

## ANALYSIS OF THE DEGREE OF APPLICATION OF ELECTRONIC AND MOBILE TRADE IN AIRLINES SECTOR

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**Abstract.** *In this paper, the authors study and analyze the degree of application of electronic and mobile commerce in the airlines sector, arguing that modern information and communication technologies provide a powerful tool for airlines and can significantly affect their operations, structure and strategy. In the airlines sector, the Internet is considered to be the most important technological revolution, because upon its appearance the booking systems ceased to be passive computer archives and records and become active operating systems that transform the air traffic with immense speed. In the mid-80s, specific types of information systems appeared and these were global distribution systems which were designed for the distribution of tourism products, whose implementation on the website gave airlines access to electronic trading and enabled them to carry out the provision of services and conduct the sale of air tickets on the Internet. However, the development of technology, the appearance of smart phones and numerous other factors today necessitate airlines to access mobile commerce and make their services available to smart phone users as well as on the website.*

**Key words:** *ICT in airlines sector, online reservations of air tickets, mobile commerce in airlines sector, global distribution system.*

### INTRODUCTION

Airlines are among the first ones that realized the importance of investing in information technology due to the complexity of their business. These companies have played a major role in the initial development and diffusion of new technologies.

In the air traffic, the Internet is referred to as the most important modern revolution during which the booking systems cease to be passive computer archives and records and become active operating systems which transform air traffic with immense speed.

The Internet is the means (channel) through which information is transmitted and exchanged in the best and fastest way. It has completely changed the way of doing business

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and it has brought down geographical boundaries, language barriers and currency restrictions. It enables simple and fast communication, the transmission of large amounts of data over long distances, easy publishing and updating of multimedia documents and their continuous availability, digital delivery of goods and services, the creation of virtual organizations.

Through expanded use of the Internet, airlines are able to reduce labor costs and eliminate commissions in some cases (Adee, 2002).

Increasing demands of buyers of services in air traffic has led to radical changes in the distribution of airline services. Before the Internet boom, airlines were relying on the agents who were selling and booking air tickets in order to sell airline tickets, and now they are able to sell and distribute air tickets through their own websites using the computerized reservation systems. These customer requirements, as well as travel agencies, led to the development of the global distribution system that connects certain computerized reservation systems with airline companies and besides the main activity distribution of airline flights serve as distribution systems for hotels, rent-a-car companies and companies dealing with cruises.

### 1. ELECTRONIC COMMERCE IN AIRLINES SECTOR

The emergence of electronic commerce created fundamental changes in the way the work gets done. Unlike traditional market, electronic market has a neutral intermediary role between the buyer and the seller. The electronic market is a virtual place where buyers and sellers meet in order to exchange goods and services. This market uses Internet technologies and standards for the distribution of products and the performance of online transactions. Traditional market is different from electronic market mainly because of the reduction of entry barriers and the ability to search and obtain information about products and services.

Electronic commerce can be defined in different ways. Any definition of the concept helps to better explain and understand, and some of the definitions are:

Electronic commerce is digitally enabled commercial transactions between organizations and individuals (Schneider, 2002).

Also, e-commerce, according to other authors, is defined as a new concept that is being developed and that includes the process of buying and selling or exchange of products, services and information via computer networks, including the Internet (Wen et al, 2001).

E-commerce is the use of electronic communication and digital information processing technology in the business purpose for the creation, transformation and redefinition of relations in the value creation between organizations or between organizations and individuals (Turban, 2000).

Electronic commerce is a trade activity performed using electronic technology, and includes the purchase and sale of products, services and information over the network (Bjelic, 2000).

Electronic commerce is not limited to buying and selling products, but also covers all pre-sales and post-sales activities along the supply chain (Kim et al. 2002). Based on the above, two general advantages of electronic commerce that directly affect the profitability of the business can be singled out:

1. The possibility of higher revenues based on the availability of a wider consumer base and increase of loyalty and repeat purchase of existing customers;
2. The reduction in costs is realized on the basis of electronic service delivery, including the reduction of personnel costs, transportation costs and material costs.

