

Airport Surface Access and Mobile Apps

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Abstract

Purpose: Airport Surface Access faces two main opposite issues: (1) cars, being the main transport mode, contribute to the increasing level of congestion and pollution of cities; and (2) simultaneously, parking fees are one important source of airports commercial revenue, creating a dilemma for airports when facing the problem. Following the recent trend of air passengers travelling with Smartphone (78% in 2013), the purpose of this paper is to monitor the adoption of mobile Applications (Apps) by airports and to analyze if the information and functions provided in those Apps can help to overcome the above two issues.

Design/methodology: 31 iPhone App of some of the largest European airports were evaluated in the lab using the evaluation model of Destinations Mobile Applications (Scolari & Fernández-Cavia, 2014) adapted for the Airport Surface Access on Airport Apps.

Findings: The Apps evaluated provided a very limited functionality to help passengers to plan and book their trips to/from the airports on public transports and gave high priority to parking information and services.

Originality/value: Although Airport Surface Access has been a widely researched, the originality of this paper is the analysis of airport mobile Apps as a potential tool for airports to deal with the surface airport access problems.

Keywords: Access; airports; mobile internet; commercial revenues

1. Introduction

Airport Surface Access refers to the journey legs of transferring to and from the airport. The previous research on this topic has clearly identified two main opposite issues:

- Cars, being the main transport mode, contribute to the increasing level of congestion and pollution of cities; and
- Simultaneously, parking fees are one important source of airports commercial revenue, creating a dilemma for airports when facing the problem.

The demand for air passengers, with a 5% average growth rate, was doubled during the last 15 years and it is expected to double again in the next 15 years (Airbus, 2013). Thus, airports will need to keep adapting their capacity to the new demand, including the Airport Surface Access. This affects passengers, employees and visitors (Budd, Ison & Ryley, 2011), but the scope of this paper is mainly on passengers.

The Airport Surface Access includes different transport modes. Those could differ from airport to airport. One classification used by Budd, Ryley and Ison (2014) is: Car and Park, Drop-off/Pick-up, Taxi and Public Transport.

Car Park refers to passengers driving and parking at the airport. Drop-off/Pick-up refers to passengers taken by someone by car to/from the airport. Sometimes also called "kiss and fly" (Marsden, Kamal & Muir, 2006). Public transportation normally includes bus, rail and shared vans (Coogan, 2008, pp. 3).

The level of pollution of each transport mode was estimated by Miyoshi and Mason (2013) for Manchester airport. They are shown below and can be easily applied to other airports as they use grams of CO₂ emissions per passengers Kilometer.



Figure 1. CO₂ emissions on airport surface access grams per passenger Kilometer [g./ pKm]. (Miyoshi & Mason, 2013)

Drop-off and taxi access options generate higher levels of emissions because they generate two airport rides for each passenger or group of passengers (Miyoshi & Mason, 2013), compared for instance with passengers parking their cars at the airport, which generate only one. Car Park, Drop-off and taxi are sometimes aggregated in a single group of passengers travelling by private cars (Budd et al., 2011).

Private cars are the main airport access mode. For instance, it is estimated that for major European airports 65% of passengers use private cars to access the airport (Budd et al., 2011). In the USA the percentage was over 80% in 2005 (Coogan, 2008).

Private cars, especially passengers driving to the airport, use the airport parking and contribute to an important source of airport commercial revenue (Budd et al., 2011). For instance, parking fees contributed to 31% of the total commercial revenue at US airports during 2006 and 18% worldwide. Total airport commercial revenue represented 48% of the total revenue in 2006 (Graham, 2009). This figure seems to be stable as the same figure of 48% was published again by ACI (2012) for 2011.

The management of these Airport Surface Access can be tackled from different perspectives; Budd et al. (2011) grouped the different instruments into four categories:

- Public Infrastructure and Policy: Facilitating airport access and promoting public transport.
- Airport Management Strategies: Promoting the use of public transport.
- Technology: Access information and green transport technology.
- Airport Parking Policy: by increasing value added parking service and development of revenue.

