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Air Transport and Tourism Dynamics

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TECHNICAL INFORMATION

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FROM REGIONAL AIRPORT TO INTERNATIONAL FLIGHT DESTINATION: THE CASE OF AALBORG AIRPORT IN NORTHERN DENMARK

Gunvor Riber Larsen¹

Claus Lassen²

ABSTRACT

This paper explores how Northern Denmark is becoming an international flight destination through the strategic route development in Aalborg Airport and the integrated collaboration with regional tourism actors. Aalborg Airport is primarily a regional airport serving primarily the people living in the northern part of Denmark, but in the past decade the airport has experienced growth in the number of international arrivals. This paper explores who these international travellers are and why they fly to Northern Denmark. Both Aalborg Airport and Northern Denmark in general has an interest in increasing the number of international arrivals, and in the effort to attract more visitors, a better understanding of this group of travellers is necessary. This paper explains that a significant number of the foreign arrivals come to Northern Denmark to visit friends and relatives, and that the geographical reach of the airport is larger than expected. This finding challenges the current approach to regional development associated with the airport and this paper suggests two new focus points for the further strategic route development in Aalborg Airport: awareness of the geographical reach of the airport and incorporation of the knowledge that the international travellers are arriving in order to visit friends and relatives or to do business.

Keywords: Aeromobility, Tourism, Regional Airport, Airport Development.

JEL Classification: R11, Z32, Z38

1. INTRODUCTION

Over the past five to 10 years, Aalborg Airport in Northern Denmark has experienced an increased number of arrivals by international travellers who come to the region on either leisure or business travel. Traditionally, Aalborg Airport has been an airport from where the people that reside in Northern Denmark depart, and as such the airport has been a strong regional player in making Northern Danes aeromobile. Aalborg Airport was established in 1936, and has been operating from its current location since 1938 (Jensen, 2005). It is Denmark's third largest airport, after Copenhagen and Billund airports, and facilitates air travel for an increasing number of passengers: 1.5 million in 2016 (Danmarks Statistik, 2017). It hosts the largest domestic route in Denmark; each year the route transports more than 800.000 passengers between Aalborg and Copenhagen (Aalborg Airport, 2017a). This domestic traffic is the main activity in the airport, but in the last decade, the airport has supported an increasing number of international routes and charter traffic.

Historically, travellers from Northern Denmark have only been connected to international route networks through Copenhagen Airport, which limited their destination choices;

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therefore, over the last twenty years, it has been a focus point for Aalborg Airport to become connected through other international routes and route networks other than just the ones provided via Copenhagen Airport. The transformation process that began twenty years ago with a change of the airport ownership (from state ownership to ownership by local municipalities in Northern Denmark), the investment in a new large terminal and airport facilities, as well as the employment of a new airport CEO (who fundamentally changed the strategic role of the airport) has together resulted in the number of international routes from Aalborg Airport increasing by 93% from 2005 to 2016 (Aalborg Airport, 2017a). This new connectivity means that the region is now linked to other European hub airports, enabling travellers to use hubs other than just Copenhagen. This, in turn, gives the traveller access to other airline alliances, such as Sky Team in Amsterdam. In addition to this increased connectivity, point-to-point routes to a number of European cities, primarily driven by low-cost carriers, have also been established.

This internationalization of the route network has led to more and more international travellers arriving in Aalborg Airport. There are no statistics available on how many of these incoming international arrivals are not Danish residents, but the airport staff have reported observing a larger number of foreign passengers (Interview with Søren Svendsen, CEO Aalborg Airport). Incoming tourists and business passengers are a welcome group in the airport and the region. This is an important element of the regional growth strategy (Business Region North Denmark, 2015), and while Northern Denmark has a significant number of tourists and business travellers arriving by car and ferry, there is a potential for attracting more travellers arriving by air, as this remains a relatively unexplored channel within the region for both tourism and business tourism (Kellerman, 2010; Business Region North Denmark, 2015). However, there is very little knowledge in the region and at the airport regarding who the international tourists and businesses passengers are and how existing tourism and business strategies, policies, and organisational structures actually meet the demand of this new group. This should be considered in light of the changing role of the airport not only as 'just' serving the arrivals and departures of international passengers, but also acting to produce more international travel through the airport (see below). To explore this further, the airport teamed up with Aalborg University, regional tourism actors, Aalborg Municipality, and Region North Denmark in order to research the rationales and practices of these international travellers so that more strategic development efforts can be made to attract more people from this visitor group to the region. This research was conducted using both surveys and interviews, thus drawing on both quantitative and qualitative data (for a full account of the research project, see Jensen *et al.*, 2016). The first objective of this paper is to show who the international travellers arriving in Aalborg Airport are and explore their traveller profile. This aids in the fulfilment of the second objective of the paper, which is to discuss the implications this new knowledge about the international travellers has for existing regional strategies, policies, and organisational structures in the region in the light of the changed roles of airports in relation to regional development.

The rest of the paper is divided into three sections that also reflect the threefold aim of the paper. Firstly, the paper examines the historical, contextual, and changing role of Aalborg Airport, nested in the theoretical framework of 'aeromobilities in situ'. Secondly, the quantitative and qualitative analysis of the rationales and practices of the international travellers through Aalborg Airport is presented. Thirdly, the results are discussed and analysed in relation to existing regional tourism strategies, policies, and organisational structures. Finally, in conclusion, the more general research implications of the study presented in the paper are elaborated upon.