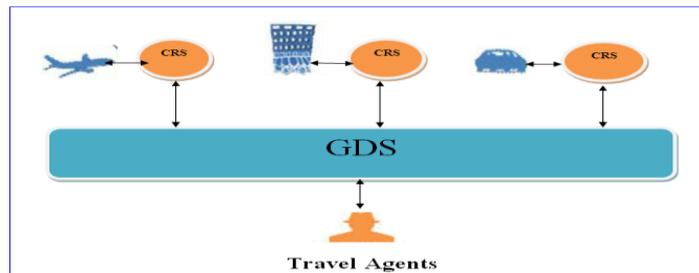
Comprehensive and reasonable interpretation of the concept of e-commerce is presented using the following definitions: electronic commerce covers all types of commercial transactions which are electronically processed data (including text, sound and image) and transmission via communication networks such as the Internet (Andam, 2003). It is the flow of information between organizations, without human intervention, thus ensuring that the flow is continuous from the beginning to the end of each business transaction.

The first central booking systems emerged in the last century during the 60s and represented then internal systems which allowed travel agencies direct access to information on available seats and prices, with the possibility of booking as well. Central booking systems were a precursor to global distribution systems and modern online booking program. The growth of air traffic and the deregulation of air transport stimulates the expansion of CRS on giant computer networks. CRS have enabled companies to compete adjusting their schedule and price demand (Bahalis and Law, 2008).

Among the first investors in information technology was the airline American Airlines, which introduced the SABRE computer reservation system in 1962.

Computer Reservation System (CRS) is a computerized system used for collecting, storing and processing information, as well as managing transactions related to travel. In the mid-80s, CRS develops into a comprehensive global distribution system (Global Distribution System, GDS), which offers a wide range of tourism products and services (transparency of airline destinations, booking of hotels, rent a car, etc.) and provides mechanisms for communication between airlines and travel agencies (Sismanidou et al., 2009).

Global distribution system is the information and communication system designed for the sale of services in the tourism industry that connects service providers in the tourism industry on one hand and sellers of these services (travel agencies) on the other hand as shown in Figure 1. These systems have become electronic supermarkets that connect buyers and sellers, allow one to make a quick and easy reservation, enable sales of the requested services and thereby provide services with additional value (Bahalis and Law, 2008). GDS consolidate information from many airlines, allowing travel agencies, companies and individuals to buy on a single electronic market.



**Fig. 1** Display of the global distribution system

Source: author

The displayed image shows that GDS connects multiple CRS. This is the main computer that enables the processing instructions and transmits information directly to end users, travel agencies. GDS offers information and reservations of all tourism products such as accommodation, rental cars, air traffic schedules, etc.

The services of GDS flights in the sector include: issuing tickets, providing information on timetables, prices, availability of places, the provision of the particular sites, online payment and others.

The four leading GDS are (Sismanidou, Palacios and Tafur, 2009): Amadeus, Sabre, Worldspan and Galileo. There are a few smaller or regional GDS, for example: SITA Sahara, Infini (Japan), Axess (Japan), Tapas (Korea), Fantasia (South Pacific), Abacus (Asia/Pacific) and others that serve the interests of specific regions or countries.

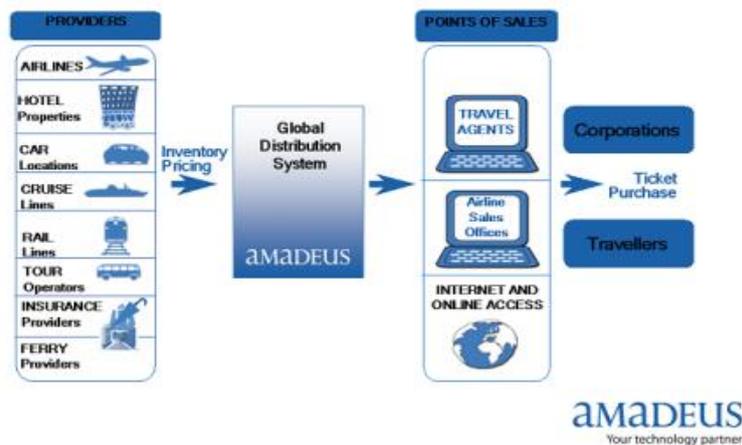
Most airlines are included in some of the GDS (Fig. 2).