Three technology innovations were evaluated by (Ryley et al., 2013) with the aim to reduce the number of trips by private cars (especially drop-off and pick-up) and to increase the use of public transport: Telepresence to reduce relatives to drop-off / pick-up passenger; RIDF (radio-frequency identification to have control of the luggage while using public transport and software to increase ride-sharing. The results suggest that consumers need to have a better understanding of technological innovations.

Although there is abundant bibliography about the Airport Surface Access issue, there is a limited research on this topic and the use of technology. The use of Smartphone technology with respect to Airport Surface Access is an area of research and highly relevant in recent years, as shown in the Figure below, the penetration of Smartphones of air passengers has increased very rapidly reaching 78% of passengers in 2013 (SITA, 2014).

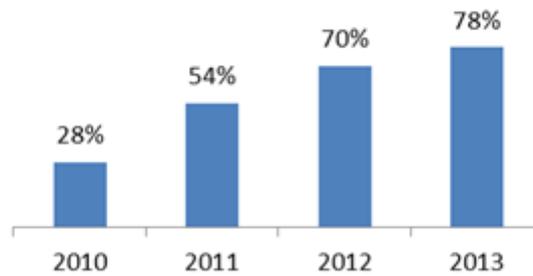


Figure 2. Smartphone Penetration for Air Passengers (SITA, 2014)

The purpose of this paper is to monitor the adoption of mobile Applications (Apps) by airports and to analyze if the information and functions provided in those Apps can help to overcome the two main airport surface access issues:

- To reduce the use of cars by promoting and facilitating the use of public transport; and
- To generate commercial revenue from airport access from other sources different than parking fees.

2. Methodology

The steps and methodology followed to collect the data for this paper were the following:

- AIRPORT DATABASE
 - Data: Database of the 100 largest worldwide airports by number of passengers
 - Type: Secondary data
 - Date: 2010
 - Source: ACI – Airports Council International
 - Method: By contacting ACI and requesting the database
- AIRPORT MOBILE INTERNET ADOPTION
 - Data: Airport Mobile Website and Applications adoption
 - Type: Primary data
 - Date: Feb - Mar 2014
 - Source: Author

- Method: Searching for each airport mobile website and Android and iPhone applications (Martín-Domingo, 2011). There were several mobile platforms on the market, but only the Android and iPhone platforms were evaluated as they represented more than 90% of market share (IDC, 2014).

- AIRPORT SURFACE ACCESS INFO ON AIRPORT iPhone Apps
 - Data: Evaluation of 31 European airport's iPhone Apps on Airport Surface Access
 - Type: Primary data
 - Date: June 2014
 - Source: Author
 - Method:
 - Selecting airports from one region – Europe in order to have a more homogeneous sample as airport access might differ considerably with other world regions (e.g. North America).
 - Only the iPhone App was evaluated as this option provided public information through the Apple store that was not available for the other options (e.g. Implementation date).
 - Adapting an evaluation model of Destinations Mobile Applications (Scolari & Fernández-Cavia, 2014) for the Airport Surface Access on Airport Apps.
 - Downloading the 31 airport App onto an iPhone 5 used for evaluation

Evaluating each app on the items described in the next section.

3. Results

This section summarizes:

- The overall Internet mobile adoption by the sample of some of the 100 largest worldwide airports;
- A general evaluation of 31 European airports iPhone's applications; and
- The airport surface access content and functions of those 31 Apps.

3.1 The Airports Mobile Services for Smartphones

Following the rapid adoption of Smartphone by passengers mentioned in the introduction section, airports have been quickly implemented mobile websites and applications. The Airport Mobile Internet Adoption chart below shows the increase from 2012 to 2014. For instance, 29% of the airports had adopted mobile website in 2012 compared to 69% two years later.

