 2.19. Future Airline Network

(Buhalis, 2004)

2.3.2. dbCommerce Era

dbCommerce (data-based Commerce) is an airline distribution model which is mentioned in the report of Atmosphere Research Group (Harteveldt, 2012). Accordingly, the model (Figure 2.20) aims to ease the communication between distribution players. However, it is emphasized that the airline companies need to make investments in their CRM and adopt new distribution channels such as mobile and social media to create dbCommerce infrastructure. The main benefit of this model is to present customized offers and prices to end-consumers who are searching for the convenient flights for themselves. The purpose of this customization is to put the content forward and eliminate the commoditization effect which is created by lower prices. It is asserted by Atmosphere Research Group that dbCommerce will be the most important technology in airline distribution industry after the advent of the internet technology (Harteveldt, 2012).

Figure 2.20. The Model of dbCommerce

(Harteveldt, 2012)

2.3.3. Wholesale Model

Traditional travel agency will maintain its presence in airline distribution industry in the future regardless of the emerging technologies and distribution cost since airlines do not want to lose the consumers who could not adapt into the internet era or prefer integrated travel package. The relationship between airlines and travel agencies eroded since airlines cut commission fees and went towards direct distribution through their websites bypassing GDS and travel agencies. With the adoption of wholesale model, it is aimed that the relationship between travel agencies and airlines will be empowered. Moreover, GDS costs will be eliminated since there will be a direct communication between travel agencies and airlines (Harteveldt, 2012).

In wholesale model, airlines offer agencies tickets at a discounted "wholesale" fare and travel agencies sell these tickets to consumers at a "retail" fare. Thus, airlines eliminate GDS costs as well as the "merchant" cost charged by the credit card or bank since travel agencies will meet this cost (Harteveldt, 2012)

In traditional wholesales model, an airline may "retail" to consumers at $300 while charging the agency a "wholesale" price - $285. However, the airline can limit the agency's "retail" price. Although the agency can't charge the ticket more than $300, it

33

can sell the ticket for less than $285. The other popular wholesales model is Manufacturers' Suggested Retail Price (MSRP) which is used actively between Apple and its authorized retailers. In this model, an airline can "retail" ticket at $300 while charging "wholesale" price for $285. However, the airline mandates the agency charge the consumer at $300. This model can be used for trading business class tickets in airline industry (Harteveldt, 2012).

2.3.4. VCH (Value Creation Hub) Channel

The VCH (Value Creation Hub) term was proposed by Atmosphere Research Group (Harteveldt, 2012) to represent a new distribution channel which presents technologically evolved infrastructure (Figure 2.21).
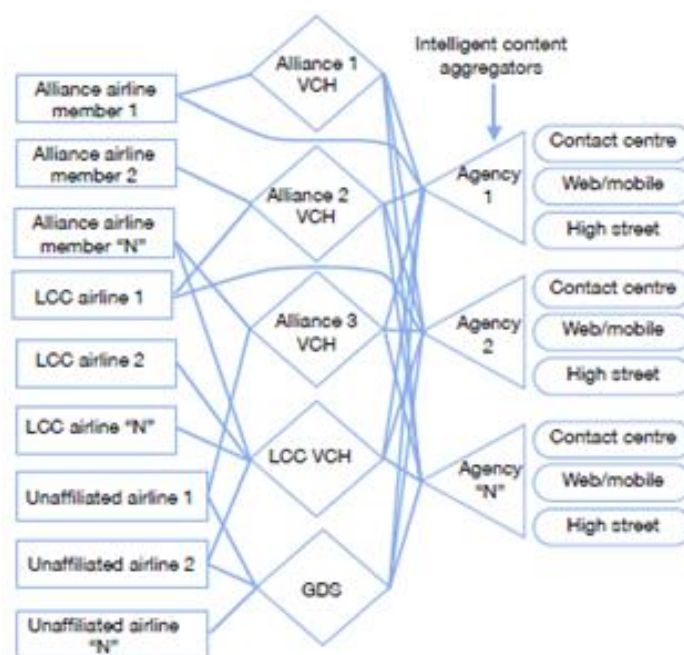
Figure 2.21. New Commerce Channel VCH

(Harteveldt, 2012)

According to the report, the task of VCH is to complete the distribution chain between airlines and intermediaries. This new model can completely remove GDS from distribution chain by replacing it. It is expected that alliances will take responsibility for

providing and establishing this channel. The main purpose of adopting VCH will be to gain the ability on controlling distribution industry by airlines (Harteveldt, 2012).

Although the alliances haven't adopted any model such as VCHs yet, a few airlines including Lufthansa have developed their own portals with a solution which has similar functions to VCH. Lufthansa has created a "direct connect" platform, allowing travel agencies to subscribe and bypass the GDS cost charged to airlines. Many of technology providers have already connected to Lufthansa's platform. The other example, which is like VCH channel, is the API of British Airways to be used by travel agencies to receive flight offers formed by the airlines without the GDSs. Intelligent content aggregator will be one of the players of the new channel. APIs will allow intelligent content aggregators to consolidate ticket contents from multiple sources, including VCHs, GDSs, and airlines (Harteveldt, 2012).

2.3.5. Developed Applications

Mobile has been an important channel for consumers. According to a survey (Blutstein et al., 2017), more than half of consumers book travel on mobile devices. In 2016, Atmosphere Research forecasts that US and UK airline passengers' adoption of mobile devices will increase in the following 5 years as shown in Figure 2.22 and Figure 2.23 (Harteveldt, 2016).
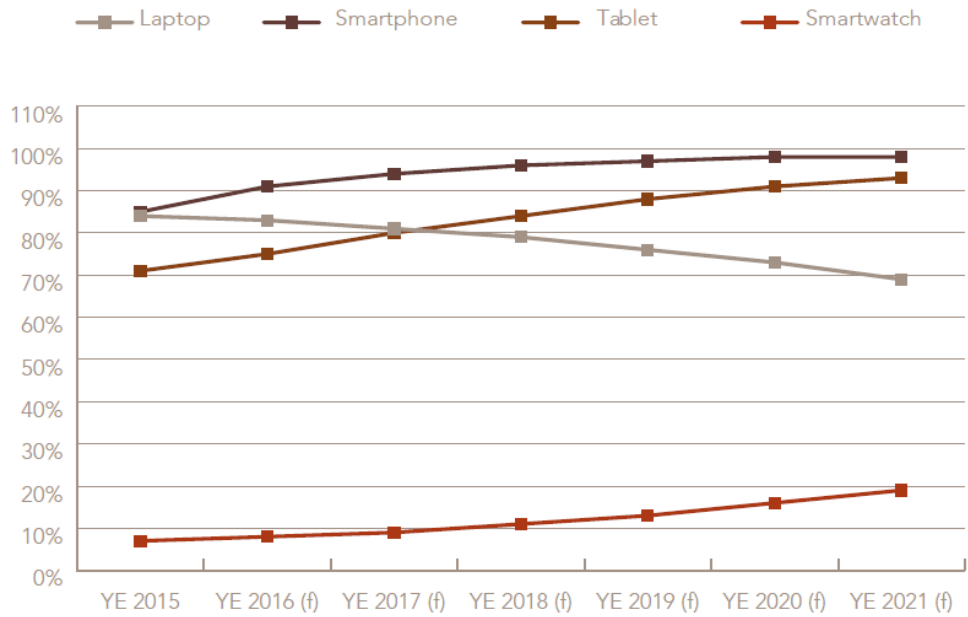
Figure 2.22. Mobile Device Forecast for US

(Harteveldt, 2016)
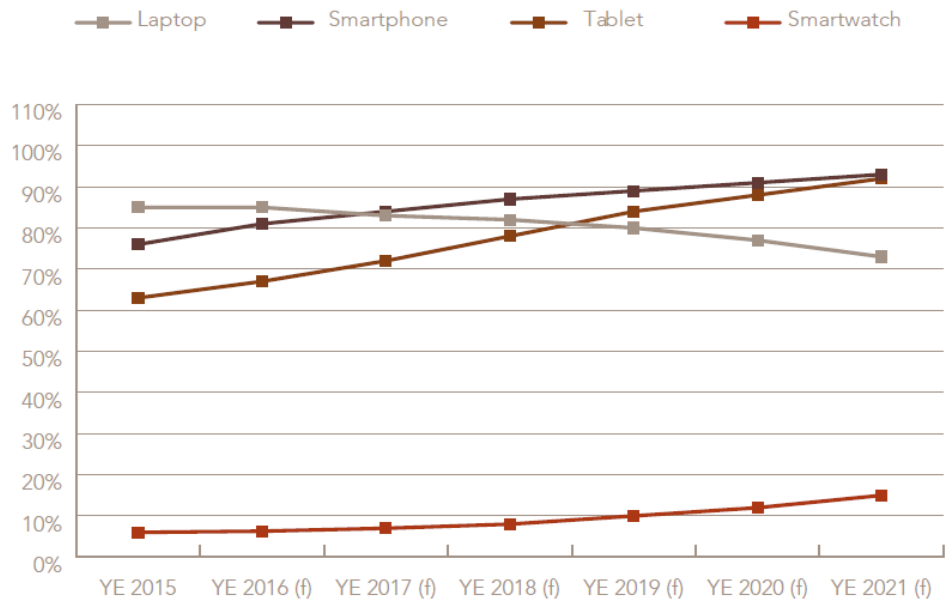
Figure 2.23. Mobile Device Forecast for UK

(Harteveldt, 2016)

Since most of global passengers carry a smartphone during their travel, key focuses will shift to mobile as consumers increasingly use their smartphones and tablets to not only research their travel, but also to book it (EyeforTravel Ltd., 2015). Consequently, it is

inevitable that mobile technology will reshape travel behavior as passengers expect to be using their mobile device at many stages during their journey as shown in Figure 2.24 (SITA, 2016).

Figure 2.24. Interest in Mobile Functions

(SITA, 2016)

According to IATA Passenger Survey (IATA, 2017), 74% of passengers used an electronic boarding pass through a smartphone in 2016. According to the report which was released in 2016, 38% of global business airline passengers and 41% of leisure passengers demand flight shopping to be as easy as shopping for a mobile phone online as shown in Figure 2.25 (Harteveldt, 2016).
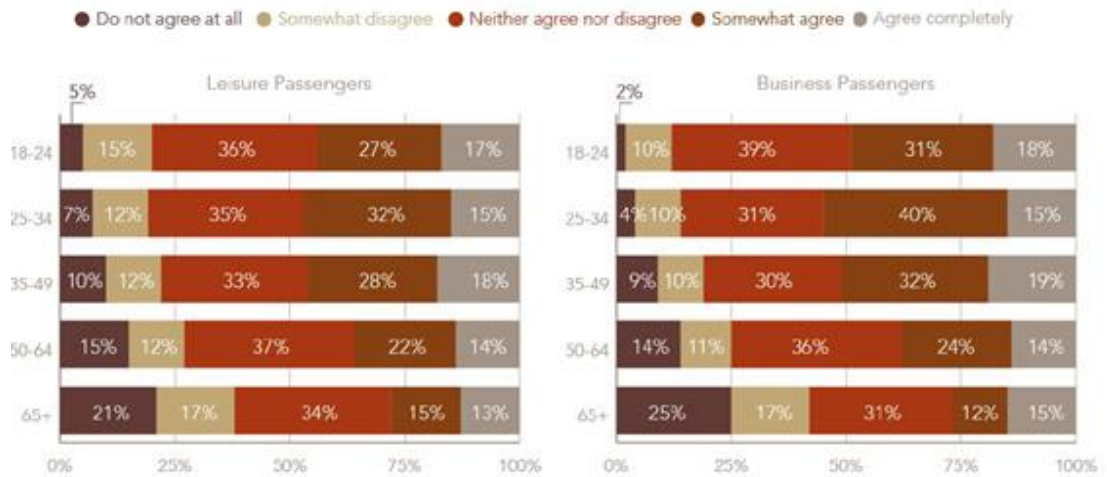
Figure 2.25. Request for Buying Travel Online

(Harteveldt, 2016)

According to the results of SITA report which released in 2017 (SITA, 2017), airlines are aware of the importance of mobile technologies and plan to apply them more effectively in the future (Figure 2.26).
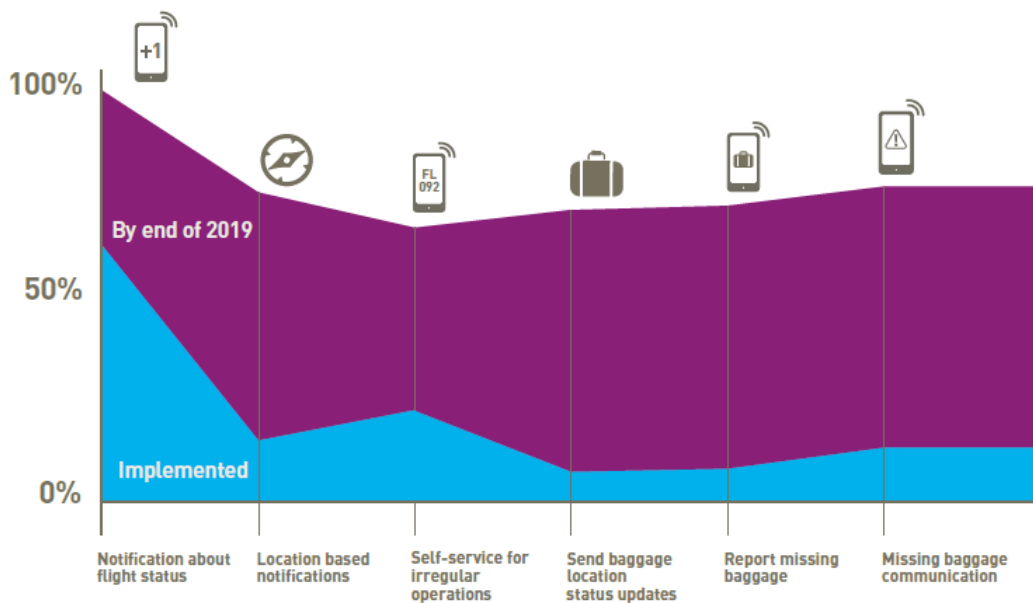
Figure 2.26. Adoption of Mobile Technologies by Airlines

(SITA, 2017)

Similarly, according to a survey made in 2016 (LSE Consulting Report, 2016), airlines experts accept the development of mobile as the most disrupting technological factor in airline distribution industry as shown in Figure 2.27.
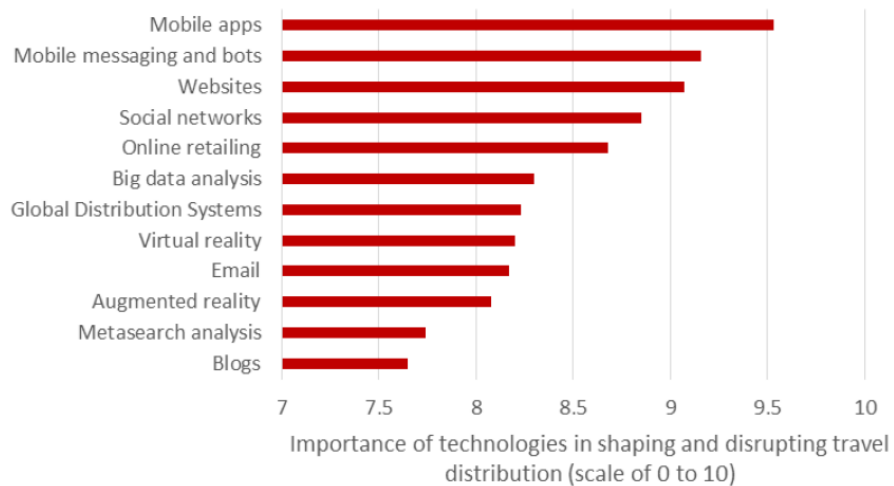
Figure 2.27. Disruptive Technologies According to Airline Executives

(LSE Consulting Report, 2016)

Considering the growth and adoption of mobile devices and existing consumer expectations, it is asserted that some mobile technologies will evolve airline distribution in the following years. These developments will affect both how consumers use their mobile devices and the mobile technology infrastructure that the airline distribution industry uses (Harteveldt, 2016).