Amadeus	Galileo	Sabre	Worldspan
Air France Iberia Lufthansa SAS	Aer Lingus Air Canada Alitalia Austrian Airlines British Airways KLM Olympic Airlines Swissair TAP Air Portugal United Airlines US Airways	American Airlines	Delta Airlines Northwest Airlines Transworld Airlines

**Fig. 2** Display of the global distribution system  
Source: Njeguš, 2010.

### 1.1. Amadeus

Amadeus has been jointly made in Europe by Lufthansa, Air France, Iberia and SAS. It is interesting that JAT - Yugoslav Airlines had played an important role in the development of Amadeus. Our air company worked together with Lufthansa on the development of Amadeus during the 80s. This system, apart from air traffic, now includes hotels, cruises, rent-a-car services, and also rail traffic. Official headquarters of Amadeus is in Madrid, its development base is in France, while the main servers are in Erding near the Munich airport.



**Fig. 3** Amadeus GDS  
Source: Website Amadeus

Many global airline companies, about 150 of them, use this system as their own reservation system and through it the sale of tickets of 440 airline companies is possible. The sales network that is connected to Amadeus consists of approximately 100,000

agencies, including many online agencies. Amadeus is used in 195 countries worldwide. The largest online systems based on Amadeus are Opodo and Expedia.

## 1.2. Sabre

The company Sabre Holding is an integrated reservation system that covers different areas of touristic activities. The members of Sabre Holding are:

- Travelocity,
- Sabre Travel Network,
- GetThere,
- Sabre Airline Solutions.

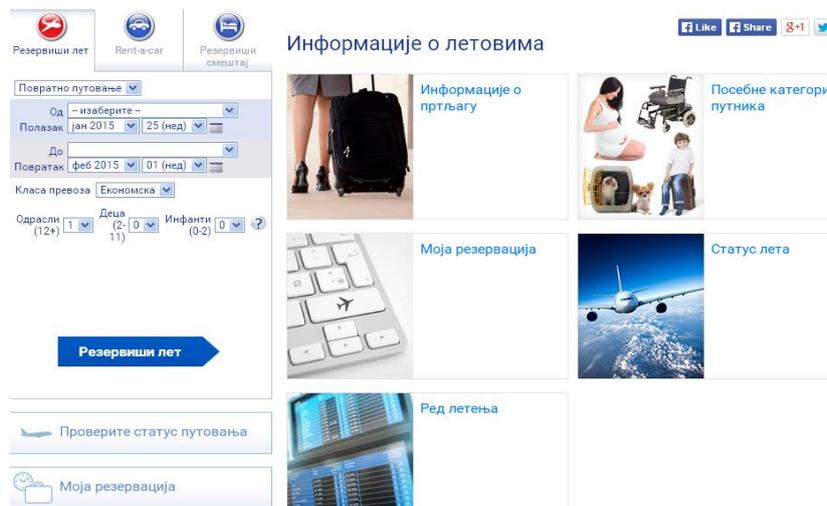
Nowadays, many major airline companies use this system as their own internal reservation system. Besides American Airlines, its users are: Aeroflot, Etihad, Virgin America and Virgin Australia. Tickets of around 400 airline companies are sold through Sabre, while 44,000 travel agencies use it for sale. The largest and the most popular online agency that uses Sabre is Travelocity.

Sabre Airline Solutions allows airline companies to reduce costs, simplify operations, maximize profits and improve customer service. More than 200 airline companies worldwide use the intelligent support systems designed by Sabre Airline Solutions.

## 1.3. Global distribution systems in Serbia

In February 2014, the company Air Serbia implemented Sabre Sonic Check-in system at Nikola Tesla airport in Belgrade and in that way made a technological improvement of the system for the registration of passengers. This system brings the functionality in the system of the passengers' check-in on the flight and provides a new and efficient system of monitoring the departures on the home airfield.

The visitors of the site Air Serbia can use this system to make a reservation of the flight, to check the booking, to inform themselves about the luggage, to review the status of the flight, to carry out rental cars and book accommodation as shown in Fig. 4.