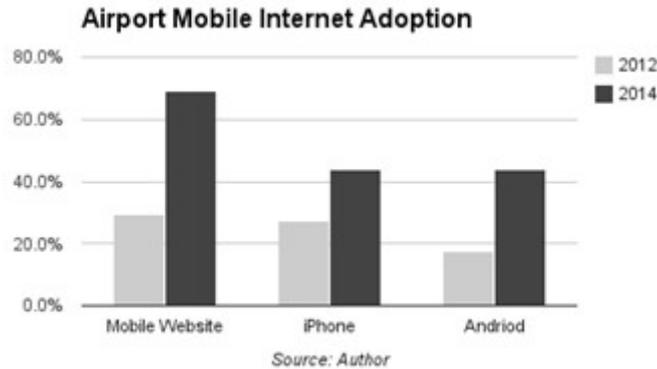


Figure 3. Airport Mobile Internet Adoption

The levels of adoption were different for each type of platform (e.g. Mobile website vs. Application) and across the different geographical regions. The chart below "Airport Mobile Adoption by Region" shows those differences.

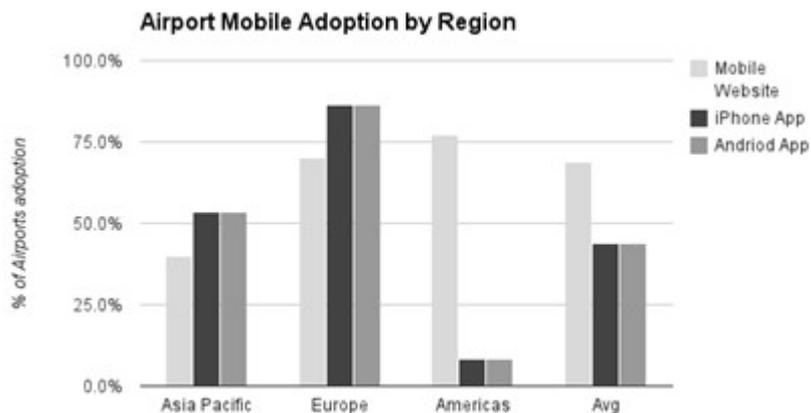


Figure 4. Airport Mobile Adoption by Region

The mobile websites were more popular in the Americas (77%) and the Apps were more popular by European airports (86.5%) followed by Asian airports (53.3%).

3.2 General Description of the iPhone Applications

This section includes a general description of the 31 European airports' iPhone applications evaluated.

3.2.1 Time when the App was adopted

The first iPhone device was launched in 2007 (Apple, 2007) and the App store one year later in 2008 (Apple, 2008). After that, developers could create their own applications and users could download Apps (many of them for free). In June 2014 there were 1.2 million Apps in the App store (Pérez, 2014). From the surveyed airports, Paris airports were the first airports of the sample launching the iPhone App in July 2009 (Aéroport de Paris, 2009). This means that Paris airports have been providing the App during 5 years.

When looking at all the airports surveyed, they have been providing the iPhone App for an average of 2.6 years. This can be considered a short time, thus mobile services provided by airports are expected to be further developed in the future. For instance, in the case of Paris airports, which now provides the App in 10 different languages, most of the languages were included in the service between February and April 2013 (Aéroport de Paris, 2013), which means almost four years after the first launch in 2009.

3.2.2 Business Model

All the applications were provided for free. Therefore, mobile apps themselves are not used as a direct source of revenue by airports. Airports seem to provide these apps to improve the passenger experience and to develop other commercial revenues (e.g. car parking).

3.2.3 Business Production

The main developer and "seller" of the surveyed airport Apps was the airport company. It is difficult to know and anticipate whether airports have or not used external companies to develop the App, however airports remind as the main owner of the apps and can be considered the official airport App. This can be relevant to differentiate them from some other airport Apps provided by third parties and where airports did not have control.