With the development of mobile technology, voice systems can be used for retrieving information. Siri is an example of voice recognition tools, which are usable through virtual personal assistants, implemented into a mobile device to assist consumers by recognizing their voice (Harteveldt, 2016).

It is expected that consumers will use the voice interfaces for travel information like flight reminders, traffic and weather in the future (Sabre, 2017). The voice interfaces can also be used for flight search. It is asserted that this function will expand rapidly in the future as the artificial intelligence (AI) behind voice interfaces become more sophisticated and increase the autonomy (Sabre, 2017).

The latest advances in voice technology also represent new ways for travel agents to increase service and support to travelers. Auditory dashboards which are built for voice interfaces like Amazon Echo can emerge to offer travel agents access daily updates and basic traveler information rapidly. This technology may include check-in notifications, weather conditions and safety issues and allow travel agencies to save time and increase operational efficiency (Sabre, 2017). Furthermore, automation will become increasingly important as travel agents employ next generation technology to take care of a great share of itinerary building and filtering to save time (Sabre, 2017). Agents have already embraced automation in a powerful way through algorithms that automate price monitoring and deal finding (Sabre, 2017).

Eye tracking interfaces is the other key technology. It aims to reduce potential fraud by providing an optical scan as a biometric security component. Eye tracking can be applied to navigation, scrolling an app or web page, and scanning a map. It can also ease to interact with various airline apps (Harteveldt, 2016). Similarly, British Airways, KLM and JetBlue are using facial recognition for boarding. Australia is planning to automate 90% of incoming international air travel processing by 2020, using a combination of facial recognition, fingerprints and iris scanning to identify passengers without the need to show passports (Sabre, 2017).

Message-based interfaces can be used effectively in customer service. WeChat is one of the pioneers of this technology (PhocusWright, 2017). Companies can offer service and support thoroughly. Travelers who use messaging services like WeChat and Facebook Messenger will have service and support capabilities without downloading a proprietary app or accessing a website (Sabre, 2017).

Furthermore, mobile technology may lead the virtual assistants to anticipate the traveler's preferences more accurately by gathering personal data to make better recommendations on destinations or ancillary services (LSE Consulting Report, 2016).

Artificial intelligence (AI) can be defined as any program with the capacity to learn new information and apply it to new problems as they emerge. In many cases, AI is being brought alongside humans to produce more effective outcomes than either could achieve

alone (Sabre, 2017). It is predicted that by 2020, customers will manage 85% of their interaction with companies without interacting with a human (Sabre, 2017).

The importance of AI which offers to improve the customized flight shopping with more personalized content has been growing in airline distribution industry (Harteveldt, 2016). Experts anticipate that new technologies such as AI will be adopted rapidly in the next decade (Switchfly, 2018). Similarly, the report which published in 2017 (SITA, 2017) supports this idea since airline executives stated that they are anticipating adopting AI in the next decade (Figure 2.28) (SITA, 2017).

Figure 2.28. Adoption of AI

(SITA, 2017)

Lola is an app that provides consumers to access to travel consultants who can take care of every step of the planning process 24/7. Utilizing a combination of AI technology and expertise, Lola provides travelers with activity suggestions in real-time, providing easy and fast access to information on-the-go (Sabre, 2017).

Virtual reality (VR) is a computer-simulated software that can create an environment (Harteveldt, 2016). It aims to engage as many senses as possible in the experience of another world like the Star Trek Holodeck (Sabre, 2017).

VR provides a new way of packaging and presenting travel inventory as content created by a distributor, rather than as information requested by a user (Switchfly, 2018). While the focus shifts to content, it is anticipated that VR will become a distribution channel on its own. VR can be used significantly on high-value leisure travel to destinations such as Hawaii or the Caribbean's. The travel website, which offers VR previews of the destination, can attract the customers at the booking process (Harteveldt, 2016). It can

also help inspire local travel opportunities like diving with sharks or paragliding off a cliff. VR experience is more accessible and can help people mentally prepare for real world experiences that may be at the edge of their comfort zone (Sabre, 2017).

The other benefit of VR is the additional feeling of authenticity. Travelers may be disappointed upon arriving a destination and realizing the actual location is not like the promotional photos. However, with VR, the traveler can investigate the place before purchase (Sabre, 2017).

In-flight VR is an opportunity for loyalty since travelers are often looking for opportunities to be distracted or entertained during the flight. VR gives the viewer autonomy to control their experience which instills authenticity and builds trust (Sabre, 2018). It is claimed that as VR headsets become more affordable, and better VR applications become available, consumer adoption of VR headsets will increase. In 2016, it is estimated that US demand for VR headsets will increase from 3.3 million units to 52.3 million by 2020 (Harteveldt, 2016).

VR allows travel agents to offer a unique experience for customers to preview potential destinations. Agencies should also consider targeted advertising on platforms where existing VR content is being consumed. If you specialize in tours of Iceland, you want your agency's "book here" ad to appear every time a potential traveler watches a YouTube VR video of the Northern Lights (Sabre, 2017).

United Airlines created a 3D environment for the Oculus Rift headset to showcase its Polaris business class which is based around Boeing's 777-300 aircrafts. Beforehand, United's marketing department used VR to show the aircrafts, the business class cabin and the associated Polaris airport lounges to help customers to have the premium experience before the availability (Sabre, 2017).

Airlines will continue to move from VR as a travel inspiration to position and sell premium products (Sabre, 2017). They should also consider targeted advertising on platforms where existing VR content is being consumed. When a potential traveler

watches a VR video tour of a foreign city, they should see a "let our airline take you there" ad allowing them to book a flight to the city they just saw (Sabre, 2017).

Augmented Reality (AR) is a technology which provides the visual of real-world with additional computer-generated sensory inputs, such as GPS location information, sound, or graphics (Harteveldt, 2016). It aims to add the physical world a richer, more informed and more seamless experience (Sabre, 2017), (Sabre, 2017).

Since smartphones and tablets are already being built with sensor technologies which can be easily tied into a connected web of digital content to provide relevant information about the consumer. The cameras, GPS and an accelerometer make it possible for developers to build applications which overlay rich visual and aural information about public transportation, restaurant reviews, etc. One of the most basic AR applications is Google Translate which allows users to point their smartphone camera at text and have it translated in real time. When traveling, this eases language and navigation barriers (Sabre, 2017)

AR includes a range of products such as associated head-up displays like Google Glass or Microsoft Hololens (Sabre, 2017). Microsoft HoloLens headset was released as a developer kit in March 2016. Wearers look through clear lenses and see fully three-dimensional virtual objects embedded in the real world. The most impressive part of the HoloLens is its ability to map and remember physical spaces with incredible precision. If you walk out of a room, digital objects in it will remain exactly where you left them—a virtual TV on the wall, a virtual chessboard on the table, a virtual window displaying a live view of the beach. Persistence and visual immersion make the HoloLens the best current experience of what will be possible in the future (Sabre, 2017). According to a survey, 84% of Asian travelers are interested in the idea of their smartphone providing AR tours and activities for their travel destination. Stockholm Sounds is an app that challenges tourists to discover Stockholm through game missions, interactive experiences and visits to some 40 locations around the city. If successful in their missions, tourists gain access to unique experiences, events and rewards (Sabre, 2017). AR will also be useful in pilot training to practice in a simulated cockpit (Sabre, 2017).

Consequently, while virtual reality is helping transform inspiration and exploration ahead of travel, AR is helping transform travelers' experiences as they move around in the physical world. AR can assist in their trip by providing contextually-aware information to streamline and enrich their experiences (Sabre, 2017).

It is expected that technological advances in both AR and VR platforms will continue to drive consumer adoption while giving those companies willing to take a chance on these new technologies the potential for increased operational efficiencies (Sabre, 2017).

2.3.6. NDC and One Order

The expected changes in airline distribution may create a big opportunity for airlines to establish dominance. These technologies are IATA's XML-based New Distribution Capability (NDC) which purposes to create a shopping standard and IATA's One Order which records single customer orders (LSE Consulting Report, 2016).

With the implementation of NDC, all messages generated by the distribution system will be sent in real-time to the airline for evaluation. This will put the airlines in control of generating the offer. NDC will accept customization with enhanced content. Hence, specific customers such as frequent flyers can be presented with specialized offers which are designed to meet their requirements (Alamdari, 2002). Hence, NDC will present new revenue opportunities for airline companies (Switchfly, 2018).

In a study (LSE Consulting Report, 2016), some airlines executives assert that NDC can prevail the GDS by allowing airlines to connect directly with travel agents in distribution chain as shown in Figure 2.29 and Figure 2.30. Airlines can also combine NDC with VR to create captivating flight shopping experiences to distinguish their products (Harteveldt, 2016). On the other hand, some of the experts expect that NDC will create new opportunities for GDS companies as well, since the complexity of information will be evolved in the long-term (LSE Consulting Report, 2016).
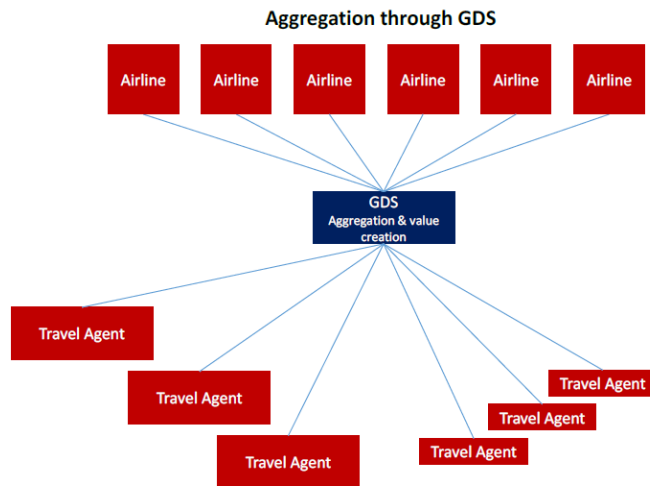
Figure 2.29. Airline Distribution Model: a) GDS aggregation model

(LSE Consulting Report, 2016)
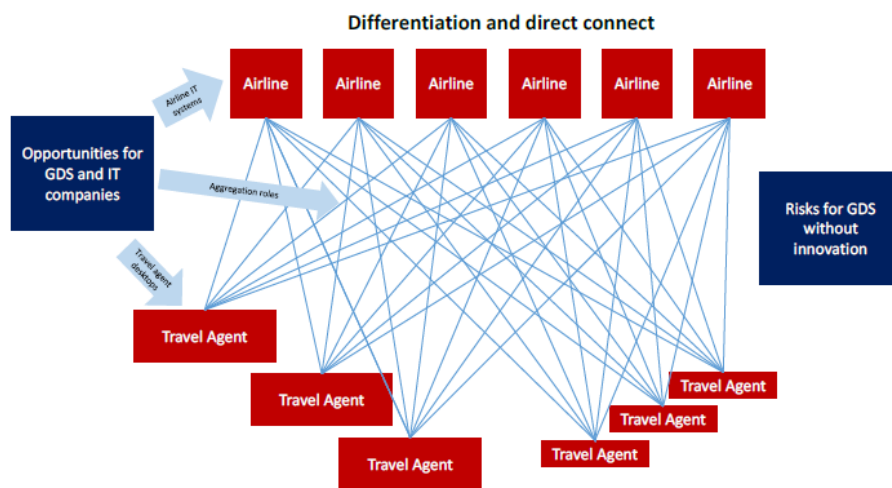
Figure 2.30. Airline Distribution Model: b) Direct connect model

(LSE Consulting Report, 2016)

One Order standard intends to simplify to reveal away passenger name records (PNRs) and e-tickets from the internal airline processes since the data obtained from these records can contain booking details, consumer's financial flow, and ancillary data. The aim of this technology is to allow airline to track and fulfill what the consumer buys (LSE Consulting Report, 2016).

2.3.7. Operational Cooperation

In 2016, the three major airline alliances (Oneworld, SkyTeam, and Star Alliance) were accounting for 57.5% of global airline capacity. However, according to a survey made with airline executives, several of the major airlines will reduce their alliance participation by 2021 (Figure 2.31) to establish a closer relationship with specific airlines for strategic and more beneficial collaboration. This collaboration was called as anti-trust immunized joint venture (JV) in the report of Atmosphere Research Group. The JVs allow both a close relationship of operational and commercial cooperation between contracted airlines while alliances cannot. This leads that the alliances will become less important in the following years (Harteveldt, 2016).

"In your opinion, how likely is it that the following airline scenarios will take place by year-end 2021?"
(5-point scale)

Airline joint ventures replace airline alliances	3,9
Network/flag airlines will reply on independent low-cost carriers for a meaningulf amount of traffic feed	3,1
There will be significantly reduced reliance on interlining, as we know it today	2,8
There will be significantly reduced emphasis on code-sharing, as we know it today	2,5
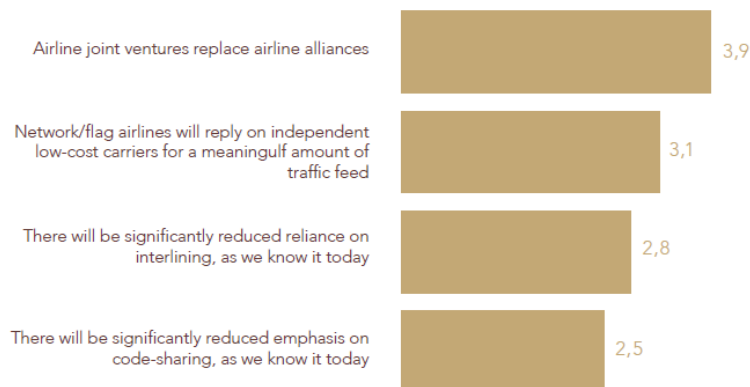
Figure 2.31. Anticipated Shifting Focus from Alliances to Joint Ventures

(Harteveldt, 2016)

During the last decades, many FSCs invested in direct distribution tools like websites and mobile apps as a similar strategy to LCCs. However, short-haul flying is still not profitable for many FSCs. To improve their financial performance of short-haul flying, Atmosphere Research believes that FSCs will shift some of their short-haul flying to LCCs which can operate as FSCs' code-share partner (Harteveldt, 2016).