**Fig. 4** The display of the Sabre Sonic Check-in system at Nikola Tesla airport in Belgrade

Source: Website AirSerbia

As it can be seen, the system offers the following services:

- tickets issuing,
- providing information on the flight schedule,
- providing information about the price,
- availability of seats,
- reservation of a specific seat, etc.

Beside the company Air Serbia, what is interesting in our country is the application of global distribution systems by the agencies that sell air tickets, one of which is the agency – website [superaviokarte.rs](http://superaviokarte.rs), which is shown in Fig. 5.

**Fig. 5** The display of the agency for the online sale of air tickets „Super avio karte“  
Source: Website Superaviokarte

This website acts as a mediator between airline companies and the buyers of airline tickets. The website browses around 500 airline companies worldwide, provides information about airline tickets for the required route and the required time period, the cost and possibility of buying the same, as well as suggestions for other airline tickets to the same destination but for a different date at a much lower price, if the trip can be postponed to that date. The site offers a lot of other discounts and every day there is one super offer and much more.

This agency achieves the following by applying global distribution systems:

- unlimited offer of airplane tickets,
- the ability to meet every demand of the passengers,
- income from the commissions of the sold services,
- simplified business,
- up-to-date timetables and prices of services,
- automatic tickets issuing,
- increased productivity of the employees,
- access to a huge amount of information,
- savings in business costs, etc.

## 2. MOBILE TRADE AS THE FUTURE CHALLENGE IN THE AIRLINES SECTOR

In addition to e-commerce, one of the following opportunities for airlines to reach new markets and win them and to keep down the costs of distribution can be achieved by using mobile technology, or by accessing electronic commerce.

Nowadays, the emergence of mobile technology, and corresponding access to the Internet through mobile handsets, has provided many opportunities for customers in the form of immediate information access, online purchases, downloading services, and various educational and entertainment services (Rose et al., 2011).

M-commerce can serve as a unique tool in the aviation sector to improve services where they can create value and enhance business performance. Different business processes can be improved and implemented the integration of mobile technology. The introduction of mobile devices as a choice of interfaces online allowed easier access to information and operations data entry, increased availability of employees in almost every moment, in cases of decision making and the like. Business processes become more dynamic and practical, real-time.

The growth in numbers of mobile device users was a result of the advances in mobile technologies (Kim et al., 2008). Mobile devices have increased the availability, frequency, and speed of communication (Scharl et al., 2005).

Mobile commerce, known as m-commerce, has been defined by Balasubramanian et al. (2002) as any business that occurs on the basis of anywhere and anytime. Abu Bakar and Osman (2005) also defined m-commerce as exchange of goods and services via wireless mobile phones, whilst Varshney and Vetter (2002) see m-commerce as an e-commerce over wireless devices. Gary and Simon (2002) referred to m-commerce as any financial dealings done over mobile devices. In addition, Alsultanny (2012) argued that mobile commerce, including airline ticket purchasing, hotel booking and reservation, and mobile banking, is a subset of electronic commerce.

Kim et al. (2005) suggested that airlines should see mobile commerce as a new and interactive method of business. Thus, mobile commerce provides a direct channel for companies to communicate with their customers through mobile phone, anytime and anywhere. So companies have a new opportunity to provide new services to existing and potential customers via mobile devices.

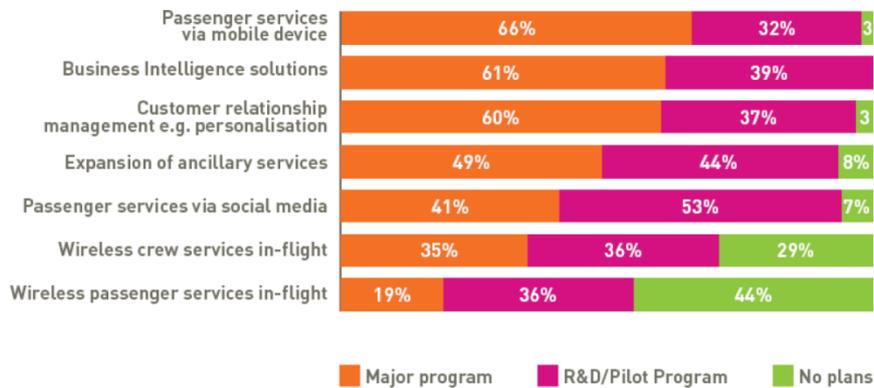
The main difference between m-commerce and e-commerce definitions is that m-commerce uses a wireless network to perform transactions, and precisely because of these unique characteristics it has massively attracted the attention of customers to e-markets (Kim et al., 2008). Siau et al. (2001) discussed the promises and challenges of mobile commerce and its impact on business environment, identifying four unique characteristics of mobile communication which differentiate it from e-commerce:

- *Ubiquity*. The use of a wireless device enables the user to receive information and to transact anywhere, anytime.
- *Accessibility*. A mobile device enables the user to communicate effectively at any time and place.
- *Suitability*. Portability of a wireless device and its features with data storage for access to information.
- *Localization*. Specific applications will allow the user to receive relevant information on which to act.
- *Instant Connectivity (3G ...)*. Instant connectivity or "always on" is becoming more prevalent with the emergence of 3G networks, GPRS or EDGE. The users of 3G services will benefit from easier and faster access to the Internet.

- *Personalization.* The combination of localization and personalization will create a new channel to attract customers. Personalization is a means to effectively meet customer needs, making interactions faster and easier, and increases customer satisfaction and likelihood.
- *Sensitivity to Time.* Access to information in real time.
- *Security.* Depending on the specific device user, the device offers a certain level of security.

Companies must recognize mobile commerce as well as innovation, creating marketing opportunities and challenges. Leung Antipas (2001) believes that companies can improve business efficiency using mobile commerce i.e. distribution of information with staff remotely.

SITA research conducted in 2013 shows that 66%, of airlines in the next three years, are planning to make a significant investment in the provision of passenger information via mobile devices, as shown in Fig. 6, and the improvement of existing and introduction of new sales channels in order to achieve greater self-service.



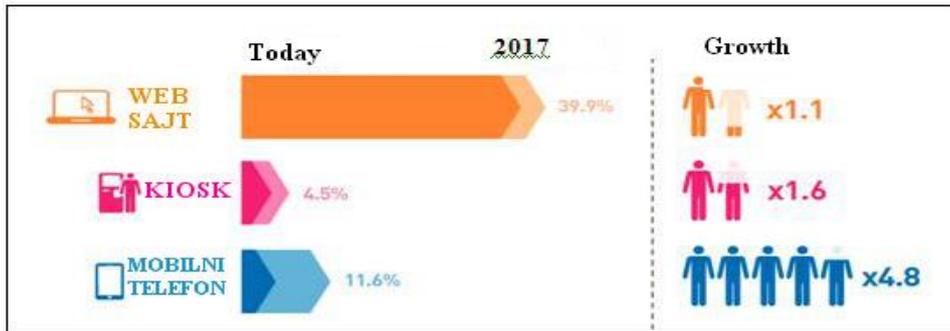
**Fig. 6** Airline investment in IT over the coming three years.

Source: SITA

The research indicates that today, the dominant airline sales channel is through website which is channel for generating ancillary sales and it would develop as such; however, in the coming years, tremendous growth of mobile commerce is expected. Currently 37% of ancillary sales is being realized through sites, while 2.4% via mobile phone. However, by 2017, the mobile channel is expected to contribute almost five times more, which represents 11.6% of the total ancillary sales (Fig. 7).

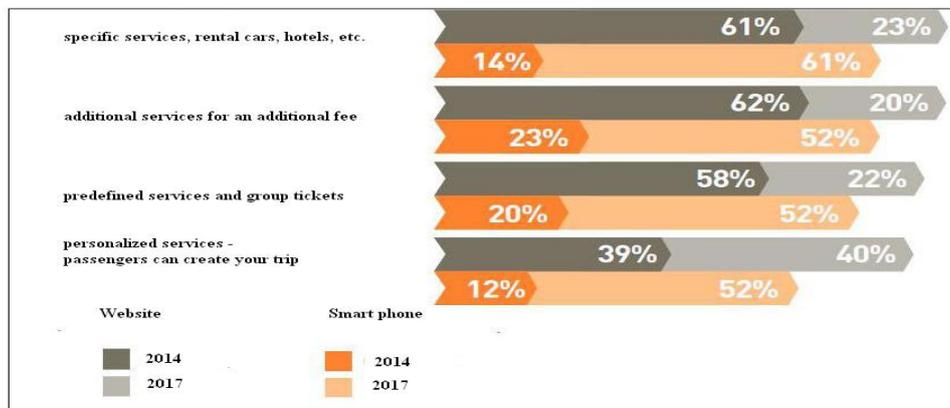
This goal is very ambitious, but there are many factors that go in this direction, and some of them are (SITA):