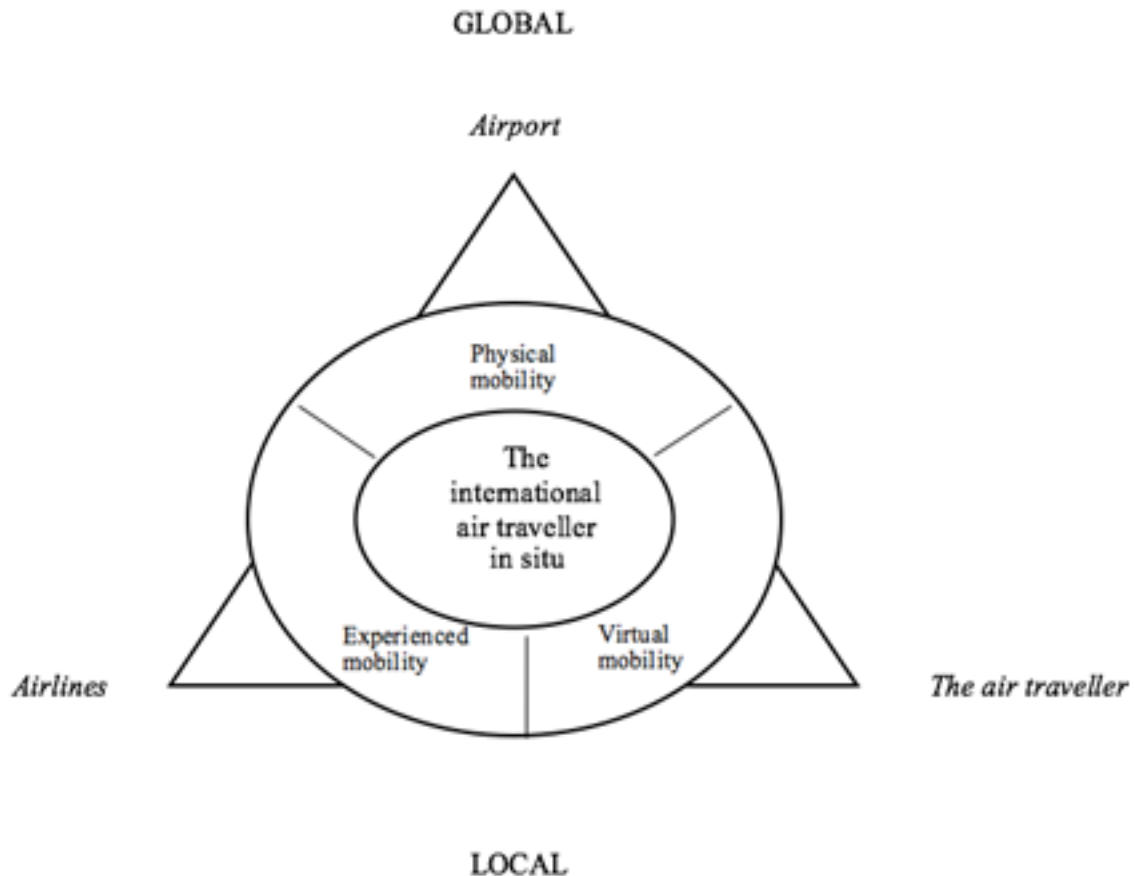
2. AEROMOBILITIES IN SITU

Theoretically, the foundation for the analysis of air travellers through Aalborg Airports as well as our understanding and way of exploring airports and aviation in this paper is captured in the term *aeromobilities* (see Lassen, 2006; Cwerner, 2009). Aeromobilities is an upcoming research field that is concerned with how aviation affects society and its development, within a multidisciplinary focus (Cwerner, 2009). Traditional research into aviation has been focused on a 'predict-and-provide' paradigm (Whitelegg, 1997: 88), where the prime goal has been to improve aviation technology and infrastructure in order to optimize on cost and time expenditure (Goetz, 2015: 363). The main focus has been on the relationship between airlines, airports, and the air travellers, which has been viewed as a closed system that does not have or receive much interference from the surrounding context (Bloch & Lassen, 2015). In contrast, the theme of aeromobilities research, instead of being regarded only as a simple air transport theme, indicates a need for bridging multiple scales connecting international air systems to particular local urban transformation processes and their consequences (Jensen & Lassen, 2011). Opposite the more conventional mono-professional and quantitative orientated 'predict and provide' (Whitelegg, 1997; Lassen, 2005) aviation research, the foundation for this aeromobilities research is also transdisciplinary with multiple focuses on aviation research and methods (Cwerner, 2009: 10-11).

Aeromobilities is a conceptual part of the recently emerged mobilities turn, which represents a shift in the understanding and analytical approach to contemporary society, where the main unit of analysis is no longer the society itself, but rather the mobilities that shape societies (Urry, 2000; 2007). The argument is that the contemporary society is increasingly constituted by the movements of people, goods, ideas, etc. (Lash & Urry, 1994). This makes mobilities one of the central sociological elements of development, and understanding societies and peoples' place in it requires understanding the actual, intended, experienced and virtual movements that binds the society together (Sheller & Urry, 2006). Within the framework of aeromobilities, the relations that exist between the technical elements of aviation and the societies that these aviation technologies exist and work within are explored, from a social science perspective, making the aeromobilities analysis one that 'must account for the complex interdependencies between different mobilities, networks, systems, institutions, risk, cultures and territories' (Cwerner, 2009: 4).

The exploration of who the international travellers arriving in Aalborg Airport are and what their rationales for traveling to Northern Denmark by air are, is therefore theoretically moored in the 'aeromobilities in-situ' model. This model is inspired by the 'mobilities in situ' model for understanding how and why mobilities are produced and performed as developed by Jensen (2013) but adapted to exploring the complex situation that is aeromobilities (See also Jensen & Lassen, 2011). Contrary to the conventional way of conducting aviation research, the aeromobilities concept draws the wider context for aviation into the research scope. The reason for this is that aviation plays an increasingly important role in society, generating economic activity and becoming a central element of the everyday lives of more and more people, whether directly through them flying more, or indirectly through the changes aviation makes for our consumption habits and our local and global environment (Cwerner, Kesselring & Urry, 2009). In order to fully understand aviation's impact, such factors need to be a part of the research, which is facilitated by the societal perspectives introduced by the aeromobilities research field. Obviously having a very broad scope for what can be viewed as important for an aeromobilities-focused research endeavour, theoretical frameworks offering a tighter view on aeromobilities is needed. For this specific research into who the international travellers arriving at Aalborg Airport are, the 'aeromobilities in situ' is used as a theoretical pin board.

Figure 1. The Aeromobilities in situ model



Source: Jensen *et al.* (2016)

The ‘aeromobilities in situ’, which is shown in Figure 1, strives to facilitate an understanding of how the international air traveller is ‘created’ in the field between physical, virtual, and experienced mobilities within the nexus of airports, airlines, and a series of relationally connected places, be they physical and/or virtual, on scales that reach from the local to the regional to the global.

Each of these units have a set of more specific focus points attached to them, that are to be explored empirically and analytically:

- *The air traveller*: socio-economic profile, preferences, rationales, and similarities and differences between various groups of travellers
- *The airport*: experience of the airport
- *The airlines*: which airlines do the international air travellers travel with on their journey to Northern Denmark
- *Physical mobilities*: the air journey and other transport and mobilities modes linked to the air journey
- *Virtual mobilities*: the use of virtual technologies as preparation for the journey, and as part of the journey
- *Experienced mobilities*: imaginations about places and experiences, and experiences as the air travellers passes on to others

This list of attributes is, of course, theoretical and as such not all of them are represented in the analysis presented below, as they do not possess the same relevance in relation to all specific cases of aeromobilities-in-situ.

2.1 The history, context and changing role of Aalborg Airport

As a contextualising starting point, we will look at the changing role of airports generally and in relation to this, the changing role of Aalborg Airport historically and contextually. Previously, airports were neutral state owned and/or regulated traffic hubs working as 'flow machines' (Fuller & Harley, 2004), where the focus was on safe and punctual transfer between two points, primarily 'managing the complex logistic service involved in the boarding and the de-boarding of people and objects' (Pascoe, 2001; Urry, 2009: 138). Today, an airport is, in addition to being a traffic hub, also a strategic focal point for societal development and business ventures; not only are airports responsible for handling air travel, but also in creating and developing it (Kesselring, 2006; Dobson, 2017). Airports and their associated route networks to other airports are thus stronger local and regional development drivers than they used to be. This change in the airport's role for the society and region it is placed within necessitates a new approach to how aviation is understood and analysed, and how it is placed in a broader development context. As Lassen, Smink, and Smidt-Jensen (2012) have shown, aeromobility is used as a core element in the development of new urban strategies of experience and transformation of urban spaces.

Navigating in this world 'on the move' (Cresswell, 2006) requires a range of different infrastructures. On a continental and global scale, airports are a central, albeit complex, piece of infrastructure of pivotal importance for producing and practicing aeromobilities. The airport is both a physical place with a massive material presence through terminals, runways, parking lots, service buildings etc., but it is also a node in a transportation network that connects land and air traffic. This makes the airport a place (rather than a non-place (Augé, 1995)) imbued with meaning, identity, and power (Cresswell, 2004), resting on top of the physical materialities that are visually perceptible by the traveller (Cwerner, Kesselring & Urry, 2009). Especially through the associated route network in an airport, it is clear that the airport is more than just a physical place and it is this route network that makes the airport an important driver for development in the region where it is located. As Cidell (2006) argues, airports are not just passive players of globalization processes and infrastructural extension. She shows that 'history, governance, airline service and the regional economic situation all play a role in mediating the effects of the processes of globalization on individual place, and in shaping those processes in turn' (Cidell, 2006: 651). Through the airport, the region acquires the status of a node in a network, where the region is connected to other places, and it is via such connections that regional development through business and leisure can progress. Airports have become 'interfaces' (Kesselring, 2006), linking the local and the global, and it is no longer meaningful to view an airport's interests as primarily linked to the local place in which it is situated.

Airports are no longer passive responders to air travel demand, but are themselves a central actor in creating the demand for air travel (see for example www.routesonline.com on the changing role of airports), and this is a reality that aeromobilities research needs to acknowledge

The change in the role of airports is highly visible at Aalborg Airport. The airport was established in 1936 at its present location as a simple airfield, but during World War II, the Germans converted the airport into a military aerodrome, 'Aalborg Fliegerhorst West', and extended the airport to 5000 barrels of land with the longest runway in Europe at the time. After the war, the airport was taken over by the Danish Government (Overgaard, 2013). In

the following years, the domestic route between Aalborg and Copenhagen, operated by SAS, was the primary activity for the airport. Aalborg Airport was a typical example of a state-owned airport that had a relatively passive approach when it came to route development and airport investments. During this period, the airport was considered a pure local airport which only served the inhabitants of Aalborg and the surrounding municipalities with domestic service and some charter flights (Overgaard, 2013) (see figure 2 for a geographical presentation of Aalborg Airport and the Region of Northern Denmark).