2.3.8. Active Distribution

In the current airline distribution industry, GDSs offer the requested flexibility to neither airlines nor customers. Conversely, Active Distribution model will be based on prioritizing the customer demand. Therefore, personalization will play a crucial role in achieving this strategy. Accordingly, Active Distribution will give the airlines the ability to distribute and sell their products flexibly while helping airlines gather and classify data from multiple sources by improving airlines' abilities to recognize customer behavior better. When NDC and One Order will be combined, airlines can provide more relevant flight shopping content to consumers across the distribution chain. Evolving technologies such as DCM, AI and FRP will be components of Active Distribution (Harteveldt, 2016).

2.3.9. À la Carte Pricing

Before the last decade, airlines had a standard fare system within the same cabin class by providing the same products and services to consumers (LSE Consulting Report, 2016).

However, the transparency of the ticket prices through the Internet have given consumers the ability to have more information for comparing services and more choices to purchase services from different suppliers as if airlines tickets are commodity. When LCCs started to offer the consumers lower ticket price with no-frill services, fare families emerged in airline distribution industry (Granados et al., 2011).

Finally, around 2005, long-established airlines began to present unbundled products by adopting á la carte model. Air Canada was the first FSC which associated fare families with product content. In the same year, United Airlines, introduced its "Economy Plus Access" program which offers consumers an upgraded seat with additional room for a one-time annual fee of $299. Another example is the "Business Select" fare of Southwest Airlines, which has offered priority boarding, an onboard drink, rapid rewards credit, and prioritized security access for a fee. Frontier Airlines' "Classic Plus" and "Classic" bundles are other examples as shown in Figure 2.32 and Figure 2.33 (Granados et al., 2011).

Figure 2.32. À la Carte Pricing Mechanisms: a) Southwest Airlines

(Granados et al., 2011)

Figure 2.33. À la Carte Pricing Mechanisms: b) Frontier Airlines

(Granados et al., 2011)

Over time, more FSCs began to accept this model. One of the main reasons of associating à la carte pricing into airlines' websites was to provide consumers a possibility to customize their tickets during purchase while GDSs and OTAs are only providing standard service packages with fixed prices (Granados et al., 2011).

À la carte pricing may lead to product differentiation for the relevant airline since it offers different fare families with ancillary services. Additionally, with this model, airlines may increase their direct sales through their own websites and eliminate the intermediaries from the distribution chain (Granados et al., 2011).

The standard bundles sold through channels are shown in Table 2.4. Consumers who book through the channel based on à la carte model have high percentage than the traditional one. It can be concluded that à la carte pricing enables consumers to evaluate whether their focus should be a low-feature or high-feature bundle by supporting decommoditization hypothesis (Granados et al., 2011).

Standard bundle	Channel bookings (percent of total)	
	Traditional	À la carte
Deeply discounted	45,036 (11.9)	459,560 (71.4)
Discounted	188,312 (49.8)	123,025 (19.1)
Flexible	119,727 (31.7)	22,334 (3.5)
Premium	24,840 (6.6)	38,698 (6.0)
Total	377,915 (100.0)	643,617 (100.0)

Table 2.4. Bundle Choices by Channel

(Granados et al., 2011)

When NDC and One Order were introduced for airline retailing, airlines became more creative in presenting customized products for consumers to increase ancillary product sales. Airlines began to unbundle their premium products as well. For example, Emirates and Qatar Airways started to sell a discounted business class ticket that doesn't include airport lounge access to generate additional revenue (LSE Consulting Report, 2016).

In another example, Virgin America has integrated flexible digital ancillary retail as part of its service model to develop customer relationships and offer relevant content to travelers in-flight. The airline has made customization by unbundling services from the base airfare and offered customers the option of buying only what they need by creating branded fares packages. In this branded fare, which is called Power Trip, the airline has offered options which give customers a "set menu" choice of select services to include in their trip. Specifically, it includes priority security and boarding, a 'Plans Change Pass' which waives change fees, and a checked bag. The same Power Trip benefits can be purchased as à la carte ancillaries through a reservations menu option called 'Customize Trip' on a separate page of the Virgin America site before the flight (Taubmann, 2014).

Not only the airlines companies, but also the other airline distribution players are planning to offer ancillary services to increase their revenue (EyeforTravel Ltd., 2015). One of the major GDS companies, Amadeus, started to provide ancillary services to be purchased associated with the airline ticket. The airline company decides if and how charges are applied to ancillary services. Some ancillary services can only be purchased while or after purchasing the ticket. Furthermore, the airline company has the power to decide which ancillary services are chargeable and under which conditions as follows (Amadeus, 2013)

- An ancillary service can be chargeable for one destination and not for another.
- A service can be chargeable for economy passengers but free in business class.
- A service can be free of charge depending on a passenger's frequent flyer status and a paid service for others.

Examples of the types of services currently offered include: (Amadeus, 2013)

- Seat Selection
- Excess Baggage
- Catering
- Pets

2.3.10. Dynamic Pricing

Dynamic pricing, in other names revenue management, is a pricing strategy that aims to increase the profits of airline companies (McAfee and Velde, n.d.). Airlines accept dynamic pricing as a major component on improving flight-shopping experiences and creating better content for consumers in the future. It will allow airlines to specify a selling price while booking. Therefore, PSS or GDS won't be required to obtain an accurate fare (Harteveldt, 2016).

According to a survey made, most airline executives believe that dynamic pricing will be the most important distribution strategy of the future as shown in Figure 2.34 (Harteveldt, 2016).
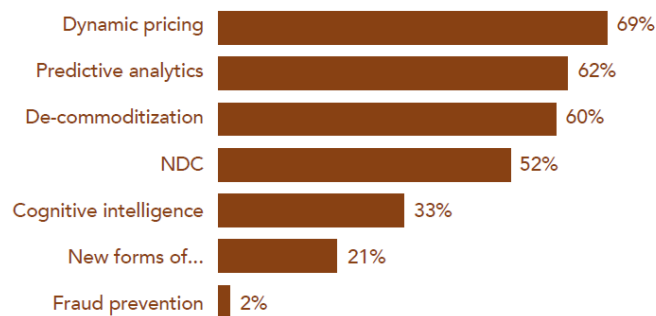
Figure 2.34. The Most Important Distribution Strategies According to Airlines

(Harteveldt, 2016)

2.3.11. Fare Aggregators

Airlines publish their fare data through the Airline Tariff Publishing Company (ATPCO) for distributing to GDSs. ATPCO has been a critical component in airline distribution for more than 50 years, but some airlines executives consider that its role will erode in the future. Filing fares via ATPCO works with the defined, pre-filed fares used today. However, this fare type will be less useful in the future because of the emergence of dynamic pricing strategies (Harteveldt, 2016).

In the era of Active Distribution, airlines will have the ability to produce dynamic price offer in real-time with NDC-enabled technology. When these technologies combined with NDC-based solutions, it will be possible for airlines to create attractive itineraries from the perspective of consumers (Harteveldt, 2016).

2.3.12. Full Retailing Platforms (FRPs)

It is anticipated that Full Retailing Platforms (FRPs) will replace PSSs of airlines for achieving Active Distribution. FRPs are the systems whose components are a next-generation inventory module, scheduling, dynamic pricing and revenue management software (Harteveldt, 2016).

Since FRPs will be linked to customer and frequent flyer passengers' databases to support personalization, they will allow the differentiation on customer-based. Consequently, if the product differentiation is effectively applied by FRPs, the commodity effect will be overcome (Figure 2.35) (Harteveldt, 2016).
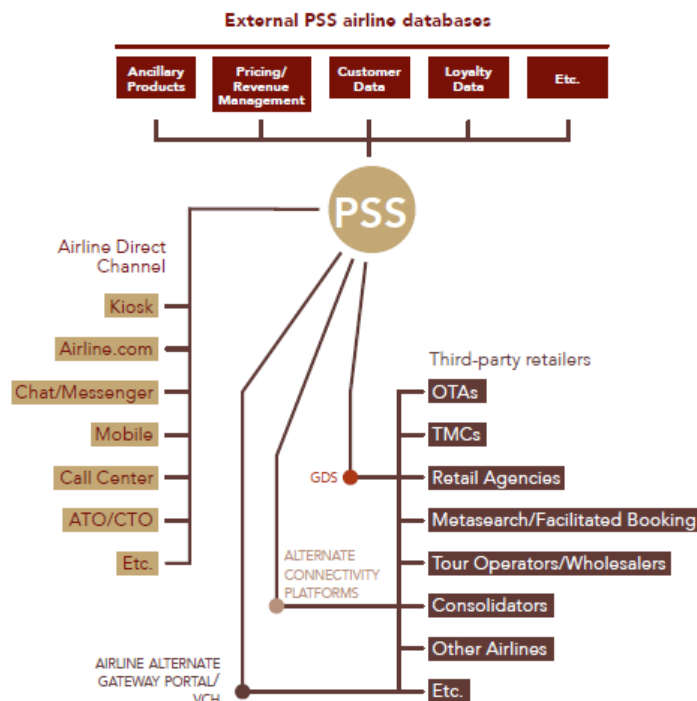
Figure 2.35. Channels to be Supported by PSS

(Harteveldt, 2016)

It is claimed that by 2021, only cabin classes will be essential since NDC and dynamic pricing make standard fares obsolete. When a shopping request is received, the FRP will assess available seat and product inventory and, through an NDC-compliant offer management application, dynamically create the offer, connecting with a dynamic pricing and revenue management tool to generate the price. As a result, it may be possible for an airline to use inventory management systems, which may be less expensive, more flexible, and easier to manage than airline-based inventory software (Harteveldt, 2016).

The combination of dynamic pricing and FRP components will help airlines provide complete control over the purchase since the airline will be the only distributor for content of the product including the price. The technology providers such as Sabre, Hewlett-Packard Enterprise, SITA and Farelogix may provide the components of FRPs (Harteveldt, 2016).

2.3.13. Distribution Channel Manager (DCM)

In Active Distribution, FRPs will need to work with a large mix of distribution channels including GDSs, alternative distribution platforms, and direct connections to travel agencies. To manage this, airlines will add a Distribution Channel Manager (DCM) technology which is a smart switch based on AI (Harteveldt, 2016).

DCM will route an airline's responses to shopping requests using the distribution channel that meets the needs instantly and dynamically. The distribution cloud will be included in this distribution chain to allow airlines to establish their own individual secure and private networks in purpose of distributing their products dynamically to third-party retailers (Figure 2.36) (Harteveldt, 2016).
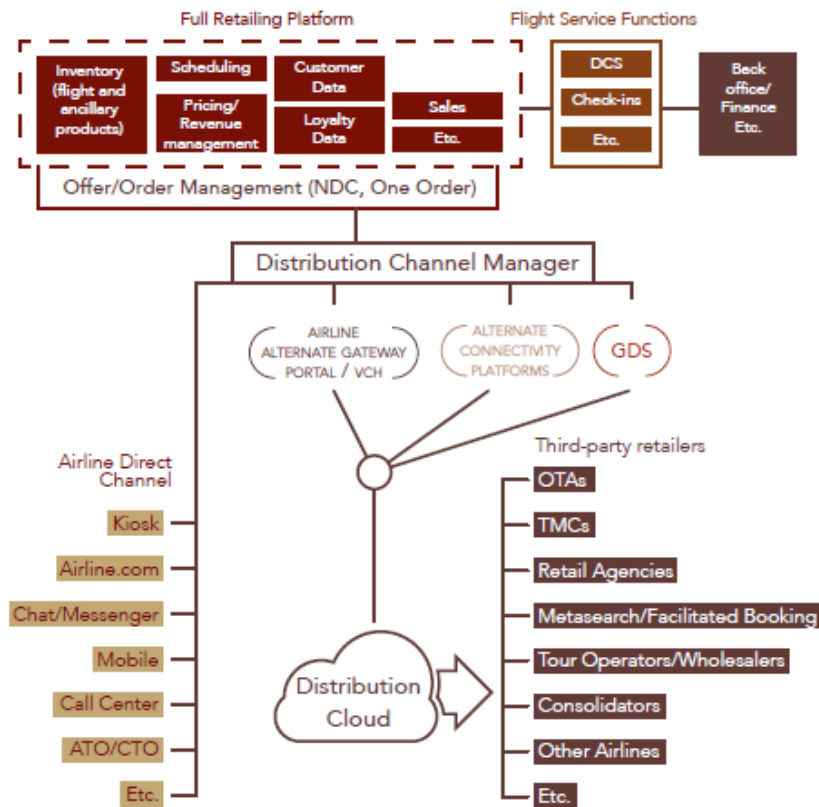
Figure 2.36. Connection between DCM and FRP

(Harteveldt, 2016)

2.3.14. Payment Innovations

The mobile payment was first developed in Japan in the early 2000s. Since then, e-payment and e-ticketing has become widespread. However, mobile payments became more universal when Apple Pay and Facebook's Messenger are developed for payments. Payment innovations have been spreading rapidly in distribution industry. The technology has massive potential in many developing countries (LSE Consulting Report, 2016).

In these circumstances, airlines need to configure their distribution systems to accept several payment methods such as cash, miles, credit card and bank transfer to increase the sales through their own websites (Harteveldt, 2016). Moreover, this situation may be transformed to a win-win situation for both airline companies and the customers. When

a customer purchases ticket through an airline's website, the website may present a discounted payment method to the customer (Switchfly, 2018).

