

EXTENDED ABSTRACT

SMART AIRPORTS: ACCEPTANCE OF TECHNOLOGY BY PASSENGERS

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The importance of airport industry is supported by data: the spent of tourist travelling in airplane was around 650.000 million dollars and the average income for passenger and kilometer grew a 7,4 % in 2016 (IATA, 2017). Spain was the second receptor of international tourists in 2017, behind France and before the United States. Airports are the main access of tourists visiting Spain (AENA, 2018).

Up to now, there are many researches about smart tourism, airports, technologies and the relation between the age and the use of technologies, but the *smart airport* has not been considered on scientific literature. In this work, we define the concept of smart airport and study the acceptance of technologies at them. In particular, it is verified how the use of self-service technologies in the boarding, obtaining luggage tags and baggage check processes increases the passenger satisfaction. It also shows that the desire to use new technologies in these processes and the use of video games and biometric passports is related to the age of passengers.

The concept of Smart Tourist Destination arises from the development of Smart Cities. In 1997, the “Project CITIES” study was created in Philadelphia, at the University of Pennsylvania, consisting of observing urban experiences in twenty innovative cities on five continents. As a result of this project, those innovative cities capable of finding a balance between cohesion and social development, economic competitiveness, and environmental and cultural sustainability, the closest precedent to smart cities, were baptized smart cities or smart territories (Vergara & de las Rivas, 2004).

So, we can define *smart airport* as the airport that uses technology to improve service, environmental sustainability, comfortability and passenger satisfaction. An airport is a physical space that Bitner (1992) named as *servicescape*, an holistic place where signs, symbols, instruments and people interaction as a whole.

Internet of Things, Code Bars technology, Radio Frequency Identification (RFID), Geolocation technologies, Immersive reality, Biometric Systems, Artificial Intelligence and Robotics and Blockchain are technologies that have made possible to create displays that makes of an airport an smart airport. Several institutions have recommended their use. Members of Airport Council International (ACI) recognize the benefit of biometry to establish personal identity at border control and recommend biometric systems in airports to simplify and improve the passenger travel experience and to reduce costs at the same time (ACI, 2005).

Airports were traditionally considered as public spaces with the only function of providing fast and secure travels. Most of times, passengers chose price and timetables that airlines offers, and the airport is chosen by airlines. However, from the eighties, the liberalization of airlines led the airports to compete, and they began to introduce marketing to increase the number of airlines being their customers. Airport managers thought that they could influence airlines decisions by offering better services to the passenger as final customer. So, by the nineties, with the eruption of low cost airlines, airport industry focused on service quality as a strategy to get a competitive advance (Lee-Mortimer, 1993).

The Internet and other Technologies of Information and Communication (TIC) are fundamental to this strategies, because of the improvement in safety and security, information to the passenger and increase of leisure offers.

Technologies above mentioned have made possible the appearance of some devices as check-in kiosks, bag tagging robots, biometric border control machines, augmented reality guide of airport apps and video games. These devices, also named self service technologies (SST) have been criticized because of the lack of face-to-face service, which was valued by passengers until now. But Gibbs (2014 in Otiendo and Govender 2016) concluded that passenger value other advantages of SST as fiability and time saving, so that depersonalization will not necessarily affect to the passenger satisfaction.

Technology Acceptance Model (TAM) established that technology acceptance depends basically on its utility and perceived ease of use (Davis 1986). Otieno y Govender (2016) established that customer perception of technology depends on comfortability, fiability and easiness of use. Fodness and Murray (2007) pointed out that quality studies on airports until then, had passed questionnaires to airport and airline authorities, and they based their work on a questionnaire answered by passengers, but they did not study technology acceptance. Since then, several jobs have used the SERVQUAL method to measure passenger satisfaction in airports, but none of them evaluate the impact of technology on the quality service perception.

Different authors have studied the importance of age on technology acceptance. Venkatesh et al. (2003) proposed the Unified Theory of Acceptance and Use of Technology (UTAUT), a model which validated age as a moderator between variables. Torres and Robles (2017) concluded that the use of the internet depends on age, level of studies and digital skills. Otieno and Govender (2016) suggest that it would be interesting to study the attitude of different generations towards the SST on the different airport processes, for example, on self-tagging baggage.