Figure 2. The geographical location of Aalborg Airport in the Region of Northern Denmark



Source: Map produced with data from SDF (2017)

However, in 1997 thirteen municipalities in Northern Denmark took over the ownership of the airport from the Danish Government. An important point to note is that the new municipal owners were not allowed to earn money from the airport, but were required to reinvest any profit to better airport facilities (Overgaard, 2013). This meant that the airport invested in a completely new airport terminal in 2001, which subsequently was expanded in 2007 and 2013. Further, the airport invested heavily in expanding free parking spaces, a new airport hotel, and starting in 2019, the airport will be linked to the national rail network via a new direct train to the airport. In addition, after the change in ownership, the airport also employed a new airport CEO who fundamentally changed the airport's strategy and role from a passive airport management strategy to an active route development

strategy (Overgaard, 2013). This can be seen, as one example, in the airport's far more active participation in the World Routes conferences and networks, as well as a much more pro-active route development approach which among other things this has meant that Norwegian Air Shuttle within 24 hours took over after the Cimber Sterling routes closed in 2012 (the former main *low-cost carrier* at the airport) when this airline went bankrupt. The CEO of Aalborg Airport explained the following about how he sees the changed role of the airport today:

“Our role is to create the best possible infrastructure in Northern Jutland. That is, in reality, the main thing (yes) but we have one leg out of the four we stand on, we say that we are holistic, so we don't just sit out here and say that now we want some airlines to come here. We are also looking for the tourist to come, that is also of value for our region. Well, one thing is to create good infrastructure out of the region, and possibly to some companies but, in reality, one of the things that we can make a living out of in the future here in Northern Jutland is [incoming] tourism... I view our role as the role of pushing these things [tourism initiatives and marketing] and we do it because of two things; we do it to benefit our own business, that is why we are here, but we also do it because the more development that comes to our region, the better it will be for everybody and that is the role we will have to play, this is where we can come into play. And instead of just looking into the airport, this has branched further out and we will all benefit from it” (Interview with Søren Svendsenn 2014, CEO Aalborg Airport).

The change in ownership, the new strategy, and ongoing investments in the airport are supported by the introduction of new international routes. In particular, the opening in 2011 of the route to Amsterdam operated by KLM/Air France has proven significant for the airport's international reach (Aalborg Airport, 2017a). There has also been an increase in international point-to-point routes mainly operated by low cost carriers and charter routes, especially those operated by Norwegian, Vueling, *Primera Air*, Ryanair as well as SAS from Aalborg to a number of European cities. This has greatly increased the international air accessibility of Northern Denmark. Thus, residents of Northern Denmark can smoothly travel to European hub airports, which is an obvious advantage. But getting to Northern Denmark has also become much easier as the route network increased significantly. This is especially true in relation to tourists and business travellers having easy access to Northern Denmark via the international route network in Aalborg Airport. This means that Aalborg Airport is in a situation where it is not just a passive player in relation to the flow of air travel through the region, it is also an active player in the creation of air travel to the region. However, the airport does not have much insight into the types of international travellers that are coming through the airport.

3. METHODS AND EMPIRICAL FOCUS

The analysis presented in this paper is based on data collected through a survey in Aalborg Airport and subsequent interviews with some of the survey participants. The survey in Aalborg Airport was conducted from June 30 to September 1, 2014. The survey was designed to provide general information about the travellers, and furthermore includes a string of questions that yield information about the travellers' rationales for their choice of Aalborg Airport and Northern Denmark as their destination. The survey also contains questions

that focus on the travellers' general attitude towards the activity of air travelling. The survey was answered by people residing outside of Denmark, who were approached by the research team as they were waiting for their departure flights after they had gone through the security check. In total, 478 travellers participated in the survey. Graphical visualisation has been applied to some of the quantitative data collected through the survey, resulting in the maps presented later in this paper.

Further, qualitative interviews were conducted with travellers strategically selected based upon their participation in the survey, in order to get more detailed information about their rationales and practices in relation to their travels to and around Northern Denmark after arriving through Aalborg Airport. These interviews were conducted via phone and Skype in the autumn of 2014, with five selected travellers. An interview was also conducted with Aalborg Airport CEO Søren Svendsen, focussing on the airport's experience with foreign arrivals. This research design generating both quantitative and qualitative data was deliberate and motivated by the fact that there didn't exist much scientific knowledge about the international travellers arriving in Aalborg Airport prior to this investigation. Therefore, data was required that would show both a broader statistical picture of the international travellers and data that would allow a more in-depth qualitative analysis of strategically selected travellers. The analysis of the survey data was statistical, and the interviews underwent a thematic content analysis based on the interview transcripts.

4. THE INTERNATIONAL AIR TRAVELLERS

The following section reports the main findings of the analyses of the international air travellers arriving in Aalborg Airport and beings to uncover their rationales for choosing Northern Denmark as a flight destination along with some of the mobilities practices they engage in while they are in the region.

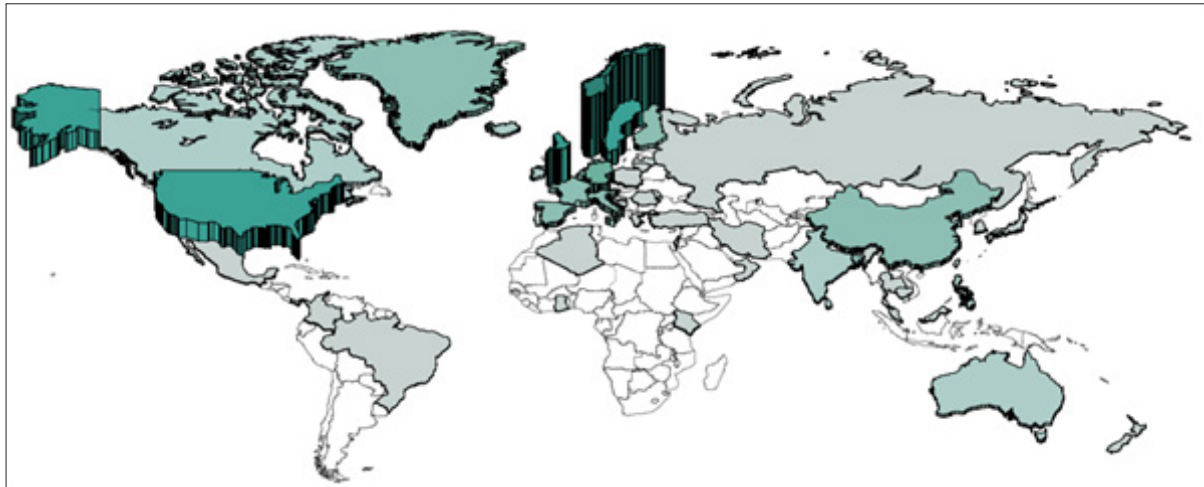
In terms of who the international travellers arriving in Aalborg Airport are, the survey showed that three categories of international travellers arrive in Aalborg Airport: leisure tourists (32%), people travelling to visit friends and relatives (VFR-tourists) (29%), and business travellers (24%), and another 15% giving the reason 'other' as purpose for their journey to Northern Denmark. In comparison to the global distribution of travel purpose provided by WTO, 53% of all international tourist arrivals stated leisure as their purpose, VFR tourism accounted for 27%, and business travel for 14% (UNWTO, 2016). The proportion of VFR tourism is roughly the same, while the amount of business travellers is 10 percentage points higher in Aalborg Airport.