According to the results which are shown in Figure 2.37 and Figure 2.38, credit cards, BSPs (Billing and Settlement Plans) and online banking transfers are airlines' three leading forms of payment in 2016. Among these, airlines expect only online banking transfers to become more important by 2021 (Harteveldt, 2016).
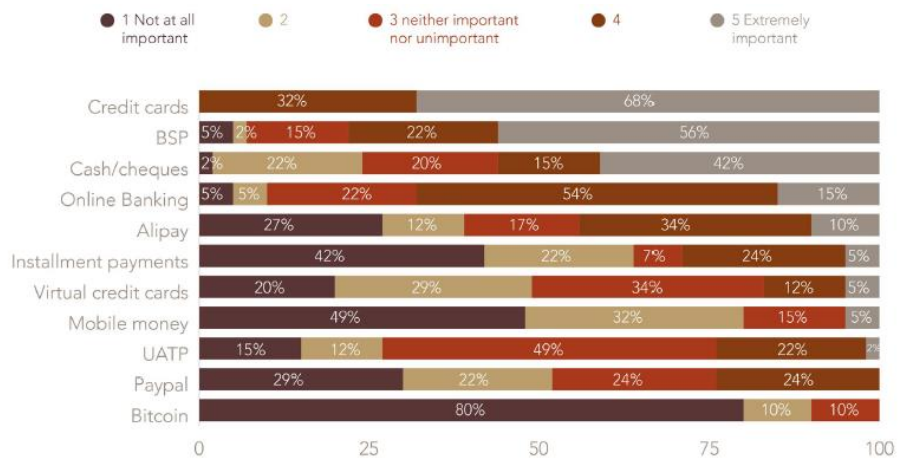
Figure 2.37. Importance of Payment Methods

(Harteveldt, 2016)
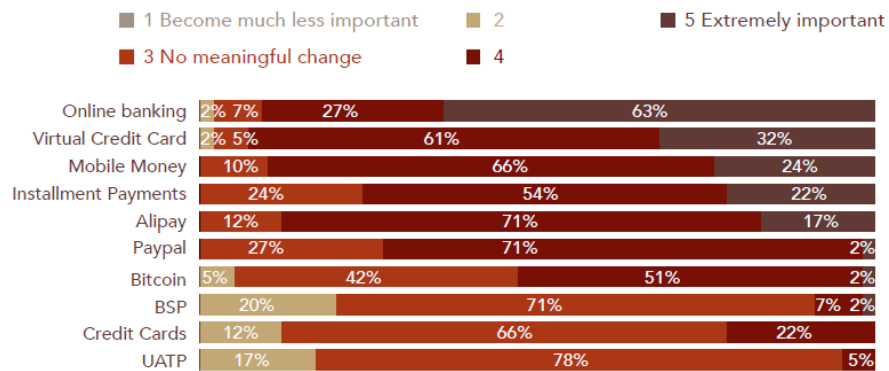
Figure 2.38. Payment Method Forecasts

(Harteveldt, 2016)

While discussing about payment, we cannot ignore the fraud which is an important problem especially in direct distribution. According to PhocusWrights's survey (Coletta, 2018), accepted payment methods in direct channels are shown in Figure 2.39.
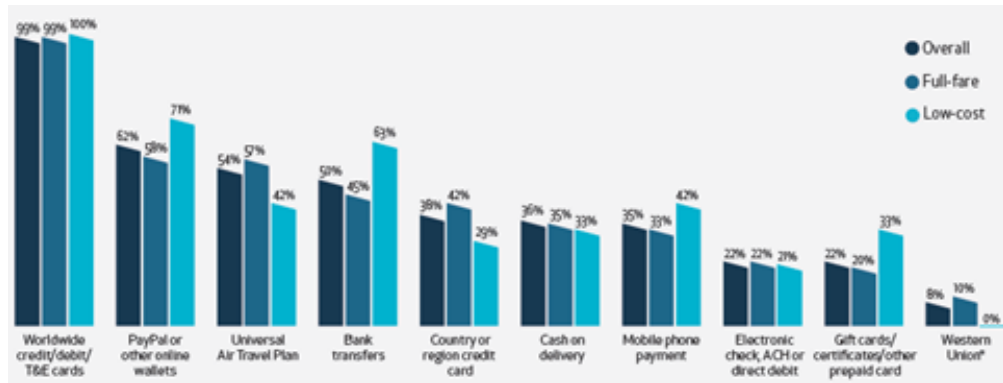
Figure 2.39. Accepted Payment Methods in Direct Channels

(Coletta, 2018)

Accordingly, it can be concluded that credit and debit cards are the most common payment methods accepted through direct sales channels with 99%. However, they have the highest fraud incidence for all airlines at 27% as shown in Figure 2.40 (Coletta, 2018).
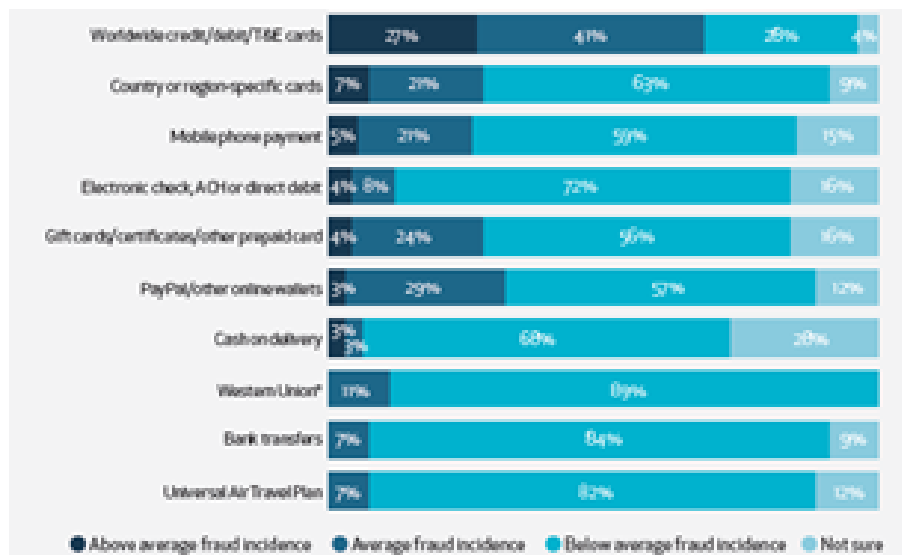
Figure 2.40. Fraud Incidence by Payment Method

(Coletta, 2018)

Payments will play an important role in the evolution of virtual reality travel. Platforms such as WeChat have already created central platforms that give users access to every service imaginable, from travel to bill payment and messaging. Virtual reality could become the next evolution of WeChat (Switchfly, 2018).

While the importance of mobile commerce is increasing, the speed and content factors will emerge. Mobile applications must support these factors efficiently. It is predictable that the airline company, which can control customer with the right content through the right payment method, will be more advantageous than others. Moreover, while the payment method is getting easier, airlines may sell much more ancillary products (Switchfly, 2018).

2.3.15. Non-traditional Companies

Non-traditional distribution companies such as Concur, Google, Apple and Facebook started to take a part in the airline distribution industry (Harteveldt, 2012). The most important side of these services is their power to reach consumers' data including their travel preferences (Okura, 2015). In 2011, Google bought ITA Software and have had the highest potential as distribution player among these companies since ITA has supported websites of multiple airlines by providing online access to fare search engine of an airline through its QPX software (Okura, 2015; InterVISTAS, n.d.). Upon these developments, it is expected that Google will present consumers a Google-powered flight search tool to find and compare ticket prices across different airlines in the future (InterVISTAS, n.d.).

Google's huge revenue from advertisers appears to be the only thing stopping it from launching an all-out assault to gain market share, but it is getting more assertive and becoming a dominant force (EyeforTravel Ltd., 2015). It is expected that these companies will be in the distribution industry rather than advertisers.

Google offers many services such as Google Maps, Google Flight Search, Google Trip as well as acquirement of ITA Software. Google has also introduced new consumer devices, including a voice-based home management tool and virtual reality headsets.

These developments may give Google an ability for combining its products. Hence, Google may create its own distribution channel in the future (Harteveldt, 2016).

Facebook has included travel distribution and marketing with its own product Facebook Messenger, which includes a payment tool and advertising platform. Facebook may be evolved to a meta-search engine (Harteveldt, 2016).

Concur plays a role between airlines and consumers by means of their tool, TripIt. This tool allows consumers to bring the travel reservations together. Hence, Concur can access to consumers' data such as market share, fare paid, purchase channels. It may become an evolved booking platform of TMC in the future (Harteveldt, 2012; Harteveldt, 2016).

Airlines assume that the search engines such as Google are important and spend more than 80% on average of their digital marketing budget on these channels. Google represents more than 90% of all airline search traffic, according to SimilarWeb. Interestingly, organic searches outperform paid searches by 80% vs. 20%. Social traffic comes mainly through Facebook, while the highest referral rates for airline searches are from Kayak, with a nearly 30% share (Phocuswright, 2017).

2.3.16. Consumer

In airline distribution industry, consumer behavior has changed with the advent of internet technology since the online platforms such as meta-search engines enable consumers to compare tickets more quickly and easily (EyeforTravel Ltd., 2015).

Similarly, with the emergence of technological developments such as big data, artificial intelligence and virtual reality, consumer expectations in the airline distribution industry are growing over time (LSE Consulting Report, 2016).

Eventually, it is expected that all major online platforms will have facilities to make suggestions based on full text searches, such as 'where can I find sun in January?'. Improving semantic search is attractive to both consumers and distribution players since

it will increase the usability of the websites or mobile apps. Companies can also build intelligent profiles to enhance suggestion capabilities further (EyeforTravel Ltd., 2015).

According to the United Nations Population Division, the world's population is growing by around 83 million people annually and it will increase by more than one billion people within the following years, reaching 8.5 billion in 2030 (LSE Consulting Report, 2016).

The Asia-Pacific population is expected to grow 10.8% from 2015 to 2030, reaching 4.4 billion. At the same time, GDP growth in Emerging Asia (South-East Asia, China and India) is forecast to grow at 6.2% annually from 2016 to 2020. Hence, Asia's middle class will represent 66% of the global middle-class population compared to 28% in 2009. This middle class which increases demand for travel will continue to grow in the future (LSE Consulting Report, 2016). Accordingly, regional bookings are estimated as shown in Figure 2.41 (PhocusWright, 2017).
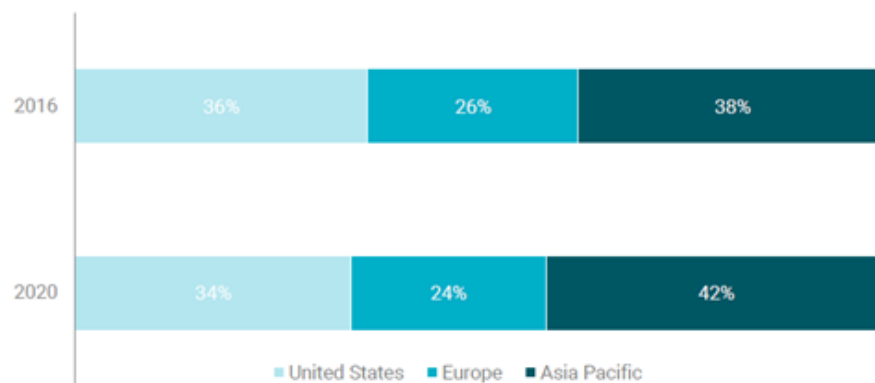
Figure 2.41. Estimated Regional Bookings

(PhocusWright, 2017)

By considering the future growth in this market, international players are getting increasingly invested in the Chinese market. For example, Skyscanner focused heavily on China in 2014 and acquired Chinese metasearch company Youbibi to establish its own product development for China. Skyscanner explains that over 2014 there have been a 61% increase in unique monthly visitors from China, as well as a 162% increase in mobile visitors (EyeforTravel Ltd., 2015).

78% of Asian travelers are open to using a mobile app for travel purpose. Asian travelers are also getting overwhelmed by the amount of choice and information available to them. To manage this complexity, according to a survey made, 42% of respondents liked the idea of one-stop more streamlined planning and booking from airlines (Sabre, 2017).

According to a survey, the types of Asian travelers are mapped out as shown in Figure 2.42 (Sabre, 2017).
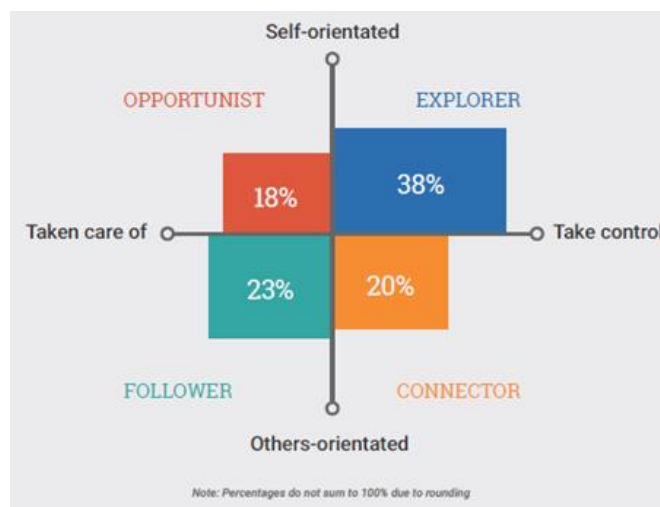
Figure 2.42. Asian Traveler Types

(Sabre, 2017)

As shown in Figure 2.45, Asian travelers expressing a strong desire to take control in their travel. However, traditional travel agencies still have an important role since the same survey shows that 64% of respondents want to use a traditional travel agency for their next trip because they believe that agencies offer greater convenience and better prices. These travelers still want support from travel agencies and expect the relevant and convenient offer. Hence, the agents should adjust their role according to the requirements of the different traveler types across Asia Pacific (Sabre, 2017).

Authenticity has emerged in travel as translation of a desire for trusted, reliable experiences and a more personal connection with people and places. Personal experience is the highest commodity in travel, and an increasing use of key influencers on platforms like Instagram is a way for airlines to highlight exciting destinations, reach key travelers,

develop brand impressions and future potential bookings (Sabre, 2018). Travel agencies can also seize the opportunity to partner with travel bloggers and social media personalities to meet the desire for discovery and authenticity, as well as build trust and credibility (Sabre, 2017).

The advent of e-commerce has given consumers the ability to have more information to compare services and more choices to purchase services from different suppliers. LCCs have offered the consumers lower ticket price with no-frill services, and meta-search engines have helped consumers comparing the ticket prices easily. Lower ticket prices have attracted consumers especially for short-haul flights. These advances reduced consumer loyalty (LSE Consulting Report, 2016).

Consumers will expect more flawless travel experience with different elements of travel being integrated. In the leisure travel, 'experience shopping' has been growing. The evidence of a travel experience (e.g. photos, video) and the sharing of that experience online becomes an opportunity for the purchase (LSE Consulting Report, 2016).

Consumers have been expecting efficient purchasing process, rapid transactions, more user-friendly websites and mobile applications. A study (SITA, 2017) shows the demand for new mobile services as follows (Figure 2.43).
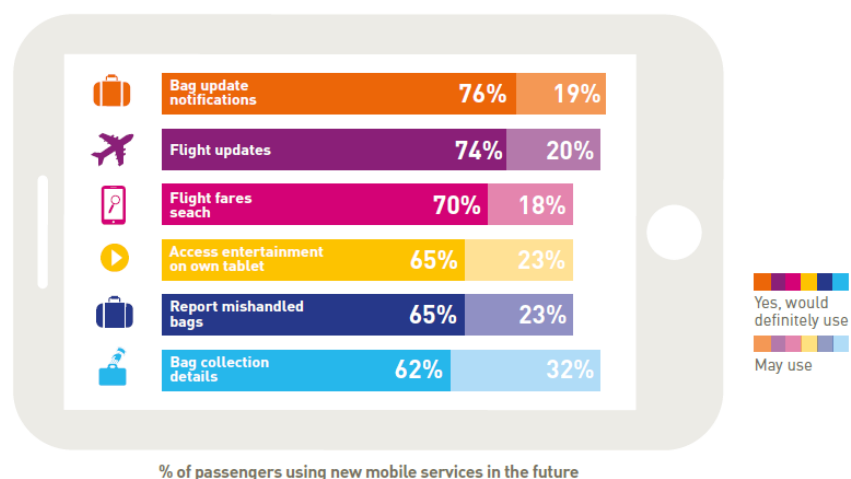
Figure 2.43. Demand for Mobile Services

(SITA, 2017)

Airlines should invest the necessary resources in improving their websites and making them as attractive, easy-to-navigate and sticky as possible. Individual e-commerce consumers who shop on an airline website expect consistent customer experience as the same level of they would get through a travel agent. The weak customer service in the travel industry negatively affects consumer perceptions of the airline brand. According to a survey result (Gasson, 2003), 79% of consumers said they would not buy online airline tickets if they had a weak experience before, and 54% said that the experience would adversely affect their future offline relationship with that company.