So, we want to test the hypothesis:

- H₁: Using technology on airport improve passenger satisfaction

- H₂: Age is related to the acceptance of technology at airports

In order to achieve it, a questionnaire of 14 items was elaborated and answered by 400 individuals in Madrid, around the Bernabeu soccer stadium on April and May of 2018. The sample obtained was compounded of 52% men and 48 % women. 4% were between 18 and 24 years old, 20,25% were between 25 and 44 years old, 12 % between 45 and 54 years old, 55 and 74 years old, and only 2,25% were older than 75 years.

In relation to the level studies, 38,45% had studies of secondary degree and 48,55% had got ten an university degree.

The answers have been tabulated regarding the satisfaction of the respondents in each stage of their last trip, in relation to the way they had booked, printed bag tags and dropped off their bag (with or without technology). Of the 400 respondents, the average satisfaction of the 89 who had booked without technology was 3.33 out of 5, while the 311 who reported having booked through an app, online, or in a self-service kiosk, had an average of satisfaction of 3.67 out of 5. Those who printed their bag tags using SST reached a satisfaction of 3.84 compared to those who delivered the luggage at the airline counter, whose satisfaction level was 3.39 out of 5. The average satisfaction of the passengers who drop off their bag with an airline agent was 3.2, compared to those who used a self bag drop, whose average satisfaction was 4.21 out of 5.

There is a greater satisfaction of the users of technology in the three processes, therefore, we validate hypothesis 1.

Regarding the wishes of using technology, 67.75% said they would like to use the biometric passport on their next trip, 60.75% would like to use an augmented reality service to guide themselves through the airport and 84% would like to book with self-service technologies (app, internet or self-service kiosk), instead of doing it face to face. 60% would like to print their own bag tag at home or at the airport in a self-service stand compared to the 40% who wish to continue to do so at the airline counter. Less acceptance presents the use of video games, since only 18.75% say they would use video games while they wait, if the service is provided at a reasonable price. In the same way, 30.25% would like to check their luggage at a self-service stand and not at the airline counter.

To validate the second hypothesis, six contingency tables have been constructed between the age variable distributed in the five groups previously exposed and each of the variables “Desire to use a biometric passport on their next trip”, “Desire for video games at the airport “,” Desire for a free augmented reality service on your smartphone to be guided through the airport “,” Desire to use self-service technologies on your next shipment “,” Desire to use self-service technologies to obtain luggage tags on your next trip “And” Desire to drop baggage through self-service technologies on their next trip “, and the corresponding contrasts of Chi-square independence have been made.

Only the variable “ Desire for a free augmented reality service on your smartphone to be guided through the airport” has turned out to be independent of the age. Therefore, we validate the second hypothesis, according to other similar studies outside the airport (Torres et. al, 2017).

When analyzing the satisfaction of the passengers in the different processes according to their age, a similar tendency is observed in the four age groups in that the satisfaction

after having used technology is greater in the baggage check-in, followed by the luggage tagging and finally in the check-in. The age group that experienced the greatest satisfaction after using technology in the check-in process is 45 to 54 years old, however, in the other two processes this group was more satisfied to have made them face to face.

An airport is an essential part of a smart city. The technologies already mentioned have enabled the creation of different displays that help passengers and make of an airport a smart airport. Airports also play a strategic role for the regions in which they situate, in that they can improve the visibility of a destination. The distinctive position of an airport can become a major value for attracting new production activities in certain geographical areas.

The logical consequence of the results obtained is that the new technologies of smart airports are already a competitive element in the airport services sector, but that their total implementation depends on two related factors: the replacement of the older passengers by the more young people and the incorporation of older passengers to new technologies. The aforementioned relief is demographic and can hardly be accelerated or stopped. The incorporation of older passengers to the new technologies will partly be produced and elsewhere it will require time and actions of dissemination and promotion. As future lines of research, the authors suggest a more detailed study of the acceptance of the Spanish passenger of the different Smart Airport devices.