4.1 Origin of the international air travellers

The international air travellers arrive from across the world, but primarily from Norway, the United Kingdom, the United States, Sweden, Faroe Islands, and Germany (see figure 3 and 4). The international travellers are mainly from Northern Europe, with the United States being the noticeable exception. At the time of the survey, Aalborg Airport was connected to the hub airports in Copenhagen and Amsterdam Schiphol, so these are obviously the two transfer airports used by the travellers. The survey shows that Copenhagen Airport is the main transfer airport for the travellers with just over 60% having travelled through there en route to Aalborg Airport, while some 10% came through Amsterdam Schiphol. A similar percentage distribution is seen in the answers to the question of which airline was used as carrier, with SAS (based in Copenhagen) transporting 60% of the travellers, and KLM (based in Amsterdam) transporting roughly 10%. Additionally, 20% of the travellers were serviced by Norwegian, which also has a route between Aalborg and Copenhagen, but has

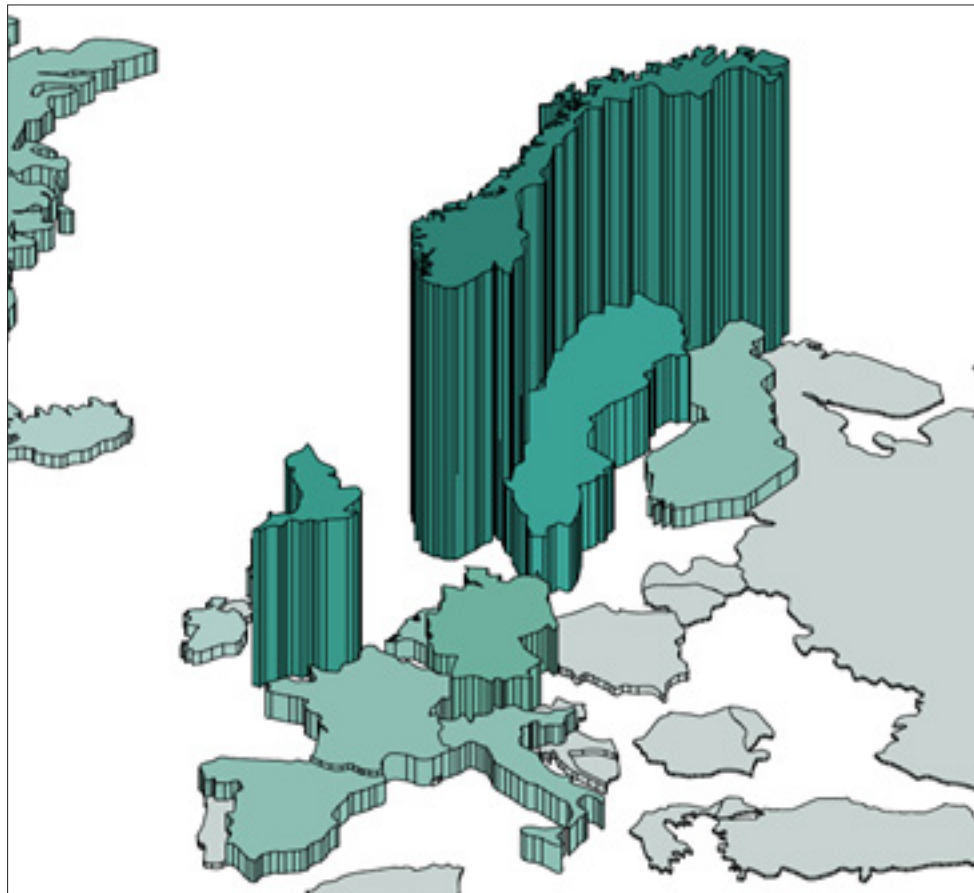
a point-to-point route to London. The top three international departure airports for the international travellers are Oslo, London, and Amsterdam.

Figure 3. Origin of the international air travellers in Aalborg Airport (N=478)



Source: Jensen *et al.* (2016)

Figure 4. Zoon-in on the origin of the international air travellers from Europe (N=478)



Source: Jensen *et al.* (2016)

4.2 While they are in Northern Denmark

Once they arrive in Aalborg Airport, the survey showed that their final destination was mainly Northern Denmark, but also that the rest of Denmark is attracting international travellers (see figure 5 and 6). The airport has a geographical reach beyond the regional borders, but as figure 5 shows, business travellers mainly stay in the region, indicating that when they choose to travel via Aalborg Airport, it is because they have business to conduct nearby. Most of the business travellers have their final destination in Aalborg Municipality, which is the economic centre of the region. A noticeable number also travel to Frederikshavn Municipality, where the main fisheries and off-shore industry is located, and the survey shows that these 'blue' and 'black' industries are in fact drawing a significant number of business travellers to the region. Of the main reasons given by the business travellers for their journey to Northern Denmark are these top five: meetings, visiting partners, daily work tasks, 'other', and conference/company visit with at least ten people. This emphasizes Urry's focus on the need for 'meetingness' as a strong driver for international business travel (Urry, 2007: 251).

Moreover, as the survey also shows, the need of just 'doing the job' in relation to various forms of work also seems to be a strong driver among some of the business travellers, exemplified by a male business traveller who installs GPS navigation equipment on ships, who views his journey as purely instrumental in terms of needing to be present where he needs to do his work. However, the interviews also illustrate, as many other studies have identified, how the boundaries between business and leisure tourism can be blurred (Lassen, 2006; Beaverstock, 2007; Kellerman, 2010). This can be identified in two ways. First, business integrating traditional touristic activities in-between work days:

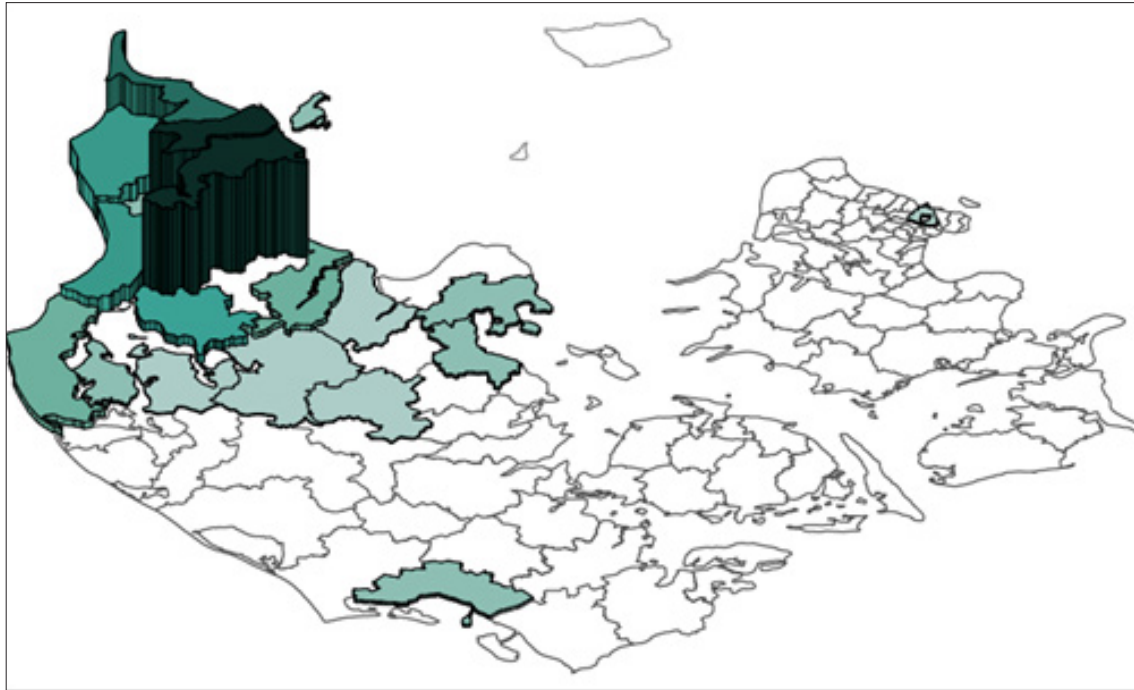
"We got the work done and it was done on time. The local area is a very nice area to stay there is a lot of amenities... swimming pool, tennis court, we can go to the cinema in Frederikshavn" (Interview with Scottish business traveller and fisherman getting his boat serviced at a yard in Skagen).