3.2.4 Languages

The language is an important issue in tourism applications (Scolari & Fernández-Cavia, 2014). This is also an important element for airports, where a large percentage of passengers at large airports travel from other countries.

English is the official language in aviation and airports provide physical signage in English as well as in the local languages - when different than English. The below chart: "Languages available on the iPhone Apps" shows that most of the airport provided local language and English (97% and 94%). However, the number of airports providing other languages was low (26%). A good practice among those airports was Paris Airport, who provides the App in 10 different languages.



Figure 5. Languages Available on the iPhone Apps

3.2.5 Link between website and the App Store

One easy way for users to find the right airport App quickly is to have a link between the airport website and the App store, from where the app can be downloaded. This facilitates the search of the airport mobile App because when going directly to the Application store, it is not always clear what the official App of the airport is. 74% of airports were founded to provide a link from the website to the app store.

3.2.6 Quality of the App

One criteria followed to measure the quality of the App was to measure how often the App was updated. In order to keep improving the quality of the Apps, some airports implement the recommendations given by passengers. For instance, Heathrow Airport (2014) when releasing the updated version of the App the 3rd of July 2014 mentioned:

"We have listened to some of your feedback and made the following enhancements to improve your experience: ... Display the flight status ahead of the gate; Resolve an issue with the Airport Guide... Please keep posting your comments – it really helps Heathrow to make every journey better".

It is assumed that those Apps that have more often updated provide a better quality. Evaluated Apps averaged 4.7 updates a year. In general, it is observed that after the first release of the App, an extra fine tuning is usually needed and more updates are carried out during the first months. For instance, Spanish Airports App had 9 updates during the first 9 months.

3.3 Content of the Applications

This section includes the content of Airport Surface Access of the App evaluated.

3.3.1 Transport Modes available on the App

The chart below "Modes shown on the App" shows the airport surface access modes included on the 31 apps evaluated. It can be seen that 100% included parking information, 90% Public Transport, 80% Taxi, 77% Rent-a-car and just 13% dedicated specific information for drop-off and pick-up services.

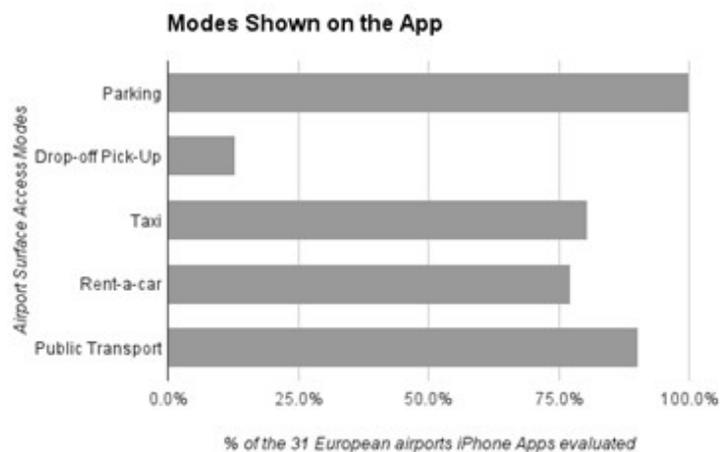


Figure 6. Transport Modes Shown on the Apps

3.3.2 App Sections on Airport Surface Access

On airport access, three main areas were identified on Airport Apps: Parking, Ground Transport and Services. 27 airports (87%) had a separated section for Parking and only 4 airports (13%) included parking under Ground Transportation.