- A growing number of smartphone users
- The passengers are already familiar with e-commerce, and mobile commerce is not a great leap for them.
- The passengers carry their mobile phones during the flight and they provide them with significant opportunities before, after and during the flight.



**Fig. 7** The percentage of sale through new channels  
Source: SITA, adapted by the author

The ambitions are that the airline companies make their services available for smart phones as well as on the website. By 2017, about 75% of the airline companies will have achieved that. Within three years, about 70% of the airline companies will be using this technique to increase sales. The expectations are that the offer on the website gets personalized and adapted to mobile phone users.



**Fig. 8** Airlines usage of mobile commerce  
Source: SITA, adapted by the author

The research shows that in the coming period, by 2017, mobile commerce will develop and its applications and services will be used more, which will affect the growth of this sales channel in the airlines sector (Fig. 8).

CONCLUSION

Based on the conducted research and carried out analysis of air flights market, it can be concluded that successful business and development of all participants in air traffic is increasingly dependent on the successful application of modern information and communication technologies in the business.

The degree of implementation of electronic commerce in the airlines sector is at a satisfactory level. The majority of airlines have automated their business in the area of reservations, ticketing, acceptance of passengers for the flight, providing information on the flight schedule, prices of services, etc. With the application of a global distribution system, all successful airlines have joined today the electronic commerce and thus become more competitive in the market, enabling the provision and sale of their services 24 hours 7 days a week and thus reduced their indirect costs and increased the income from sales.

Regarding the degree of the application of mobile commerce in the airlines sector, it can be said that it is at unsatisfactory level and that mobile commerce in the airlines sector is still in its infancy. With the development of new technologies and the growing demands of the users of air services, the imposed requirements in the upcoming period for airlines are to personalize and adapt their offers on the website for mobile phone users and in that way approach mobile commerce and increase their sales. Mobile commerce in the airlines sector is becoming a tool of competitiveness, because the number of users of powerful mobile phones is growing.

It is important to emphasize that the global distribution systems must follow the trends of development of information and communication technology and continuously expand the range of their services because it is the only way to survive in the future.

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## **ANALIZA STEPENA PRIMENE ELEKTRONSKE I MOBILNE TRGOVINE U AVIO SEKTORU**

*U ovom radu autori sagledavaju i analiziraju stepen primene elektronske i mobilne trgovine u avio sektoru, obrazlažući da savremene informaciono-komunikacione tehnologije pružaju snažan instrument za avio kompanije i mogu značajno uticati na njihovo poslovanje, strukturu i strategiju. Internet se u avio sektoru smatra najvažnijom tehnološkom revolucijom, jer su njegovom pojavom rezervacioni sistemi prestali da budu pasivne kompjuterske arhive i evidencije i postali aktivni operativni sistemi koji neslučenom brzinom transformišu avio saobraćaj. Sredinom 80'tih godina dolazi do pojave posebnih tipova informacionih sistema, globalnih distribucionih sistema, koji su namenjeni distribuciji turističkih proizvoda, čijom implementacijom na veb sajtu avio kompanije pristupaju elektronskoj trgovini, odnosno vrše pružanje usluga i obavljaju prodaju avio karata na Internetu. Međutim, razvoj tehnologije, pojava pametnih telefona i brojni drugi faktori danas nameću potrebu avio kompanijama da pristupite mobilnoj trgovini i učine svoje usluge dostupnim i korisnicima pametnih telefona kao i na veb sajtu.*

*Ključne reči: ICT u avio sektoru, onlajn rezervacija avio karata, mobilna trgovina u avio sektoru, globalni distribicioni sistem.*