Second, the business journeys become in some cases the reason to go on a later holiday in the region:

"I think that it is the plan for next year. I will come over with the boat and they will fly over [his family] – they will maybe just stay for 2 or 3 weeks" (Interview with Scottish business traveller and fisherman getting his boat serviced at a yard in Skagen).

Generally, the examples above illustrate how business travel can be a hybrid journey (Unger, Uriely & Fuchs, 2016) involving many different elements. For some travellers whose main purpose is business, the journey only contains business activities, but for others, once the business part of the journey is over, they engage in leisure tourist activities as well.

Figure 5. Final destination of business travellers arriving in Aalborg Airport (N=478)



Source: Jensen *et al.* (2016)

The VFR travellers are a relatively overlooked group of travellers in the region compared to the historic focus tourism organizations have had on car-based cottage holidays. The leisure and VFR travellers have a slightly different geographical distribution than the business travellers (see figure 6), with Hjørring Municipality receiving the most of this group of guests, followed closely by Aalborg and Frederikshavn Municipalities. Hjørring Municipality is host to the most of the coast and sea tourism attractions in Northern Denmark, with Aalborg being the one (and in essence only) city destination. Skagen is also a popular tourism destination, which is located in Frederikshavn Municipality, and these three municipalities are the most populous, and thus also the most likely receiver of VFR-tourists.

A Danish emigrant to California exemplifies the region's overlooked VFR travellers. He tells how he combines three interests: music composers, genealogy, and family visits. He often travels around in the summer for one or two months to visit European cities with famous composers, and to visit historical archives in Northern Denmark to study his family roots and place history, and finally to visit his cousins living in the region:

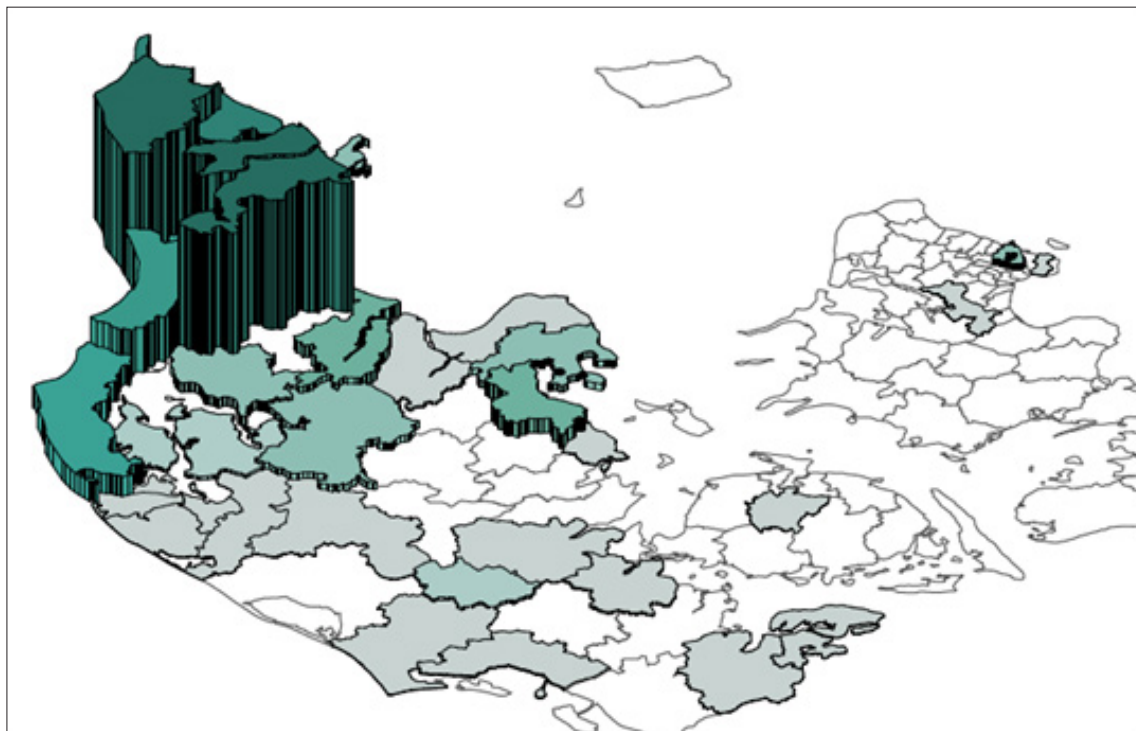
“It is something that I have done for years, because I have family in Himmerland [the southern part of Northern Denmark] so I visit them. Then I started looking into my family history in 2011, and then I combined that interest, which was completely new, with the old one, visiting family. So it became both. And then I have this third interest, to have a look around, get new experiences. But for Northern Denmark you can say that it starts with family. My mother was born in Himmerland, so we have routes there. It is always nice when my cousins say ‘when will you be back, will you be here this summer?... I am lucky that I have such nice cousins’ (Interview with Danish-American air traveller).

Another Danish emigrant, to Norway, also describes the journey to Denmark as a hybrid because the family gathers at her father's house and she then uses this as a base for summer holidays in Denmark:

“My oldest grandchild, her biggest dream was to have an entire summer holiday in her great grandfather’s house in Denmark. So it was actually her that gave us the idea, and we did it, and my cousin came back from USA. Everything fitted nicely” (Interview with Danish-Norwegian air traveller).

The family is thus gathered to visit the father and see each other in Denmark, but part of the time they also act as “traditional” tourists in the region. As Janta, Cohen and Williams (2014: 593) explain: “visiting friends and relatives combines the fulfilment of social obligations with opportunities for tourism activities”. Not surprisingly, the main “reason to go” for the VFR tourists is to visit friends and relatives (45%), but also for the group that characterizes themselves as leisure tourists this is the main reason for their journey to Northern Denmark (14%). The opportunity to spend time near beaches, the ocean, and lakes is the next highest stated reason to go for both leisure tourists (12%) and VFR tourists (9%). Below we will return to the question of the overlooked VFR tourists.

Figure 6. Final destination of tourists and VFR tourists arriving in Aalborg Airport (N=478)



Source: Jensen *et al.* (2016)

Although it represents a small part of both the tourist and business travellers, it is also important to note that, from the above maps, the spatial extent of international travellers is not exclusively linked to the region but extends beyond its borders. Airports do have fixed coordinates as Merriman (2007) has pointed out, but their vectoring ensures that it is hard to know where an airport ends and something else begins (Merriman, 2007: 109-110; see also Adey, 2011). This is a question we will also return to in the following discussion. In summary, two main points are to be drawn from the analyses of the survey and interviews with the international air travellers arriving in Aalborg Airport. First, the analysis shows that the passengers, once they have arrived, travel out into a geography that stretches beyond the regional borders of Northern Denmark. Aalborg Airport is a regional airport in the sense that it is owned by the regional municipalities, and that the policies and strategies related

to the airport's development are formed in a regional context, but this insight into the extra-regional travel practices of the passengers might call this regional development focus into question. Second, it must be noted that 53% of the international air travellers have either business or visits with friends and relatives as their main journey purpose and 'reason to go'. This again needs to be considered in relation to the region's desire to attract more air travellers within the context of the tourism offer the region provides and anticipates to provide for guests arriving by air.

5. DISCUSSION OF FUTURE REGIONAL TOURISM STRATEGIES AND POLICIES

The reason for exploring who the international travellers arriving in Aalborg Airport are is to strengthen Northern Denmark as an international flight destination. In order to achieve this, knowledge about who the travellers are, and why they travel to Northern Denmark is necessary as a foundation for further work by a range of regional actors. In parallel to the research project, whose findings are presented in this paper, Aalborg Airport took the initiative to set up an Airport Growth Committee. The purpose of this forum was to discuss the findings from this research and how they could be employed in the strategic route development at Aalborg Airport. The opening of new routes and collaboration with new airlines is a complex process, and direct impact of this research upon the Aalborg Airport route development is still to be seen. However, the research findings have been employed in relation to the establishment of an Incoming Bureau for Aalborg Airport and Northern Denmark. After the documentation of who the international air travellers arriving in Aalborg Airport are as provided by this research, this new knowledge was utilized by the airport to collaborate with the regional development organization Business Region North Denmark and the regional tourism marketing organization VisitNordjylland. Together they defined the scope for this Incoming Bureau and found the tourism partners that could take active part in the bureau's work. The main tasks for the Incoming Bureau is to make Northern Denmark more attractive and more accessible for international air tourists. The regional tourism agency Samson Travel has been chosen to conduct analysis of potential both in relation to attracting tourists and in relation to scoping the market for tourism products to offer the tourists (Business Region North Denmark, 2017; VisitNordjylland, 2017). One of the issues identified as part of this research in relation to attracting air tourists to Northern Denmark was that there was no clear product on offer for the tourists to buy. This issue is one of the focus points for the Incoming Bureau, who is now, in close collaboration with Aalborg Airport, working on a range of tourism offers that can be purchased by the air travellers to the region (Aalborg Airport, 2017b).