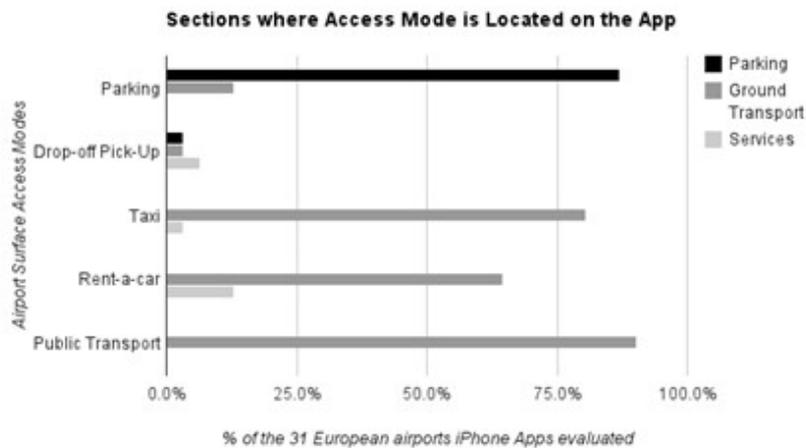


Figure 7. Sections where Access Mode is placed on the App

The ground transportation section was used for most of the airports for information about taxis (80%), rent-a-car (65%) and public transport (90%).

The third category of Services was used for information about taxis by 4 airports (13%).

Having these three sections, airports did seem to follow the recommendation given by Coogan (2008): "Airport access information systems should integrate all modes of transport".

3.3.3 Clicks away from the App's home - Importance

One way to measure the importance given to each airport access from the airport on the App is by measuring the number of clicks away from the App's home.

The below chart "Clicks away from home App – priority" shows Parking is given the highest priority with 68% of the airports providing the Parking section at the home of its App. By contrast Public Transport was only provided by 10% of the airports at the App's home.

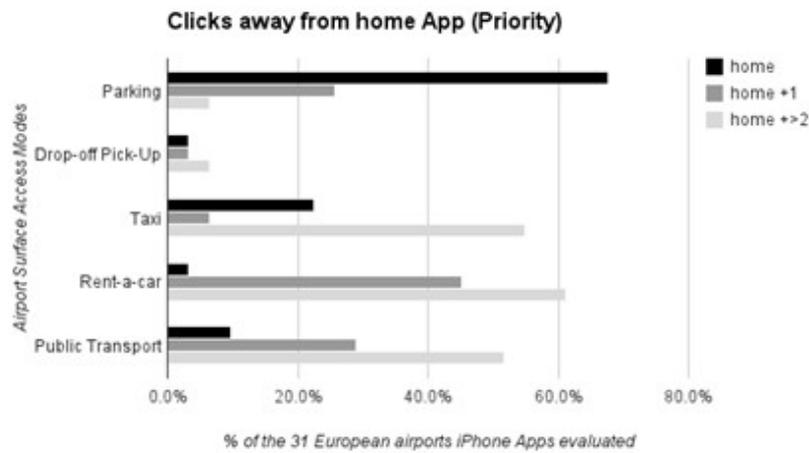


Figure 8. Clicks away from home App – Priority

3.4 Functions of the Apps

This section includes the functions identified on the mobile App related to Airport Surface: Booking Functionality, Travel Planner, Real Time info, Weather and maps.

3.4.1 Booking Functionality

Regarding booking Coogan (2008) suggests that “airport access information systems should provide for immediate ticket sales”. Airports did not seem to follow this suggestion as the chart below shows how this functionality was only implemented as a common feature in the case of Parking, with 68% of the sampled airports providing this option on their Apps. For the rest of the transport modes or services it is practically inexistent.

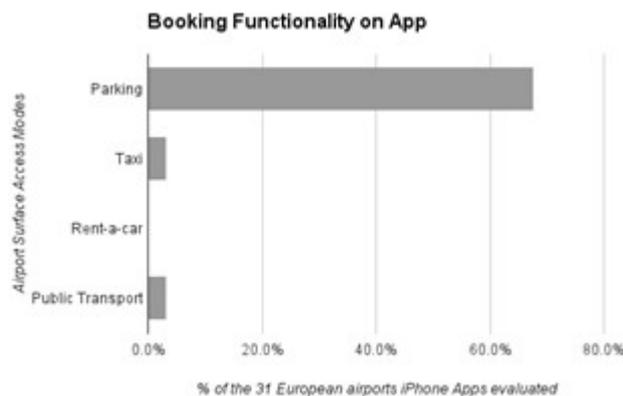


Figure 9. Booking Functionality

3.4.2 Travel Planner

For passengers who don't know the way to the airport or the airport access modes of transport a travel planner can help the access to and from the airport. 20% of airports provided with a travel planner to drive to and from the airport. In the case of those passengers wishing to use public transport 29% of the airports provided them with a travel planner. For the small number of airports providing travel planner, Google was often the used solution (e.g. Heathrow airport).