The airline company needs flexibility to create a responsive UI (User Interface) and develop an understanding customer data to personalize the experience which satisfies customer needs and create bundled ancillary products. A flexible back-end reservation system which makes controlling engagement easier and yields customer insights is required (Taubmann, 2014). However, this has required sustained investment in their IT infrastructure. Consequently, while airlines save their distribution costs, they spend money on IT (EyeforTravel Ltd., 2015).

According to a survey made in 2015, consumers are quickly leaving a website because of the factors as shown in Figure 2.44 (EyeforTravel Ltd., 2015).
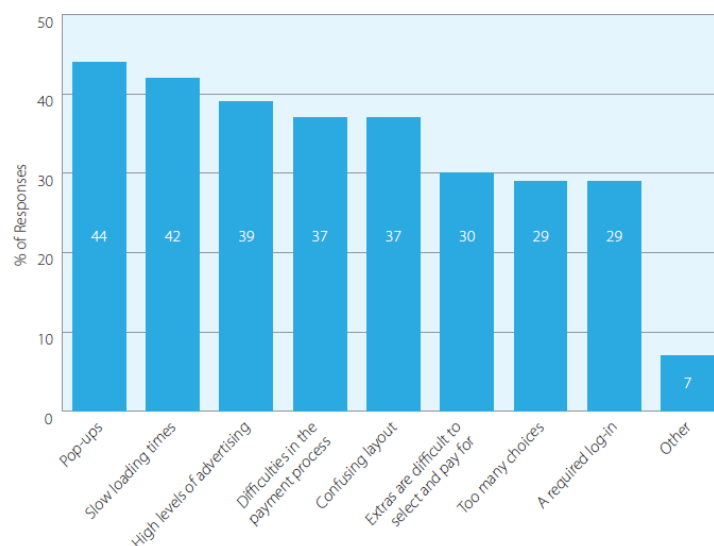
Figure 2.44. The Disruptive Factors in the Website Design

(EyeforTravel Ltd., 2015)

Website design is an important factor to convince consumer to buy the product or service. When consumer gets lost in the website, he/she leaves the page immediately. Functionality and usability are two major features in website design.

Functionality refers to whether the website provides enough information about the promoted products. The functionality of website influences online consumers' potential purchasing behavior. According to a survey, consumers expect informative, interactive, and attractive information from websites (Online Travel Industry and Internet (Accessed 5 Mar 2018)).

Usability refers that website can be used by specific users to achieve specific purposes efficiently. When a user is faced with a site with poor usability, he/she would like to leave the site. According to a survey result, 65% of visitors of retail websites leave due to usability barriers (Online Travel Industry and Internet (Accessed 5 Mar 2018)).

The usability of website is concerned with the ease of use which is the ability of a customer to find information with the least amount of effort, and it influences the decision to use a certain website (Online Travel Industry and Internet (Accessed 5 Mar 2018)).

Personalization is a method to provide information and services based on individual needs. For example, the website may offer seating and food in an airplane according to stored, personal preferences. Therefore, customers do not need to express their preferences each time they make the purchase (Online Travel Industry and Internet (Accessed 5 Mar 2018)).

Successful companies give importance on personalization. For example, Amazon's method of personalization makes it easy for customers to quickly find a product that works for them without having to extensively search for it since customers spend a little effort. From the moment they start searching, Amazon listens and any information that the customer enters into the system is stored so Amazon can learn more about the customer. That information includes anything from searching, buying, posting reviews or communicating with customer service (Sabre, 2017).

According to a survey, 73% of customers want to receive personalized shopping experience during their purchase. It means that personalization is no longer just a pleasant surprise for customers, it has become an expectation. A traveler who is travelling to New York doesn't need recommendations for attractions in Las Vegas. It is also important that people have different expectations. While some may be looking for a cultural experience in museums, the others may be more interested in shopping and gastronomy. The companies which want to attract all types of customers need to engage their customers on a personal level (Sabre, 2017).

Personalization will be an important part of distribution efforts in the future according to the airline executives as shown in Figure 2.45 (Harteveldt, 2016).
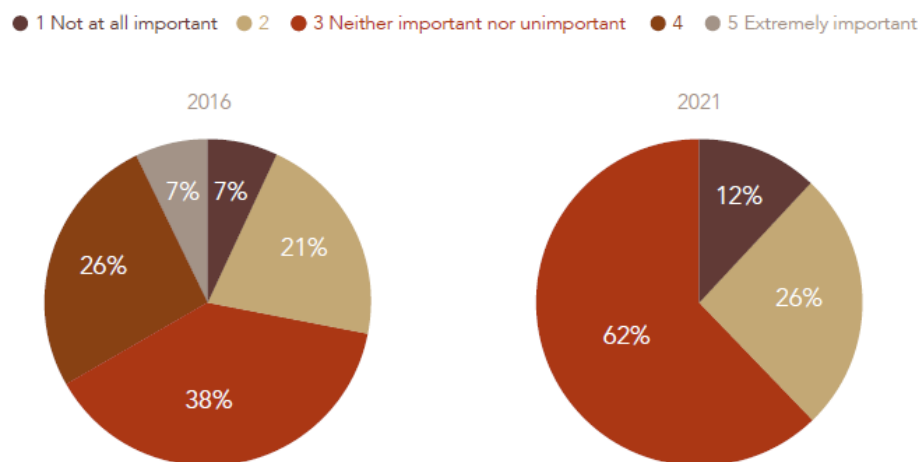
Figure 2.45. Importance of Personalization in the Future

(Harteveldt, 2016)

To support the previous research, according to the survey results made by SITA in 2017, airlines are planning to expand their range of data sources to provide better services. Until now, frequent flyer status information has been the main data source for making offers and recommendations to passengers. In the following years, most airlines will also be using purchase history and preferences, customer shopping behavior, social media activity and data, physical location and service disruption history as seen in Figure 2.46 (SITA, 2017).

% of airlines using (or planning to use) information/data when defining
an offer or presenting a recommendation to a passenger
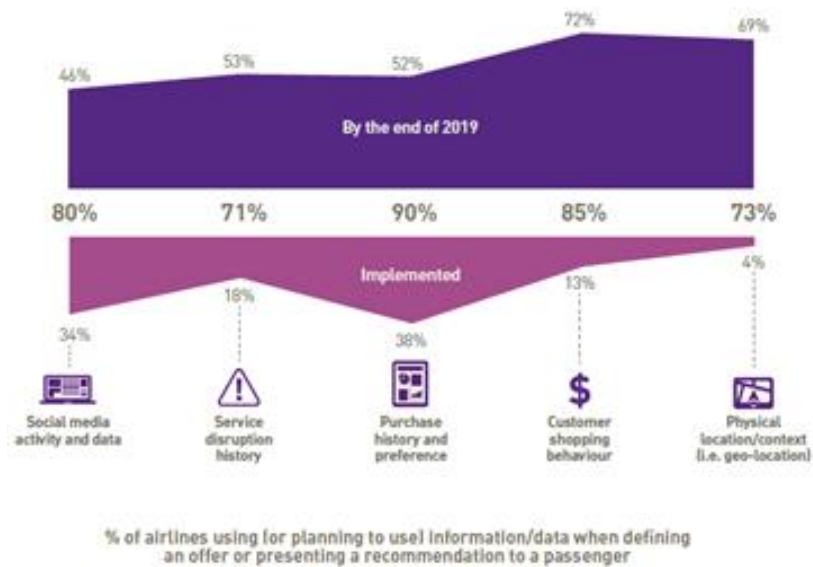
Figure 2.46. Planning to Use Customer Data Widely

(SITA, 2017)

Capturing the customers' data is the initial and most critical step in personalization since the airlines must know their customers' needs to personalize products and services to the customers (Sabre, 2017). According to another survey as shown in Figure 2.47, most of the consumers want airlines to use their data for better services and relevant contents (Harteveldt, 2016).

Figure 2.47. Customer Expectation from Flight Shopping

(Harteveldt, 2016)

65

Similarly, according to another survey, 72% of consumers are willing to share their location or personal data with travel providers. However, some passengers are not keen about sharing personal information when they don't foresee the benefit. Only 29% of passengers (SITA, 2015) are comfortable sharing private data for receiving relevant services (Figure 2.48).
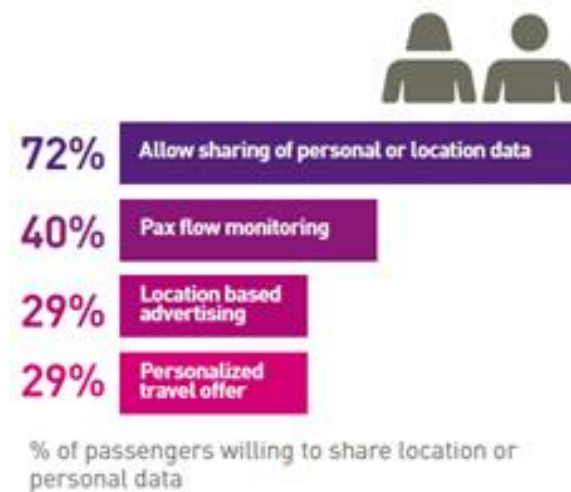
Figure 2.48. Willingness to Share Data

(SITA, 2015)

Localization in travel means providing content and booking accessibility for some markets. It's the first step to personalization and provides two key benefits: increased traffic and increased conversions. Using a language service provider (LSP) for language translations to ensure linguistic differences and a second professional agency to verify the translations can be beneficial for reaching the target market for effective personalization and distribution. Another localization component for travel is payment options from currency flexibility to methods of payment (credit card, mobile, cash, check, etc.). Localized payment is especially important in Latin America, because many customers don't hold an international credit card or don't trust international payment forms. Consequently, having a localized payment form means more transactions. Localization also provides market awareness, acceptance and, subsequently, loyalty to the brand (Phocuswright, 2017).

For a large majority of travelers, ancillaries play a key role in personalization. According to a survey, 80% of travelers currently purchase extras when flying (Sabre, 2017). Travelers prefer ancillaries to have a personalized flight as shown in Figure 2.49 (Sabre, 2017).

Figure 2.49. Most Preferred Ancillaries

(Sabre, 2017)

The survey concludes that the travelers spend money on the ancillaries as shown in Figure 2.50 (Sabre, 2017).

Figure 2.50. The Ancillaries as Percentage

(Sabre, 2017)

It is obvious that airlines must use customer data to generate higher revenue and consequently gain sustainable and profitable brand loyalty (Sabre, 2017). Loyalty programs might be more focused on common ancillary revenue generation that leads to their best loyalty offers, rather than trying to turn every customer into a loyalty program member. This could also help solve the "commoditization" of travel loyalty programs by building a better loyalty infrastructure. Moreover, if airlines can use loyalty program data to better personalize and package fares, they can gain significant market share as travel distributors.

Airline travel distributors may gain brand loyalty with exclusive VR content like a tour of the ski slopes. The vendors which support travel distributors on VR content will lead to first-mover advantage as VR evolves into its own distribution channel.

Many airlines have started to integrate AR technology which allows passengers to view and experience the specifications like seat space on the aircraft prior to making their choice.

With the shift to mobile travel planning, AI platforms will be used for what the customer prefers and how to package that in the most efficient way possible to make travel sales in real time. Moreover, with this technology, travel distributors can request for customer's data.

In the airline distribution industry, human interaction still plays a significant role for both airlines and agents. Both players can become experts and advisors for their travelers and add value to travelers' experience. According to a survey, Latin America (LATAM) travelers give more importance in human interaction. As shown in Figure 2.51, 48% of travelers from LATAM think it's important to be able to talk to an actual person when planning and booking travel (Sabre, 2017).
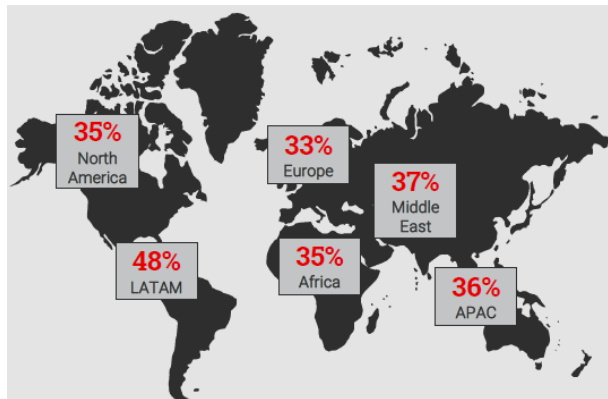
Figure 2.51. Regional Importance of Human Interaction

(Sabre, 2017)

2.3.17. Regulation

GDSs were regulated in the US and Europe in the 1980s. The key principles of the regulation were that GDSs should treat all airlines fairly and offer equal functionality, airlines owning a GDS should participate equally in other systems, and that GDSs should provide an unbiased display of airline information. These regulations were brought about at the time when all the GDSs were owned by airlines, and there were strong possibilities for the GDSs to give unfair competitive advantage to their owners, such as biased display of flight information in their favor. This intervention changed the aspect of the distribution industry (Alamdari and Mason, 2006).

Regulation has still been controlling the competitiveness in airline distribution industry. As mentioned in the previous parts, when Google took over the ITA Software, the U.S. Department of Justice did not approve this situation as is. They stipulated that Google provide access to QPX software for other distributors such as Kayak (LSE Consulting Report, 2016).

With the new technological developments, regulators may intervene to limit the power of the emerging or existing distribution players such as Google and meta-search engines which have biased advertising model (LSE Consulting Report, 2016).

According to the surveys in the literature, most of the consumers accepted the increased use of their personal data where the improvements in product or service were clear and appreciated. However, if this situation becomes a reason of complaining, regulations can limit the access to personal data, and all the players in the airline distribution industry can be affected (LSE Consulting Report, 2016).

2.3.18. Travel risk

The risk factors in the destination affect the consumers' travel demand. Terrorist attacks and natural disasters are among these risks.

According to an analysis, the following months of Brussel Airport attack, bookings for flights departing from Belgium dropped as shown in Figure 2.52. According to the Amadeus's data, the bookings lowered around 74,700 during the week following the event compared to expectations (LSE Consulting Report, 2016).