The two important insights from the research presented here, which have implications for how the future development of Northern Denmark as an international air destination is approached strategically, are: the knowledge that the geographical reach of Aalborg Airport stretches further than the administrative region of Northern Denmark, and the knowledge that a majority of the international air guests arrive in the region because they want to visit friends and relatives, or do business. The first insight calls for rethinking how regional tourism development strategies and policies are produced, and the second insight must point to relevant tourism products being developed and marketed to the potential air travellers.

Currently, tourism development is mainly hosted municipally and regionally, but such administrative borders are of little significance for tourists, who are probably not even aware of them. The research presented here suggests that Aalborg Airport is no longer just a regional airport for Northern Denmark, but has a reach that crosses into the mid-Danish

region. This should prompt further consideration of the tourism development strategies and policies linked to attracting travellers by air, as these should reflect the geographical extent of the airport. There are, of course, challenges related to this, one being the presence in the mid-Danish region of Aarhus Airport, which is trying to cement its position as the main airport in that region (without, unfortunately, much success), making the issue of regional air tourism development a political one as well as a practical one. Such cross-regional collaborations on tourism development are not a novelty in a Danish context though, with Vestkystpartnerskabet being an example of three administrative regions teaming up in order to develop west coast tourism strategically (KL, 2015). This approach to coastal tourism development could serve as an example for cross-regional air tourism development.

The new insight into who the international air travellers arriving in Northern Denmark are is relevant for the work being done by the newly established Incoming Bureau and Samson Travel in their efforts to produce relevant tourism offers for guests to Northern Denmark. Northern Denmark has traditionally received leisure tourists, arriving by car or ferry to spend a week or two in a summer house by the coast, but the air travellers seem to have a different profile: they are in the region to visit friends and family (but also going to the beach while they are in the region, like the leisure tourists), or they are in the region to do business. This 'reason-to-go' profile needs to be considered when developing the strategies for how to attract more travellers, as such travel purposes would require other supporting facilities, marketing approaches and collaborating partners than would an effort directed towards the traditional leisure tourists.

6. CONCLUSION

The transformation of Northern Denmark into an international flight destination is a result of deliberate action taken by a range of regional actors, where each party has contributed their expertise. Being an international flight destination is not a given and is not something that happens overnight. Northern Denmark has emerged in the cross field between the regional airport and international destination deliberately by developing their strategic route network to include flights to airports in Europe that serves as hubs for airlines that are members of two airline alliances (Star Alliance and Sky Team). Thereby Aalborg Airport is connected to the widest possible route networks with a significant international geographical reach. This development work is done in parallel with the regional university analysis of who the international travellers are that already arrive by air in the region in order to obtain more knowledge about reasons to go and what they seek and demand in terms of activities etc. while in the region. This knowledge has since been used by regional tourism development organisations and institutions in an effort to develop their tourism value chains for the purpose of offering a suitable product that might attract international air travellers. Two main points from this research still need to be addressed: the need for a cross-regional tourism development effort that will better mirror the current use of the airport by international air guests arriving in Aalborg Airport, and a stronger focus on attracting and servicing the specific profile of the tourists arriving by air, which is different than the tourists arriving by car and ferry.

The theoretical framework of aeromobilities in situ used in this research informs this analysis of the international air traveller profile by providing the context within which these travellers must be understood, outlining that their travel behaviour is a product of the interplay between their personal rationales, practices, and abilities and the airports and airlines that facilitate their journey. In this research, this theoretical framework has been used on the single case of Aalborg Airport, but, adhering to the words of Flyvbjerg (1991;

2006), the knowledge produced from a single case study can provide insights of significance for other cases.

6.1 Recommendations

So, what knowledge can be taken from the Aalborg Airport case and transferred to other similar regional contexts that wish to become international air destinations? The main recommendations from this research for actors wishing a regional airport to become an international destination are:

- The airport needs to acknowledge, and act upon, the changing role of airports in contemporary society and become a proactive player in the strategic route development to the region.
- Development of an international air destination requires combined and deliberate efforts from regional actors, who need to work together to produce and market relevant and sellable tourism products.
- A quantitative and qualitative profiling of the international travellers already arriving in the airport will give a better picture of the types of people the airport and the region have the potential to attract via the airport.

Looking ahead into the international air travellers at Aalborg Airport, it is highly relevant to maintain an empirical focus on Aalborg Airport development in the future. The effects of the newly started initiatives by the Incoming Bureau and Samson Travel need to be documented in order to identify any quantitative and qualitative changes to the passenger profile these initiatives might cause. On a strategic regional level, research is needed into the ways in which a more integrated approach to developing Northern Denmark as an international air destination can be established, as the current steps in that direction are incipient and hold potential.

Ultimately, a stronger connection between Aalborg Airport and international hub airports will be a benefit for the residents and businesses in the region, and thus a continued combined regional effort to maintain and develop the routes that link Northern Denmark to the rest of Europe and the world through as strategic a route network as possible must be a focus point for all relevant actors. The aeromobilities in situ model has helped establish which factors are relevant for uncovering the important elements in such a route connectivity, and Aalborg Airport and the North Danish region are showing how to engage practically with these factors in a strive to make Northern Denmark an international air destination.

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AIRPORT CONCESSIONS IN BRAZIL AND ITS INFLUENCES ON SERVICE QUALITY: THE CASES OF BRASÍLIA AND SÃO PAULO – GUARULHOS AIRPORTS

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ABSTRACT

Over the last decade, the Brazilian air market has tripled in size, a result of economic expansion and the spread of the air travel culture, among others. As far as airport infrastructures are concerned, during the mega-events era (2014 FIFA World Cup and the 2016 Summer Olympics), the airport management sector started to receive greater investments from private and foreign companies. After 2012, a large array of improvements took place, in order to meet the demands associated with the mega-events, but also to tackle the increase of domestic air traffic. In this context, this paper aims to identify, describe and analyze the influences of the airport concession in Brazil on the quality of services perceived by the users (passengers). For that, an analysis of the reports of the aviation authorities is carried out. The airports of Guarulhos (São Paulo) and Brasília (Federal District), among the first to be privatized, were selected as case studies. From this study, the mobility of global capital associated with airport management deserves to be highlighted, while the expertise of these large companies is expected to contribute to the increase in the quality of services in Brazilian airports - historically managed by public sector.

Keywords: Air Transport, Airports Concession, Quality of Services, Brazil.

JEL Classification: L93, L83

1. INTRODUCTION

Over the last decade, the Brazilian air sector has developed into a significant competitor in relation to the road transport, especially the transportation by bus. Economic expansion, the attraction of mega-events, such as the FIFA World Cup in 2014 and the Olympic and Paralympic Games in 2016, favored the dissemination of the travel culture throughout the country, with the air travel being essential for a territory of continental dimensions, such as Brazil.

The deregulation of the Brazilian air sector was driven by a flexible policy of the commercial aviation started in the 1990s, composed of at least three phases of liberalization (between 1992 and 1997, from 1998 to 2001 and from 2001 to 2003) (Ribeiro, Fraga & Santos, 2010).

The discussion on the transformations regarding airport management in Brazil - one of the largest aviation markets in the world - and its relations with the dynamics and organization

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of tourism in the country is essential for the advancement of knowledge in the air transport and tourism interface. Thus, the aim of this study is to identify, describe and analyze the influence of the concession of airports in Brazil on the quality of services perceived by passengers. The specific aims are: (a) to review the reports of the Civil Aviation Secretariat and the National Civil Aviation Agency and (b) to present, as case studies, the airports of Guarulhos (São Paulo) and Brasília (Federal District), among the first to be privatized in the country.