Figure 10. Travel Planner Availability

3.4.3 Real Time info

Providing real time information on the road (e.g. traffic conditions) or the public transports (e.g. when is the next train departing) to passengers can help them to choose the most optimal transport modes. The situation can change depending on the travel day or time of the day (e.g. traffic conditions). Therefore, real time information is a relevant attribute when passengers make their access and egress choices. The chart below on "Real time info available on the App" shows that only 10% of airports provided real time info about the roads to/from the airport and 20% real time information on public transport.

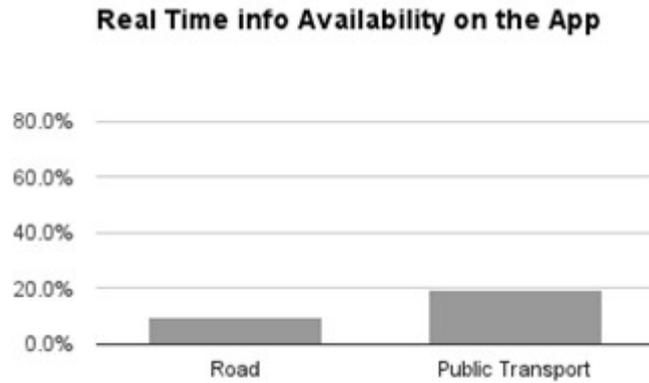


Figure 11. Real Time info available on the App

3.4.4 Weather

The weather conditions of the date of travel could also influence the transport mode chosen by passengers. For instance, during a rainy day, a passenger might want to avoid long walking distance to public transport stops and decide to take a taxi. Rain often increases levels of road congestion and some passenger might choose a rail alternative that is usually considered more reliable in these circumstances. Thus, weather information can be a useful piece of information to decide the best alternative of access to/from the airport. The chart below "Airports showing the weather on the App" shows that only 42% of airports provided this information. This percentage is considered to be very low, taking into account that airports could easily provide this information with some weather forecast provider.

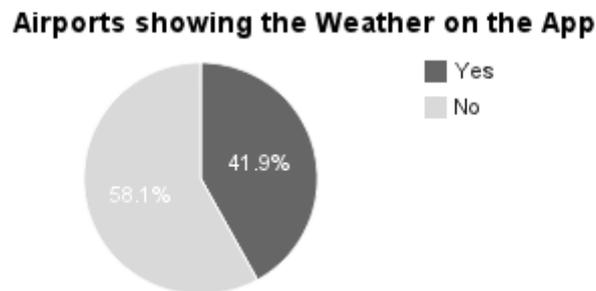


Figure 12. Airports showing the weather on the App

3.4.5 Maps

Maps can help passengers to orientate themselves at the airport as well as to situate the airport in relation to the city for those not familiar with the city. The chart below “maps included on the Apps” shows that most of the airports (90%) provided maps of the airport, but only 30% of airports provided maps to help passengers to locate the airport within the city.