Figure 2.52. Impact of Brussel Attack on Flight Bookings

(LSE Consulting Report, 2016)

Severe storms can also have a major impact on travel bookings. In the week following Hurricane Sandy in 2012, booking rates decreased rapidly as shown in Figure 2.53. Scientists predict that the frequency of major storms will increase because of global climate change. It is inevitable that this situation affects the airline travel industry negatively (LSE Consulting Report, 2016).
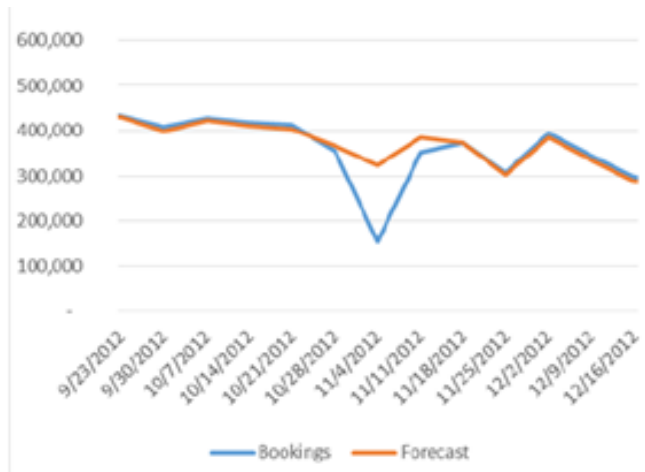
Figure 2.53. Impact of Hurricane Sandy on Flight Bookings from New York

(LSE Consulting Report, 2016)

3. METHOD

This thesis is based on the studies and reports about the airline distribution industry. We focused on the current issues in the airline distribution and possible factors which affect the future. We investigated the airline distribution ecosystem and proposed an integrated framework for the industry ecosystem canvas in a timeline with three phases (past, present, future). Thus, we extended Business Model Canvas (BMC) as an ecosystem canvas via different aspects along with the time dimension. We evaluated the past, present and future of the airline distribution industry from perspectives of key players by exploring the critical developments in the industry. Consequently, we aimed to analyze the evolution in airline distribution industry by focusing on the airline ecosystem players, technology trends and market dynamics referring Porter's Five Forces as a theoretical lens and suggested an ecosystem canvas in a timeline as a research contribution.

In this study, we aimed to understand how airline industry evolved in line with emerged players and developed technologies by utilizing secondary data. The data sources were publicly available data and industry reports. We extensively reviewed the relevant literature and industry reports. At the end, we constituted an integrated framework for analyzing the airline industry in three phases (past, present, future) and from four aspects (five-forces, technology trends, ecosystem players and ecosystem canvas).

We constituted the three phases (past, present, future) based on the pioneering players. In 1962 the first CRS, Sabre, was developed and in 1996 the first online players, Travelocity and Expedia, emerged and both opened new eras in the distribution industry. According to the reports of SITA (2017) and Switchfly (2018), since the internet technology continues to develop, the airline distribution industry will embrace new technologies and experience a significant change in the next decade.

We constituted integrated framework for analyzing four aspects of airline distribution industry as follows; at first, we examined the key ecosystem players and their interactions in terms of booking, payment and information flow for three phases. Then, we investigated technological trends in past and present phases, and envisioned the future. After that, we adopted Porter's Five Forces model which explains external forces to define the market pull in airline distribution industry for present phase. Later, we extended

key players, technological trends and market analysis for potential future projections based on our secondary data. Finally, we developed the airline distribution ecosystem canvas in a timeline having three phases (past, present analysis and potential future expectations) as illustrated in Table 3.1.

PHASES / ASPECTS	PAST (1962-1996)	PRESENT (1996-2018)	FUTURE (2018-2027)
ECOSYSTEM PLAYERS	ILLUSTRATED IN FIGURE 4.1	ILLUSTRATED IN FIGURE 4.2	ILLUSTRATED IN FIGURE 4.3
MARKET PULL	N/A	ILLUSTRATED IN FIGURE 4.4	
TECHNOLOGY TRENDS	ILLUSTRATED IN TABLE 4.3		
ECOSYSTEM CANVAS	ILLUSTRATED IN TABLE 4.2		

Table 3.1. Integrated Framework for Analyzing Airline Distribution Industry

The main contribution of this study is the constitution of airline distribution ecosystem canvas which is adapted from the concept of BMC to overview the industry from different elements such as the structure, resources and challenges.

3.1. Business Model Canvas

The business model canvas (BMC) which is developed by Osterwalder and Pigneur (2010) can be quite effective to understand an organization's business model. It visually represents a business model through the canvas tool and develops more integrated business model (Joyce and Paquin, 2016).

BMC is a conceptualization of an organization which includes 3 key aspects (Chesbrough, 2010; Osterwalder, 2004; cited in Joyce and Paquin, 2016):

- How key components and functions are integrated to deliver value to the customer
- How those functions relate to the organization and along its supply chain
- How the organization generates value through those relations

The original BMC (Osterwalder and Pigneur, 2010) separates an organization's business model into nine components as customer value proposition, segments, customer relationships, channels, key resources, key activities, partners, costs and revenues (Joyce

and Paquin, 2016). BMC and the key questions for each component from the full canvas (www.businessmodelgeneration.com (Accessed 27 May 2018)) is listed in Table 3.2 below.

BMC building block	Key questions
Value Propositions	What value do we deliver to the customer?
	Which one of our customer's problems are we helping to solve?
	What bundles of products and services are we offering to each Customer Segment?
	Which customer needs are we satisfying?
Customer Segments	For whom are we creating a value?
	Who are our most important customers?
Channels	Through which Channels do our Customer Segments want to be reached?
	How are we reaching them now?
	How are our Channels integrated?
	Which ones work best?
	Which ones are most cost-efficient?
	How are we integrating them with customer routines?
Customer Relationships	What type of relationship does each of our Customer Segments expect us to establish and maintain with them?
	Which ones have we established?
	How are they integrated with the rest of our business model?
	How costly are they?
Key Activities	What Key Activities do our Value Propositions require?
	What Key Activities do our Distribution Channels require?
	What Key Activities do our Customer Relationships require?
	What Key Activities do our Revenue Streams require?
Key Resources	What Key Resources do our Value Propositions require?
	What Key Resources do our Distribution Channels require?
	What Key Resources do our Customer Relationships require?
	What Key Resources do our Revenue Streams require?
Key Partners	Who are our Key Partners?
	Who are our key suppliers?
	Which Key Resources are we acquiring from partners?
	Which Key Activities do partners perform?
Cost Structure	What are the most important costs inherent in our business model?
	Which Key Resources are most expensive?
	Which Key Activities are most expensive?
Revenue Streams	For what value are our customers really willing to pay?
	For what do they currently pay?
	How are they currently paying?
	How would they prefer to pay?
	How much does each Revenue Stream contribute to overall revenues?

Table 3.2. BMC Components and Key Questions

(www.businessmodelgeneration.com, Accessed 27 May 2018)

Business models can be used as part of business management to comprehend and analyze an organization's current business and options for future development of the business. A business model can be utilized for business and IT alignment, present business ideas to stakeholders and serve for solution developments in requirement analysis (Burkhart, et al., 2011; Hauksson, 2013).

BMC which is a visualized tool with an emphasis on key partners, key product/services, value propositions, channels, key resources, customer relationships, can be used to design more sustainable business models (Osterwalder & Pigneur, 2010; cited in Joyce and Paquin, 2016). Spil et al. (2017) used BMC to understand the strategic use of social media in airline industry. However, the evaluation of the changes in terms of BMC is an unresearched area. This paper contributes to the existing research on sustainable business models by providing a theoretical framework for the airline distribution industry.

3.2. Porter's Five Forces Model

When airlines left the control of airline distribution to GDS companies completely, they started to face significant distribution costs over time (Harteveldt, 2012). This situation has led airline companies to search for new ways to reduce distribution cost which is among the largest operational costs of them. There have been technological and environmental changes in the airline distribution industry with increasing customer demand. As of the 2000s, the structure of airline distribution has been evolving to different phases with the advent of the internet technology. There have been some player impacts on distribution such as advertising model of non-traditional distributors that are still uncertain for even regulators. Hence, the future of airline distribution industry will be affected and possibly evolve according to;

- rules enacted by regulators,
- move of each distribution player,
- consumer expectation and perceptions towards technological developments,
- technological development of substitutions,
- new entrants that appear because of the changes on technology or regulations,
- adaptation of GDSs and fare providers such as ATPCO to the changes

The structure of airline distribution industry has been evolving to different phases with the effect of external factors. Porter's Five Forces model can be utilized to explain external forces in the industries to define possible strategies with their advantages and disadvantages. It analyzes the relative competitive pressures exerted on a firm by five different forces which are competition, power of customers, power of suppliers, substitutes and new entrants (Shaw, 2007; Granados et al., 2011). Based on this model, Gasson (2003) conducted a study to understand the change of travel agents' role with new information technologies in airline distribution industry.

In the light of the research made, we revised the Porter's Five Forces model to explain external forces for present and future of airline distribution industry.

4. FINDINGS AND DISCUSSION

4.1. Findings

In parallel to aims of the thesis, disruptive factors are specified based on analysis of the related reports and studies, which contain insights from industry leaders and experts in the interviews.

Table 4.1 lists key factors which affect the airline industry based on analysis we made.

Author(s)	Key Factors	Implemented Area	Method, Data Collecting and Analyzing
Kim et al. 2008	Acceptance of e-commerce Attitudes towards technology Perceived usefulness Perceived ease of use	Airline marketing	Quantitative Questionnaire Path analysis
Buhalis 2003	The use and role of ICT Adoption of technology ICT issues Future competitiveness	Airline management	Qualitative Exploratory research
Smith et al. 2000	Adoption of e-commerce Intermediation Regulation	Airline distribution	Theoretical
Alamdari 2002	Intermediation Bypassing intermediators Direct channels Distribution strategies	Airline distribution	Comparative Analysis
Wertner et al. 2004	Acceptance of e-commerce Intermediation Change in the structure of industry	Airline distribution	Theoretical
Shon et al. 2003	Impact of internet Online sales e-commerce issues Conflicts between channels	Airline distribution	Questionnaire Case study
Buhalis et al. 2001	e-commerce Intermediaries Disintermediation Future of distribution channels	Airline distribution	Exploratory research Both qualitative and quantitative Survey Interview

Karcher 1996	Evolutionary development of GDS	Airline distribution	Conceptional
Schulz 1996	Changed distribution channels Increasing competition Future of intermediators	Airline distribution	Theoretical
Kracht et al. 2010	Role of the internet Evolution and transformation of intermediators	Tourism distribution	Theoretical
GAO 2003	Evolution of airline distribution industry Impacts of the changes on distribution players	Airline distribution	Theoretical
Raymond et al. 1997	Effectiveness of relationship between the distribution industry players	Airline distribution	Case study Both qualitative and quantitative methods Interview Questionnaire PLS analysis
Buhalis et. Al 2011	ICT developments and impacts on tourism industry eTourism	Online travel distribution	Theoretical
Granados et al. 2008	Changes with the internet Emerging online intermediaries	Online travel distribution	Theoretical
Uyanık 2008	Consumers' satisfaction about online booking services Customer loyalty Comparation of online and traditional channels	Airline distribution	Thesis Descriptive research Online survey Factor, correlation and ANOVA analysis
Mason 2002	Development of alliances Emergence of LCCs and online channels Substitutions of air travel Effects of the changes in the future	Business travel	Quantitative Survey

Barnett et al. 2001	Emergence of online channels Disintermediation	Travel industry	Theoretical
Sismaniodou et al. 2009	Impact of ICTs on airlines Emerging of new entrants Impacts of technology on distribution	Airline distribution	Case study Interviews with industry experts
Vinod et al. 2008	Impacts of branded fare families and ancillary services on distribution Revenue management Price transparency	Airline distribution	Theoretical
Vinod 2010	Online channels Customer loyalty Customized content	Airline distribution	Theoretical
Chircu et al. 2000	IT investment Barriers of IT	e-commerce	Case study
Quaddus et al. 2005	Perceived success of e-commerce	e-commerce	Questionnaire-based survey Structural equation modeling
Clemons et al. 1999	Competitive forces Emergence of online channels	Airline distribution	Theoretical
Alamdari et al. 2006	Changes in airline distribution industry Online direct channels Future developments Issues in distribution	Airline distribution	Four industry groups were surveyed: corporates, airlines, travel management companies, and GDSs. Roundtable discussion questionnaires
Gasson 2003	Competitive advantages of technologies Challenges of c-commerce Porter's Five Forces Model Future expectations	Airline distribution	Case study
Sismaniodou et al. 2008	Emerging of new entrants First-mover advantage Intermediation Technological advances	Airline distribution	Case study Qualitative Interview

Dorinson 2004	Distribution channels Revenues management Challenges of distribution Impacts of changes on industry players Online travel websites	Airline distribution	Thesis Empirical data analysis Both qualitative and quantitative methods Simulation study
Granados et al. 2014	Online intermediaries Decommoditization Hypothesis Commoditization effect Differentiation À la Carte Pricing (unbundling) Channel conflict Direct channel	Airline distribution	Analysis of 1 million bookings from a large international airline Interviews with the airline executives Empirical data analysis Case study Insights based on population descriptive statistics
Anckar 2003	Emergence of mobile e-commerce Reintermediation / Intermediation / Disintermediation Online channels	Online travel distribution	Quantitative consumer data collected through a survey Non-interactive, self-administered questionnaire
Lee et al. 2009	Online vs offline channels e-commerce Personalized service	Travel distribution	Questionnaire Hypothesis testing Logistic regression analysis Quantitative
Mundra 2008	LCC Online channels Adoption of e-business: Environmental, organizational and managerial factors Disintermediation Uncertainty of future	Online airline distribution	Thesis Case study

Table 4.1. Some Studies on Airline Distribution Industry

The structure of the airline distribution industry in the past is shown in Figure 4.1. Accordingly, airlines publish their fares through ATPCO to be received by GDSs which aggregate fares and availability for multiple airlines through a single access point and TTAs (Traditional Travel Agencies) distribute the information obtained from GDSs to customers. GDSs receive subscription fee from TTAs and booking fee from airlines per ticket sold. In the meanwhile, the revenue of TTAs is the incentive fee from GDSs, commissions and overrides from airlines and hidden service fee from customers included in the ticket price.
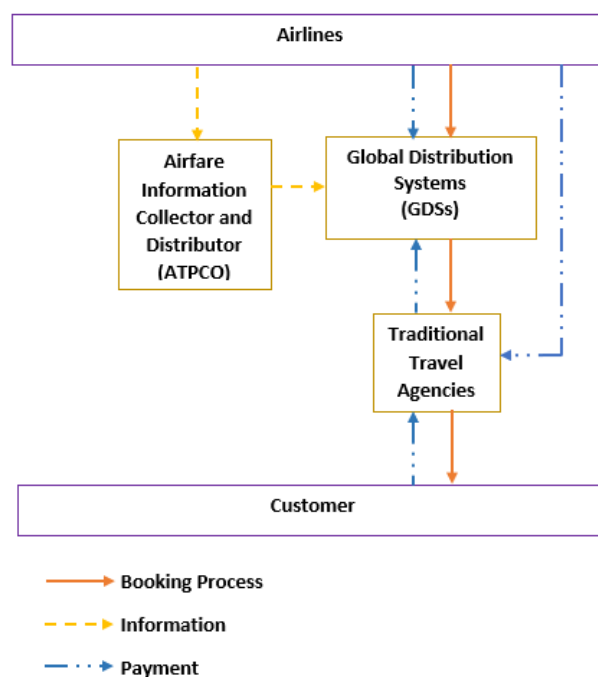
Figure 4.1. The Structure of Airline Distribution Industry after GDS

(Adapted from Wardell, 1991)

Figure 4.2 shows the current structure of the industry with the emerged distribution channels of the internet technology in airline distribution. When airlines started to bypass GDSs and reduce commission fees, new flow of payments were involved in the structure as mentioned before. In present structure, airlines stop paying commissions to TTAs. However, they won't be eliminated from the industry since airlines need to compromise with them not to lose the customers who prefer travel packages. Airline Websites appear as suppliers' online players. Airline Ticket Offices (ATO) exist in the industry as direct distributor of the supplier to support customers without additional price. OTAs and