In terms of methodology, since 2013 the Civil Aviation Secretariat (SAC) has been carrying out the Permanent Passenger Satisfaction Survey (PPSP) ($n = 54,000$ / year) in 15 airports that account for 80% of passenger traffic in the country. This research serves to “monitor the operational performance of the terminals and the user’s perception about the service, as well as providing bases for the planning of public policies for the sector” (SAC, 2017).

Considering this survey, the airports of Brasília and São Paulo (Guarulhos) were chosen as they are two of the airports awarded in the first phase of the airport concession program (2012) and also both are included in a category of over 15 million passengers per year.

The survey considers 38 items, split into five categories: airport infrastructure, passenger facilities, airlines, public services and public transportation, as well as a general score for passengers’ satisfaction. In our study, we consider only the categories “airport infrastructure” and “passenger facilities”, as these illustrate the results of the concessionaire performance in airport management – other than “airlines”, “public services” and “public transport”, whose operation and supply, at first, do not depend on direct management of the concessionaires (Figure 1).

Figure 1. Passenger Perception Airport Indicators

AIRPORT INFRASTRUCTURE		PASSENGER FACILITIES		PUBLIC AGENCIES	
1	Easy boarding and disembarking at the curb	17	Quality of parking facilities	31	Emigration queue time
2	Queue time on security check	18	Availability of parking spaces	32	Emigration staff cordiality
3	Security check reliability	19	Parking cost-benefit	33	Immigration queue time
4	Cordiality / helpfulness of security check staff	20	Quantity / quality of snack bars / restaurants	34	Immigration staff cordiality
5	Airport signage quality	21	Snack bars / restaurants cost-benefit	35	Customs queue time
6	Availability and quality of flight info. displays	22	Availability and location of ATMs/Banks/Bureaux of Change	36	Customs staff cordiality
7	Availability of outlets	23	Quantity and quality of commercial establishments		
8	Internet / Wi-fi quality	24	Commercial products cost-benefit		
9	Toilets availability				
10	Toilets cleanliness				
11	Seats availability in the departure lounge				
12	Safety feeling in the public areas				
13	Airport cleanliness				
14	Airport thermal comfort				
15	Airport acoustic comfort				
16	Quality of info. of baggage reclaim carousel panels				
		AIRLINES		TRANSPORT	
		25	Check-in queue time (self service)	37	Public transport availability
		26	Check-in queue time (counter)		
		27	Cordiality and helpfulness of check-in staff		
		28	Airline information quality		
		29	Baggage reclaim speed		
		30	Baggage integrity		
				PASSENGER GENERAL SATISFACTION	

Source: Own Elaboration. Adapted from SAC (2017)

Since 2013, that survey has undergone methodological adjustments, for example, a question about availability of power plugs at airports was considered only since 2014. Thus, in this study, we chose to include items that had been included for more than one year in the survey scheme, in order to achieve a minimum of comparability between periods. The

data are provided in quarterly reports by the Secretariat of Civil Aviation. By convention, only the data for the last quarter of each year were considered and scores range from 1 to 5.

The paper is subdivided into three parts, the next section presents the literature review under two biases, the first on the quality of services, and the second on airport concessions. The other section then deals specifically with the cases. Thus, based on this study, the mobility of global capital associated with airport management must be highlighted, while it hopes that the expertise of these large companies will contribute to the increase of the quality of services provided at Brazilian airports - historically managed by public companies (such as Infraero⁴).

2. LITERATURE REVIEW

The relationship between transport and tourism is intrinsic, and air transport plays a key role in shortening distances, since it is possible to access virtually any point on the globe in a short space of time (Palhares, 2002). The services of both transport and tourism have very specific characteristics such as intangibility, perishability, inseparability and variability, and should be treated based on marketing mix strategies (Lohmann, Castro & Valente, 2013).

The need to differentiate service provision is fundamental in a globalized world in which air sector companies, such as airports, compete to attract passenger demand, whether tourists or not. The advancement of new information and communication technologies (NICTs) plays a strong role, since passengers can have real-time information that can influence decision making and the composition of services. One of the strategies of differentiation used by airports is branding, which is the creation of a distinct identity aiming to provide the clients with positive and unique experiences (Castro, 2015).

Table 1. Brief Literature Review on Airport Service Quality

Author (Year)	Geographical Area	Remarks
Bogicevic <i>et al.</i> (2013)	33 airports around the world	Evaluation of positive and negative points on airports made from reviews on websites, which highlights the importance of the relationship between real and virtual in the provision of services at airports.
Bezerra & Gomes (2016)	GRU Airport, São Paulo, Brazil	The authors developed a multidimensional model for measuring the quality of airport services.
Pantouvakis & Renzi (2016)	911 passengers of various nationalities boarding at Fiumicino Airport in Rome, Italy, were interviewed.	In this study, it was evident that the evaluation of the Italians about the perception of the quality of this airport was worse than that of the foreigner passengers.
Fernandes & Pacheco (2008)	6 Brazilian international airports (Belém/PA, Brasília/DF, Curitiba/PR, Fortaleza/CE, Porto Alegre/RS and Salvador/BA)	The study uses Fuzzy multi criteria methodology to analyze a complex set of variables related to the quality of airports.
Bogicevic <i>et al.</i> (2016)	United States of America	The authors state that pleasure and anxiety are achieved with satisfaction or dissatisfaction regarding the quality of airport services.

Source: Own Elaboration

⁴ Infraero is the acronym for the Brazilian Airport Infrastructure Company, a Brazilian government corporation founded in 1973 with the aim of managing the country's airports. Until 2011, Infraero managed 67 airports, concentrating approximately 97% of the country's regular air transport movement. Currently, after the concessions, the company is responsible for the management of 59 airports, as well as being a partner (with 49% participation) of the airports of Brasília, Guarulhos and Viracopos (in São Paulo), Confins (Belo Horizonte) and Galeão (Rio de Janeiro) (Infraero, 2017; Lohmann, Fraga & Castro, 2013).

It is known that travelers are becoming increasingly savvy and less loyal, which makes research on the quality of services essential for the air travel sector (Halpern & Graham, 2013). Thus, the objective of this part of this brief literature review was to identify studies on airport service quality, summarily presented on Table 1.

The perception of airport services is a complex process. Characteristics related to the design and the good smell of the place, for example, may positively influence the pleasure of travelers generating greater satisfaction with the airport. On the other hand, poor functional organization and inadequate temperature and lighting conditions are important factors for increasing travelers' anxiety, leading to a low satisfaction (Bogicevic *et al.*, 2016). In another study, it was possible to identify satisfactory (such as cleanliness and pleasant environment) and unsatisfactory examples (e.g. safety checks, confusing signaling, poor food supply) issued by users in the survey of airports in 33 countries. Thus, it is noticed that the management of the quality of services in the airports is a great challenge that demands a lot of research (Bogicevic *et al.*, 2013).

The study of Bezerra and Gomes (2016) is extremely relevant to the case studies presented here (see next section), since the validation of the method was carried out through the results of the Civil Aviation Secretariat (SAC) survey on Guarulhos Airport in São Paulo (Brazil). The results of this study suggest that a measurement structure should contemplate six factors when it comes to the quality of services perceived by the passengers (check-in; security; convenience; ambience; basic facilities; mobility). The authors emphasize that there may be a difference between the "weights" attributed to each factor whether they are domestic or international passengers.

In a previous study, Bezerra and Gomes (2015) addressed the need to consider passenger characteristics (such as the habits and frequency of air travel, among others), since these may be directly related to the perceived levels of service quality (Bezerra & Gomes, 2016). Thus, observing satisfaction survey data in a static, or non-contextual way, can contribute to inferences and misplaced conclusions of the reality. This is evident when it is considered, for example, the difference of nationalities. In a study regarding Fiumicino International Airport in Rome (Pantouvakis & Renzi, 2016), it was concluded that the Italians were more critical about the service quality than the foreign customers.