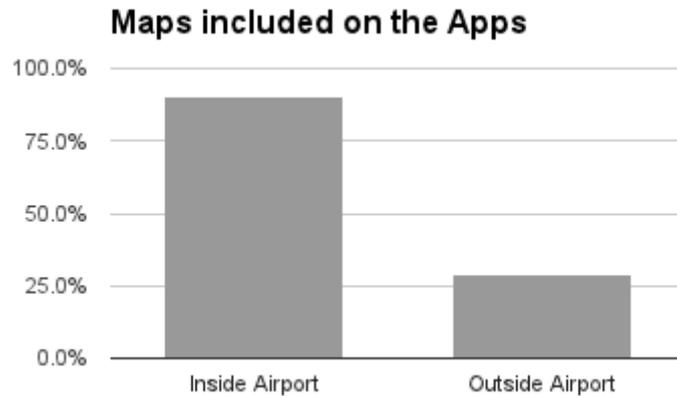


Figure 13. Airports including Maps on the App

4. Discussion

Airport worldwide are reacting to the quick adoption of Smartphones by air passengers with mobile websites and mobile Apps. The fastest adopter region is Europe where almost 90% of large airports provide mobile Apps.

After a close evaluation of 31 European airport Apps we have learned that Airports have been providing Apps during an average of 2.6 years for free, so the application itself is not taken as a source of revenue. Airports make it reasonably easy for passengers to download those applications as a large number provide a link on the airport website to facilitate the download of the App. English and the local language of the airport, when different than English, are almost always available on the Apps, however only 25% of airports provided other languages. Airports have taken seriously the quality of the Apps because they release on average more than 4 new versions of their Apps every year.

The Airport Surface Access information is always included in the airport Apps. The main transport modes or services included are: Parking, Public Transport, Taxi and Rent-a-car. Parking seems to be given more importance as it is normally shown on a dedicated section on the home screen of the Apps, compared for instance with Public transport which is normally

some clicks away from the home of the App. Overall, the airport access information is still mostly static information.

When evaluating the booking options related to airport access we see that almost only Parking can be booked directly from the Apps. So airports keep relying on parking fees as the main source of commercial revenue from the different airport surface access modes. Only few exceptions, such as Amsterdam Schiphol with the taxi or Vienna with the airport train, allow passengers to book directly from the App. The implementation of the booking to different transport modes from their Apps could facilitate the shift of more passengers to public transport. At the same time, airports could explore other sources of commercial revenues different from parking exploring some commercial agreements with the respective stakeholders and managers.

Other functionality that could help and empower passengers to decide on the airport access mode are: Travel Planner, Real Time info of traffic conditions and public transport, and Weather information. However, the evaluation carried out shows that there is still a very limited functionality provided by airports in this respect.

5. Conclusions

The generalization in the use of Smartphones by passengers and the provision of mobile applications by airports is a recent trend. The first smartphone (iPhone) was introduced by Apple in 2007. The first airport iPhone App, of the airports analyzed was provided by Aeroport de Paris in 2009. Every passenger is expected to travel with a smartphone very soon (78% in 2013) and a large number of airports provide mobile solutions for passengers (83% of large European airports provided mobile App in 2014). Thus, the provision of mobile services by airports, although a recent trend, can be expected to become soon a standard airport service.

This research founded that the airport surface access information is included in those Apps. However, to have the airport access information is not enough to contribute to find a solution to the airport surface access problems:

- To reduce the use of cars; and
- To generate commercial revenue from airport access, different than parking fees.

The reduction of congestion and pollution around airports could come by increasing the number of passengers using public transport. However, these airport Apps have a very limited focus on public transport in general don't allow passengers to plan and book their trips to/from the airport from their mobile devices.

Parking has a high priority on those Apps and has the main focus for commercial revenue from airport surface access. Airports have not implemented in those Apps other sources of commercial revenue while promoting public transport.