Supplier Link Portals receive service fee from customers and booking fee from airlines per ticket sold. Differently, OTAs request incentive fee from GDSs and meta-search engines route customers to the OTAs or airline companies by a fee (Brown and Kaewkitipong, 2009).
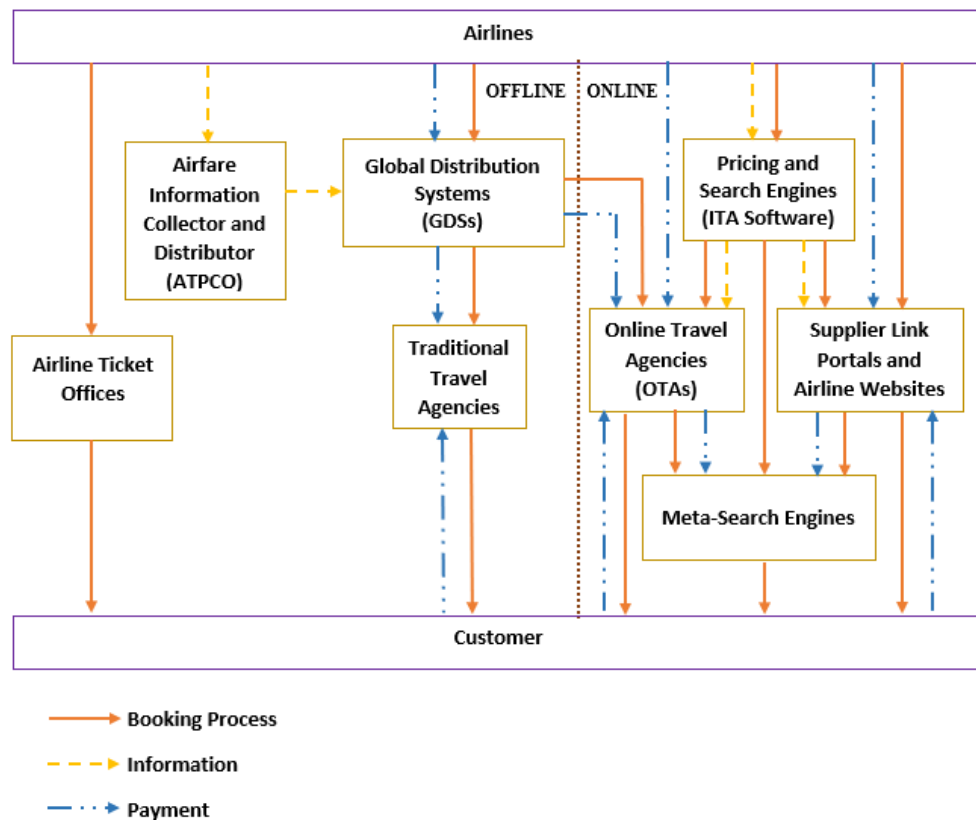
Figure 4.2. Airline Distribution Chain with Offline and Online Players

(Adapted from Granados et al., 2011)

It is expected that GDSs won't be able to meet the future requirements and will be replaced by technologies such as VCHs (Value Creation Hubs). VCHs will use new-generation airline commerce technology infrastructure used to power airline PSS (Passenger Service System). Unlike GDSs which work with individual airlines, VCHs will be developed for each major alliance to serve as a gateway between the airlines which participate in each VCH. The expected structure of the airline distribution industry in the future is shown in Figure 4.3 which is developed in this study. Accordingly, VCH will interact with alliances by paying the subscription fee. Non-traditional companies will emerge to route the bookings for a referral fee like meta-search engines.
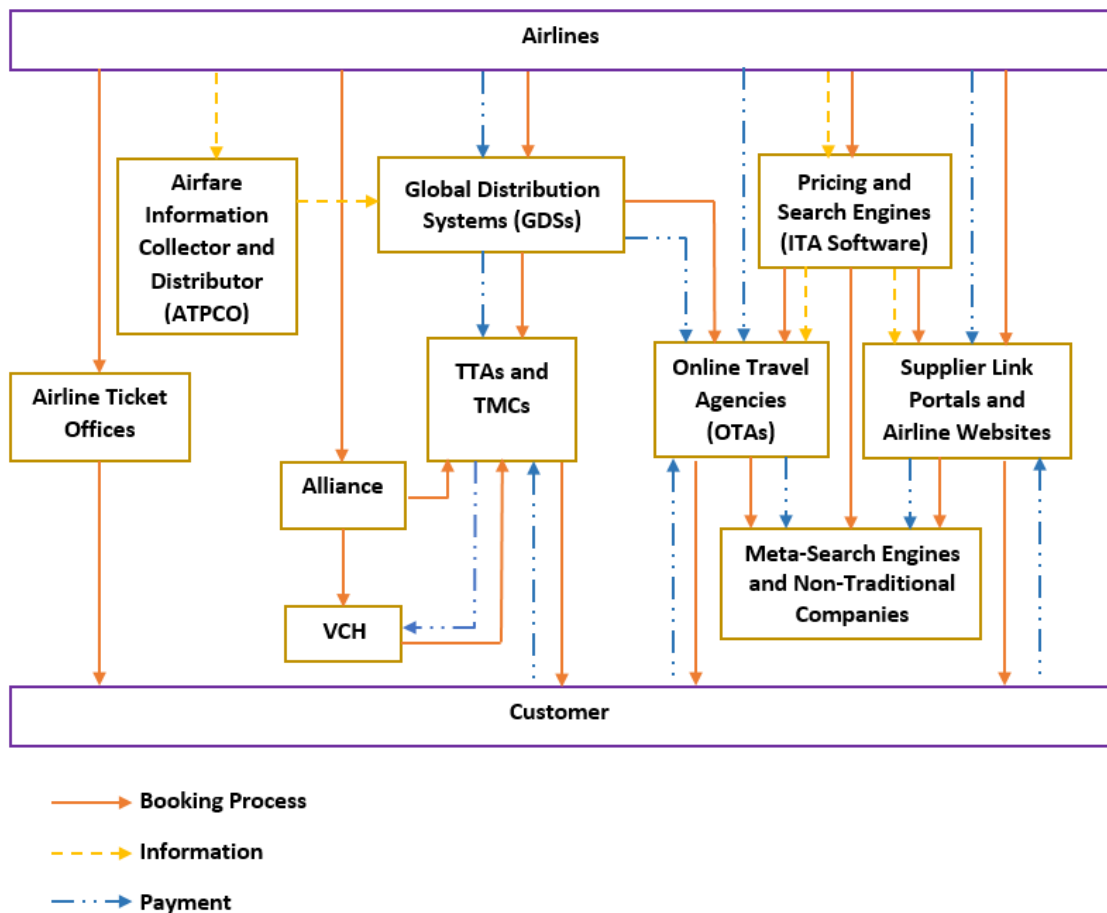
Figure 4.3. Expected Future Structure

The current issues which the airline distribution industry faced with found as follows:

- Airlines' reservation systems remain incapable because of the massive information requests after the establishment of OTAs and meta-search engines.
- Airlines' reservation systems face problems on transacting the synchronization of flight, fare and passenger information since the developments in the industry are beyond their capabilities.
- Travel demand of consumers is depending on the factors such as travel risk in destination, consumer's economic situation and technological developments.
- Most of the consumers are price-sensitive because of the competition arose from online ticket sales. They are comparing the options and choosing the cheapest one regardless of content. This situation decreased loyalty of the airline brands.
- Consumers expect personalized and relevant content from airline companies and consider that airlines don't use their data efficiently.

According to the research, key factors of current and future industry are concluded as follows:

- Technological advances have been affecting the structure of airline distribution industry.
- Airline distribution players need to draw their roadmaps to keep their role in distribution.
- Airline companies can prefer either outsourcing their IT or making investment on it. Each airline company should decide on which one is more profitable according to their business model.
- Airline companies plan to bypass intermediaries with the adoption of new technologies, so they take the control of ticket distribution.
- Consumers will reshape the future of airline distribution with their preferences and expectations.
- The focus of consumers will shift from price to content of the service.
- Personalization will be one of the key factors in airline distribution.
- The future will be mobile-centric regardless of distribution channel.
- Airlines have been working for gaining loyalty which they lost after the emergence of online players.
- FSCs started to sell ancillary products and unbundled services by following LCCs.
- Online players need to enhance their website distribution with enhanced contents and effective website design.
- Non-traditional companies will create their own distribution channel in the future.
- Airlines need to compromise with travel agencies not to lose the customers who prefer travel packages.
- Innovations should be followed closely and be evaluated in terms of their usability.
- GDS companies may be eliminated from distribution industry and provide only IT solutions.
- Airlines should make investment on their IT or outsource it to develop their insufficient reservation systems.

When the future disruptive factors are examined, the expectations can be found as follows:

- Non-traditional companies and meta-search engines can prioritize a supplier through their biased advertising model. However, they can be limited by regulators because of the non-neutral competition.
- The improvement of new technologies such as virtual assistants may increase the role of non-traditional distributors in the airline distribution industry since they can gather consumers' data easily.
- VR and AR technologies can be used by most of the distribution players to provide experience before purchasing especially for high-value consumers.
- Since personalization is one of the important factors to gain loyalty, consumer will be attracted by personalized services such as mobile virtual assistants.
- Since the focus of customers is shifting from price to content, VR will play an important role in both business and leisure travels.
- New distribution players such as VCH may appear by means of technological innovations in the future as alternative to GDS.
- Airlines can create a direct platform to be connected by traditional travel agencies to bypass GDSs.
- Some airlines such as Lufthansa offer last minute tickets at good prices in auctions through their websites. This method can also be followed for bypassing GDS fee.
- The emergence of new channels such as mobile and social media may cause any shift towards the direct channel of airlines, non-traditional companies or OTAs.
- The messaging applications such as WeChat can be used to book travel and make payments. A new distribution channel can be created when it is followed by the other message applications.

4.2. Discussion

The key developments in the current industry and disruptive factors of future airline distribution are described in Section 2 with all details.

According to our research, we adopted Porter's Five Forces model which explains external forces to define the market pull in airline distribution industry for present phase.

Later, we extended key players, technological trends and market analysis for potential future projections based on our secondary data.

The forces of the Porter's model which are competition, substitutions, new entrants, power of consumers and power of suppliers are examined in detail as follows.

4.2.1. Competition in Airline Distribution

According to Porter, long-established firms lead to motive for change since they often have the same problems (Shaw, 2007). The information revolution affects the competition in three ways: (Porter and Millar, 1985)

- It changes structure of industry and the rules of competition
- It creates competitive advantage by giving companies new ways to perform their roles
- It generates new businesses for existing operations of the companies

Accordingly, there had been two important changes in airline distribution to affect and evolve the industry in terms of the ways as stated above: development of CRS and the advent of the internet.

The advent of internet constituted the current airline distribution industry. The emergence of LCCs and establishment of new players such as OTAs enabled consumers to compare the ticket prices easily and choose the cheaper prices. Lower ticket prices have attracted consumers especially for short-haul flights. After the emergence of online players, customer loyalty of airlines decreased (Wang and Pizam, 2011; LSE Consulting Report, 2016). Accordingly, FSCs, which are the long-established firms in the air travel industry, have eroded economically. For instance, British Airways lost nearly £250 million on its intra-European network during its 2002-2003 financial year (Shaw, 2007).

As response, FSCs have attempted to adopt some of the LCCs' characteristics by trading tickets through their own websites and reducing dependence on travel agents and GDSs for decreasing distribution costs. Some of the FSCs even established their own 'budget airline' within the main organization such as BA and GO, British Midland and bmibaby, KLM and Transavia (Hunter, 2006).

FSCs could only adapt the new era. To gain loyalty, they can establish collaborations with the other distribution players. Since non-traditional distributors and meta-search engines will have the power to display the supplier on the top of the searching list for an advertising fee, they can prioritize the supplier which pays a considerable price. FSCs can also collaborate with LCCs by shifting their short-haul flying to them. This collaboration can increase the revenues of both carrier types while reducing the prices offered to consumers. The airline companies can also invest in another to establish a mutual strategic collaboration. It can be used between the airlines which are based on the regions. The relationship is called Joint Ventures.

It is expected that the focus will shift from price to the content soon. Since airline distribution players look for ways to improve their service and provide effective content, new technologies will be adopted to increase efficiency and establish better connections with existing and potential customers (Sabre, 2017).

The online players can adopt the dynamic pricing to create better content for consumers. They can also associate fare families with content of services by considering the customers who do not use all services included in the standard package price or offer premium products as ancillary services. Hence, they can differentiate their products and increase the loyalty. To achieve this strategy, the player should develop their IT infrastructure and CRM (LSE Consulting Report, 2016). They can use NDC and One Order technologies or à la carte selling mechanism to offer ancillary products. By adopting à la carte selling mechanism, airlines can increase their direct sales through their own websites and bypass the intermediaries.

With the common use of dynamic pricing, PSS will not be enough to meet the request. PSS should be replaced by FRP to adopt dynamic pricing and ease the selling of ancillary products. FRPs are linked to customer databases as structural. Hence, FRP can be used for product differentiation. Distribution Channel Manager (DCM) which is an artificial intelligence-based smart switch to connect cloud and distribution players with airlines' FRP can be adopted to manage the complex infrastructure of distribution industry dynamically.

Digital realities offer new opportunities for traditional travel agencies to inspire travelers and encourage them to enhance potential destinations. VR can make all manner of locations and experiences immediate for both potential travelers and travel agents who want to learn about new travel products and destinations they may want to share with customers (Sabre, 2017).

Regulation is one of the most important factors which forms the structure of the airline distribution industry. Regulators enacted CRS rules to provide fair competition between owner and non-owner airlines and protect customers against high prices and the structure of the distribution changed radically (GAO, 2003). Similarly, non-traditional companies and meta-search engines which will play an important role in the future by prioritizing any supplier through their biased advertising model can be intervened by regulators to limit their power for sustaining competitiveness in the industry.

4.2.2. Substitutions

Porter argues that the competitive balance of the long-established firms can be eroded by substitutions which occur when firms in another industry find a new and better way to meet the same customers' needs (Shaw, 2007).

The substitutions of airline travel are other travel options and emerged technologies. Hence, airline travel is not the most convenient option for the leisure customers who are more price sensitive. Therefore, they may use other travel options such as high-speed trains to reach their destinations. In some cases, business customers may choose not to travel because of the economic reasons, limited time for travel or the risky travel to the relevant destinations and replace face-to-face meetings by video conferencing (LSE Consulting Report, 2016).

To meet customer expectations better, it is asserted that new mobile technologies will evolve airline distribution in the following years. These developments will affect both how consumers use their mobile devices and the mobile technology infrastructure that the airline distribution industry uses. One of the key changes is voice recognition (Harteveldt, 2016). Virtual assistants with voice recognition can be implemented into the mobile applications to learn the customer's travel preferences and gather personal data to make

better recommendations on destinations and offer relevant ancillary services (LSE Consulting Report, 2016).

AR can be used in airline distribution to display the relevant seat to customers and allow them to experience it before purchasing. VR can be used to offer a specialized purchasing method for high-value travel. Online players can combine VR with NDC to improve flight shopping. They should increase customers' experiences through implementing advanced technologies into their websites or mobile applications to differentiate their products.

4.2.3. New entrants

With the advent of the internet technology, new players like OTAs emerged as both distributor and supplier as competitor for GDSs in some content. Furthermore, meta-search engines that consolidate the price options from OTAs and airline websites and route the consumers to the relevant website for booking appeared. As the internet technology led the emergence of online players, it is expected that new entrants will affect GDS more than ever in the future.

Non-traditional companies will start to play a role in distribution with their power in accessing customer data. Since technical infrastructure of GDSs may be insufficient for future developments, a channel which is like VCH can be created to bypass GDS. Airline companies can create a platform for distributors such as travel agencies which are based on the data obtained from GDS and can pay incentives for subscriptions. Hence, they can bypass GDS and reduce their distribution cost at a significant level.

4.2.4. The Power of Consumers

Since customers could compare the ticket prices online, they tended to choose the cheapest one by treating the airlines' tickets as commodity. The commoditization effect provided them a bargaining power (LSE Consulting Report, 2016). However, customers are expecting efficient purchasing process, rapid transactions, more user-friendly websites and mobile applications for the future (SITA, 2017). It means that the focus is shifting from price to content.

Active Distribution strategy can be adopted by online players to distribute their products flexibly. They can provide more relevant flight shopping content to consumers and travel agents when they implement the technologies such as dynamic pricing. Since personalized content is an important part of Active Distribution strategy, they should develop their CRM and integrate the most preferred payment methods in their system to provide better customer service, sell ancillary products easily and increase loyalty (Harteveldt, 2016).

When the players adopt Active Distribution strategy, they can provide more relevant flight shopping content by implementing the technologies like Artificial Intelligence (AI). The importance of AI has been growing in airline distribution industry (Harteveldt, 2016). Some companies such as the startup travel booking company Hipmunk are trying to save customers from the endless travel options available on the internet. Hipmunk's newest feature, Hello Hipmunk, is an AI personal travel agent. Easily reached through email, Facebook Messenger or Slack, Hello Hipmunk provides connection, humanlike answers to any questions travelers may have. Hipmunk will even have choices on keywords like romantic or adventure to help travelers find the relevant trip (Sabre, 2017).

4.2.5. The Power of Suppliers

According to the Porter, when a firm is totally dependent on the support of monopolized suppliers, these suppliers can charge huge support prices by reducing the profits of the firms too much. The most suitable example of this situation is GDSs in airline distribution industry (Shaw, 2007). However, with the rise of the internet technology, GDS's position eroded, and airlines could increase direct sales. Airlines will continue to make attempts to increase their power.

One of the possible attempts is the wholesales model. In this model, airline companies can check the retail fare of travel agencies. For example, an airline can charge "wholesale" price for $285 by mandating the agency "retail" ticket to the consumer at $300. This model can be used for trading business class tickets in airline industry (Harteveldt, 2012). Wholesales model can reduce the traffic towards the reservation system of the airline company. It can be adopted to empower the relationship between airlines and travel agencies. Moreover, airlines can eliminate GDS fees.

Meta-search engines list the options and route the consumers to the relevant supplier for a referral fee. They also use a non-neutral advertising model to display the supplier on the top of the searching list in return for a fee. Moreover, if airlines don't agree with meta-search engines for referring, their price option won't be displayed (EyeforTravel Ltd., 2015).

To increase sales, the online players should pay attention to their IT infrastructure. They need to analyze their resources and capabilities of IT staff elaborately to decide about making huge investment on IT or outsourcing it. However, as occurred in the distribution through GDS, the IT companies can use this opportunity for themselves and can increase their support price extremely. As another option, alliances can establish a central IT hub as Starnet to support their participants.

4.3. Proposed Framework

In the light of the research made, we revised the Porter's Five Forces model to explain external forces for present and future of airline distribution industry as shown in Figure 4.4.

POWER OF SUPPLIERS

- GDS Fee
- Referral Fee
- Advertising Fee

POWER OF SUPPLIERS

- Adopting wholesales model
- Utilizing IT effectively

NEW ENTRANTS

- LCCs
- OTAs
- Meta-search Engines

NEW ENTRANTS

- VCH or similar players
- Non-traditional companies

COMPETITITON

- Advent of the internet
- Adoption of internet by LCCs
- Launch of meta-search engine
- Emergence of ITA software

COMPETITITON

- Collaboration between players
- Widespread use of fare families
- Adoption of dynamic pricing strategies
- Regulations

SUBSTITUTES

- Video-conference
- High-speed trains

SUBSTITUTES

Mobile technologies

POWER OF COSTUMERS

- Commoditization
- Customer expectation

POWER OF COSTUMERS

- Personalized content
- New payment methods
- Active distribution strategy

Present

Future

Figure 4.4. Adopted Porter's Five-Forces Model for Present and Future

We constituted airline distribution ecosystem canvas which is adapted from the concepts of business model canvas as illustrated in Table 4.2. We classified the airline distribution industry into seven concepts and explained the relationship between industry players with their main functions to find their business models. It can be concluded that GDSs adapted to the current industry by offering OTAs. They are still necessary as backend system of traditional travel agencies. However, the emergence of VCHs or similar technologies can erode the GDSs in the future. It is expected that VCH and similar technologies will be connected to travel agencies directly. Hence, they will not be different from GDSs in terms of the indirect relation to the customers. Non-traditional companies can be a middleman between airline companies and customers. On the other hand, they can create their own channel to reach customers with the most convenient offers by collaborating with other players in the industry.

KEY PRODUCTS AND SERVICES

Past	Present	Future
GDS: Aggregation of schedules, fares, availability and booking capability Ticket distribution for FSCs **TTAs:** Comprehensive flight information to consumers	**GDS:** (+) ticket distribution for LCCs IT services **TTAs, OTAs and Supplier Link Portals:** Flight information to consumers **Meta-search engines:** Collecting the online offers for customers to route them to the relevant supplier **Airline websites and ATOs:** Servicing customers for the relevant airlines	**Non-traditional companies:** Routing customers to the relevant supplier. Servicing customers directly. Collaborating with other players in the industry. **VCHs:** Aggregation of schedules, fares, availability Ticket distribution for the member airlines

VALUE PROPOSITIONS

Past	Present	Future
GDS: Combination of information received by aggregating too many requests Transaction all the time and in a short response time **TTAs:** Establishing direct connection between airlines and the customers who don't want to arrange their travel plan by themselves.	**OTAs and Supplier Link Portals:** 7/24 online service **Meta-search engines:** The possibility to compare all online offers Reaching more customers **Airline website:** 7/24 online service **ATOs:** 7/24 support via telephone	**Non-traditional companies:** The possibility to compare all online offers Reaching more customers Finding the relevant content for the customers **VCHs:** High-frequency and high-volume shopping.

KEY RESOURCES

Past	Present	Future
GDS: Technical infrastructure Skilled staff GUI **TTAs:** GDSs	**OTAs:** Pricing and search engines GDSs **Supplier Link Portals:** Pricing and search engines Airlines **Meta-search engines:** Technical infrastructure to combine and sort prices Pricing and search engines **ATOs:** Airline reservation systems **Airline websites:** Airline reservation systems Pricing and search engines	**Non-traditional companies:** Infrastructure to combine and sort airfares from OTAs, Supplier Link Portals and airline websites Pricing and search engines **VCHs:** Huge investment in technical infrastructure Skilled staff

REVENUE STREAMS

Past	Present	Future
GDS: Booking fee Subscription fee **TTAs:** Incentive fees Overrides Hidden service fee	**OTAs:** Incentive fee. Service fee Booking fee **Supplier Link Portals:** Service fee Booking fee **Meta-search engines:** Referral fee Advertising fee **ATOs and airline websites:** Ticket price Invest on technological infrastructure.	**Non-traditional companies:** Referral fee Advertising fee **VCHs:** Subscription fee Incentive fee

KEY PARTNERS

Past	Present	Future
GDSs – TTAs	**GDS:** (+) OTAs Supplier Link Portals: Airlines **Meta-search engines:** OTAs, Airlines, Supplier Link Portals **Airline websites and ATOs:** The relevant airline	**Non-traditional companies:** OTAs, Airlines, Supplier Link Portals **VCHs:** Alliances / Airlines, TTAs, OTAs

CUSTOMER RELATIONSHIPS

Past	Present	Future
GDS: Establishing the connection between airline and TTAs **TTAs:** Selling tickets to the customers directly.	**OTAs, Supplier Link Portals, ATOs and airline websites:** Selling tickets to the customers directly. **Meta-search engines:** Routing the customers to the relevant supplier's website.	**Non-traditional companies:** Routing the customers to the relevant supplier's website. Selling tickets to the customers directly. **VCHs:** Establishing the connection between airline or alliance and TTAs / OTAs.

CHANNELS

Past	Present	Future
GDS: Technical support for TTAs. No direct interaction with customers. **TTAs:** Meeting face-to-face or via telephone	**OTAs, Supplier Link Portals, meta-search engines and airline websites:** Websites Mobile applications **ATOs:** Meeting with customers face-to-face or via telephone	**Non-traditional companies:** Websites Mobile applications **VCHs:** Websites Mobile applications

Table 4.2. The Airline Distribution Ecosystem Canvas

Technology trends of the players in different time phases are shown in Table 4.3. After the developments in internet technology, new entrants emerged with improved infrastructures and online user-friendly portals to contact with customers directly. GDSs upgraded their old infrastructure and supported OTAs. In the future, new entrants will appear to meet increasing customer needs, and mobile technologies will be among the key developments.

	PAST	PRESENT	FUTURE
YEARS	(1962-1996)	(1996-2018)	(2018-2027)
INFRASTRUCTURE	• GDSs receive information from fare aggregators and distributors such as ATPCO. • GDSs based their system architectures on mainframe computing platforms running TPF (IBM´s durable Transaction Processing Facility OSS). • GDSs provide technical infrastructure for traditional travel agencies without interacting with the customers directly.	• GDSs have started migrating programs to open service-oriented architectures (SOAs) which enables a major up-front cost advantage over IBM mainframes in terms of hardware and software licenses to support both TTAs and OTAs. • GDSs have introduced data feeds in XML, but data must be converted back into the original TPF application to interact with the core GDS host at some point. • GDSs developed a GDS network using XML Application Programming Interfaces (APIs) which allows LCCs to connect to GDS with a simpler protocol. • ITA has provided websites support for multiple airlines by providing online access to fare search engine of an airline through its QPX software. • Supplier Link Portals are based on the search technology developed by ITA Software to avoid reliance on legacy system infrastructures. • Meta-search engines receive information from supplier websites through screen scraping procedure. • ATOs use airline reservations systems which are based on Eastern's Programmed Airline Reservation System (PARS).	• It is expected that the infrastructure of GDSs won't meet the future requirements. • VCHs will use the new-generation airline commerce technology infrastructure used to power airlines' PSS and eCommerce solutions. • Non-traditional companies especially Google will be supported by ITA Software. Google will establish integration between its functions.
FRONTEND	• GDSs provide a complex sales platform for TTAs with an almost one-stop-shop content. • TTAs establish face-to-face meetings with customers to make reservation for them.	• GDSs developed more features and functionality to agency desktop applications. • OTAs converts information provided by GDSs into user-friendly websites for customers at a low cost. • Supplier Link Portals use web interfaces to connect customers. • Meta-search engines perform a search and compare function via their websites to be used by customers directly. • Airlines has commercial websites and mobile application for accessing customers directly. • ATOs use platforms which are proposed by relevant airlines.	• VCHs will offer an online platform to establish a connection between alliances and TTAs. • Non-traditional companies can offer their mobile applications and/or websites. They can perform a search and compare function via their websites to be used by customers directly.
INTEGRATION	• Airlines provide information to ATPCO to be received by GDSs. • GDSs obtain price and information from multiple airlines for TTAs. There is a back-office integration between them.	• OTAs, airlines and Supplier Link Portals receive support from ITA Software while meta-search engines collect prices from them.	• VCH will interact with alliances which are the cooperation of subscribed airline companies to obtain offers for TTAs. • Non-traditional companies will route the customers to the relevant supplier for reservation. They have power to reach consumer data including in their travel preferences.

Table 4.3. Technology Trends of Key Players

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5. CONCLUSION AND FUTURE WORK

5.1. Conclusion

In this thesis, the current issues in airline distribution industry are described. Since the distribution industry can be affected by a lot of external resources, the issues of the future cannot be foreseen. However, the potential disruptive factors in the future were obtained from the reports and studies which were constituted with the previous experiences in the evolved industry and insights from consumers, airline executives and the intermediators such as GDSs. Then, we analyzed past, present and future of airline distribution industry by constituting an integrated framework which contains ecosystem players, market forces, technology trends, and ecosystem canvas. After that, we adopted Porter's Five Forces model which explains external forces to define the market pull in airline distribution industry for present phase. Later, we extended key players, technological trends and market analysis for potential future projections based on our secondary data. Finally, we developed the airline distribution ecosystem canvas in a timeline.

There had been two important changes in airline distribution to evolve the structure of the industry. First, CRSs were established with increasing customer demand, and the computerization era began. Then, the internet technology emerged and formed the current structure of the industry. Airline companies changed their business model by adopting online ticket sales, and GDSs developed their services by enabling OTAs. With the emergence of meta-search engines, customers were able to compare the prices easily. However, price has not been the only factor in purchasing decision anymore. Customers have started to evaluate the offers from all aspects.

Customers have been governing and forming the industry with their choices and expectations, as they adopted the internet technology easily. Distribution players adapted to new era to meet customers' requirements. However, these developments couldn't be enough to keep competitiveness of the players. Since customers started to demand more rapid and effective transactions, the use of websites started to gain importance. Nowadays, mobile technology has been developed since smartphones and tablets have

been placing an important role in our life. Customers request to use their mobile devices with more effective functions during their trip.

New technologies and opportunities are in service for all industry players. However, the player which wants to adapt to new era will meet challenges and limitations because the future is ambiguous. In the future, GDSs can be replaced by direct platforms or VCHs with more effective technological infrastructure. Non-traditional companies will have advantage over most of the existing players since they can reach customer data easily and use it to offer more relevant content. Non-traditional companies and meta-search engines will play an important role since both can prioritize any supplier through their biased advertising model. However, regulators may intervene to limit their power for sustaining competitiveness in the industry.

With a strategy focused on personalizing offers to each customer, distribution players can step into the future (Sabre, 2017). It is also important to evaluate the customers according to their purpose of travel. Leisure and business travelers have different expectations and demand different ancillary services than each other. VR and AR technologies will have an importance to live the experience before the purchase especially for high-value leisure travelers.

Airline distribution industry will embrace new technologies and experience a significant change in the next decade. The players which will lead the change in the industry will have first-mover advantage. However, the industry will not be evolved soon since the developments will involve high investments and long time for being implemented and tested.

5.2. Recommendations

Consequently, the results of this thesis can be used as a guide to give an initial idea about the potential disruptive factors in the future. The results can be supported by interviews with the relevant experts from the airline distribution industry. The strategic roadmap which is constituted in this thesis can be validated with the distribution players' roadmap.

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