References

- ACI (2012). Commercial Revenues' Resilience Key to Airport Investment & Modernisation. Press Release, April 24.
- Aéroport de Paris (2013). *My Airport –Official Aéroports de Paris Service*. App Store. <https://itunes.apple.com/gb/app/my-airport-the-official-aeroports/id322543617?mt=8>. (Last access date: May 15th, 2014).
- Aéroport de Paris (2009). *My Airport –Official Aéroports de Paris Service*. App Store. <https://itunes.apple.com/gb/app/my-airport-the-official-aeroports/id322543617?mt=8> (Last access date: Sept 11th, 2014)
- Airbus (2013). Global Market Forecast 2013-2032. <http://www.airbus.com/company/market/forecast>. (Last access date: May 1st, 2014).
- Apple (2007). *Apple Reinvents the Phone with iPhone*. Apple Corporation. <https://www.apple.com/pr/library/2007/01/09Apple-Reinvents-the-Phone-with-iPhone.html>.
- Apple (2008). *iPhone 3G on Sale Tomorrow - Over 500 Native Applications for iPhone & iPod Touch Available at Launch*. <https://www.apple.com/pr/library/2008/07/10iPhone-3G-on-Sale-Tomorrow.html>
- Budd, T., Ison, S., & Ryley, T. (2011). Airport Surface Access Management: Issues and Policies. *Journal of Airport Management*, 6(1), 80-97.
- Budd, T., Ryley, T. & Ison, S. (2014). Airport Ground Access and Private Car Use: A Segmentation Analysis. *Journal of Transport Geography*, 36, 106-115. <http://dx.doi.org/10.1016/j.jtrangeo.2014.03.012>
- Coogan, M.A. (2008). *Ground Access to Major Airports by Public Transportation*. Transportation Research Board: Washington.
- Graham, A. (2009). How Important Are Commercial Revenues to Today's Airports?. *Journal of Air Transport Management*, 15(3), 106-111. <http://dx.doi.org/10.1016/j.jairtraman.2008.11.004>
- Heathrow Airport (2014). *Heathrow Airport Guide*. App Store. <https://itunes.apple.com/gb/app/heathrow-airport-guide/id427951859?mt=8>. (Last access date: May 25th, 2014).
- IDC (2014). *Smartphone OS Market Share*. www.idc.com. <http://www.idc.com/prodserv/smartphone-os-market-share.jsp>. (Last access date: July 5th, 2014).

- Marsden, G.R., Kamal, P., & Muir, H. (2006). *Kiss and Fly-a Study of the Impacts at a UK Regional Airport*. <http://eprints.whiterose.ac.uk/42630>. (Last access date: June 22th, 2014).
- Martín-Domingo, L. (2011). Airport Mobile Internet as an Indicator of Innovation. Available online in: <http://aeriport.mobi/academia>. (Last access date: May 18th, 2014).
- Miyoshi, Ch., & Keith J.M. (2013). The Damage Cost of Carbon Dioxide Emissions Produced by Passengers on Airport Surface Access: The Case of Manchester Airport. *Journal of Transport Geography*, 28(April), 137-43. <http://dx.doi.org/10.1016/j.jtrangeo.2012.12.003>
- Pérez, S. (2014). *iTunes App Store Now Has 1.2 Million Apps, Has Seen 75 Billion Downloads To Date*. TechCrunch. <http://techcrunch.com/2014/06/02/itunes-app-store-now-has-1-2-million-apps-has-seen-75-billion-downloads-to-date>. Last access date: June 7th, 2014).
- Ryley, T., Elmirghani, J., Budd, T., Miyoshi, Ch., Mason, K., Moxon, R., et al. (2013). Sustainable Development and Airport Surface Access: The Role of Technological Innovation and Behavioral Change. *Sustainability*, 5(4), 1617-1631. <http://dx.doi.org/10.3390/su5041617>
- Scolari, C.A., & Fernández-Cavia, J. (2014). Mobile Applications and Destination Branding in Spain. *International Journal of Interactive Mobile Technologies (IJIM)*, April. <http://online-journals.org/index.php/i-jim/article/view/3575>, (Last access date: June 5th, 2014).
- SITA (2014). *Passenger IT Trends Survey 2013* | SITA.aero. <http://www.sita.aero/surveys-reports/industry-surveys-reports/passenger-it-trends-survey-2013>. (Last access date: May 20th, 2014).