It is clear that the analysis of several dimensions and criteria are essential for the treatment of the service quality at airports (Fernandes & Pacheco, 2008; Bezerra & Gomes, 2016; among others). In general, airport concession/privatization processes are mostly justified by the need to increase the quality of airport services. Thus, analyzing the transformations in airport management and its relations with the dynamics and organization of tourism is an opportunity.

Graham (2011) identified in the literature the main purposes of airport privatization: "Improve efficiency/performance"; "Provide investment"; "State financial gains"; "Less state influence"; "Improve quality"; "Improved management/diversification". Indeed, the empirical analysis of several privatized airports (notably in Australia, the United States, Congo and India) highlights the importance of the "improve quality" factor (Burton, 2007, 2009; Assaf, 2010; Vasignand & Haririan, 2003, *apud* Graham, 2011). Hooper, Cain and White (2000) highlight the complexity involved in the privatization process in Australia, and this international experience can be useful to analyze the Brazilian scenario for post-privatization objectives.

Table 2 presents a brief review of the literature on airport concession/privatization.

Table 2. Brief Literature Review on Airport Concession

Context	Author (Year)	Geographical Area	Remarks
International	Graham (2011)	Not applicable	From the literature review the main objectives and results of airport privatization are identified.
	Hooper, Cain & White (2000)	Australia	Describes the sales processes and details about new owners, their commitments, and the regulatory system in the post-privatization period in Australia
	Lipovich (2008)	Argentina	It addresses the origin and the characteristics of the operationalization of the National System of Airports in Argentina.
	Park <i>et al.</i> (2011)	South Korea	The study identifies the possible effects of the planned privatization of Incheon International Airport (IIA).
National (Brazil)	Pereira Neto <i>et al.</i> (2016)	Brazil	It deals with the pro-competition rules in the concession of multiple airports for private companies, based on the recent Brazilian experience
	Oliveira, Lohmann & Costa (2016)	Brazil (2000- 2010)	The study addresses network concentration and airport congestion in the post-deregulation period.

Source: Own Elaboration

In Brazil, the study by Pereira Neto *et al.* (2016) addresses the recent national experience, highlighting not only the learning that Brazil had with the experience of Australia, but also with Mexico and the United Kingdom. Brazil seemingly learned from international experience when designing its own airport privatization program. It did not put “all eggs in one basket” as in the UK and tried to incorporate some of the sophistication in tariff regulation which was recommended in Mexico. In doing so, Brazil moved closer to the Australian experience, where potential competition between hubs was found to have positive impacts, even when their catchment areas were not coincident (Pereira Neto *et al.*, 2016).

One of the conclusions of Pereira Neto *et al.* (2016) is that governments should design regulatory decisions regarding competition between airports. Thus, it is no longer just a matter of competition between tourism destinations or between airlines, but also between airports, which makes quality issues (see Table 1) relevant to progress in service delivery, including services for tourism.

In a study in South Korea, regarding the possible effects of the privatization of Incheon Airport in Seoul (IIA), six different scenarios were analyzed by 47 experts: (1) The privatization of IIA will affect its future general aspects; (2) The privatization of IIA will affect its future ownership; (3) The privatization of IIA will affect its future airport strategy and plan; (4) The privatization of IIA will affect its future financial affairs; (5) The privatization of IIA will affect its future airport operation and approach facilities; (6) The privatization of IIA will affect its future airport fees. The panel ended up predicting that the privatization of this airport could be related to the weakening of the government control system and to the increased costs for airlines and passengers (Park *et al.*, 2011).

A South American reality, which also began in the 1990s, as in Brazil, is portrayed by Lipovich (2008) in the process of privatizing airports in Argentina. The main purpose in this case was to facilitate investments in the modernization of airports in order to meet its long-term needs. The author also highlights other Latin American countries that inspired the privatization process of airports in Argentina, such as Colombia, Mexico, Chile, Bolivia, Costa Rica, Peru, the Dominican Republic and Venezuela. The total of 33 airports were offered for concession in a period of 30 years, with the possibility of extension for another 10 years. The consortium Aeropuertos Argentina 2000 SA (Group consisting of Argentine capital - 34%, Italian - 33% and American - 33%) was the winner, taking out all the airports, which led to subsequent changes (in 2007) in the concession agreement (Lipovich, 2008).

Paiva (2015) made a specific study about the concession of Confins Airport in Belo Horizonte, Brazil, even though there are still few studies on this matter (Table 2). However, it is clear that the process of privatizing airports can directly interfere with flight operational issues. For example, episodes of delays and cancellations have decreased at privatized airports in Brazil (Oliveira, Lohmann & Costa, 2016). During the 2014 FIFA World Cup, where the Brazilian airport system was used by more than 16 million passengers in less than two months, only about 7% of flights were affected by delays (Oliveira, Lohmann & Costa, 2016).

The next section addresses a specific discussion about the concession of two Brazilian airports in the service quality perspectives.

3. AIRPORT CONCESSION IN BRAZIL: THE CASES OF BRASÍLIA AND SÃO PAULO-GUARULHOS AIRPORTS

Regarding the airports infrastructures, it was only during the so-called “mega-event era” that the airport management sector started to receive larger investments from private and foreign companies. After 2012, a great variety of improvements occurred aiming to meet the demands associated with the mega-events, but also to face the increase in domestic air traffic. In the first auction, the International Airport of São Gonçalo do Amarante was awarded in Natal (2012); In the second lot (July 2012), the auctions of Brasília airports, in the Federal District; Guarulhos, in São Paulo (São Paulo International Airport, the busiest airport in the country) and Viracopos, in Campinas, stood out. Finally, the third lot (May 2014) included Tom Jobim International Airports in the city of Rio de Janeiro and Tancredo Neves-Confins in Belo Horizonte, Minas Gerais (ANAC, 2015).

In March 2017, a fourth lot included the airports of Florianópolis in Santa Catarina, Porto Alegre in Rio Grande do Sul, Salvador in Bahia and Fortaleza in Ceará. The media also reported the possibility of a fifth lot, which could include Santos Dumont airport in the city of Rio de Janeiro, Recife in Pernambuco and Cuiabá in Mato Grosso, this time without Infraero’s participation, which will be different from previous lots (O Globo, 2017).

The aim of this section is to identify the influence of the airport concession in Brazil on the service quality perceived by the users (passengers), especially focusing on two airports that were some of the precursors of the concession process: GRU Airport in São Paulo (see sub-item 3.1) and Brasília Airport in the Federal District (see sub-item 3.2).

3.1 GRU Airport - São Paulo/Guarulhos International Airport

São Paulo / Guarulhos International Airport - Governador André Franco Montoro (GRU) was built on a site at the São Paulo Air Base, in the municipality of Guarulhos, Northeastern of the São Paulo Metropolitan Area. Until its opening (1985), the international traffic of passengers and cargo was handled by the Congonhas (in operation since 1930’s in the South Zone of São Paulo) and Viracopos (in the city of Campinas, 100 km from São Paulo) airports.

Since then, São Paulo-Guarulhos Airport has consolidated as the main hub of Brazil, as well as much of South America, making connections with the Northern Hemisphere (Europe, the United States and Canada) and some regions of Africa (such as Morocco, South Africa and Ethiopia) and the Middle East (Qatar and the United Arab Emirates). Currently, the airport’s three terminals handle more than 36 million annual passengers, accounting for 267,000 take-off and landing operations (GRU Airport, 2017).

The growth of domestic air flows, mainly after the partial liberalization of the Brazilian air sector (1990s), as well as the consolidation of São Paulo as one of the main global

metropolises, has generated greater pressure on the airports of São Paulo (Guarulhos and Congonhas, and, to a lesser extent, Viracopos-Campinas). This was one of the first airports to be included in the program of airport desestatization in Brazil, considering future demands for sport mega-events which would occur in the following years. Since July 2012, the airport is managed by São Paulo International Airport Concessionary – or simply *GRU Airport*, formed by Invepar and ACSA (Airports Company South Africa), in a concession granted for 20 years (GRU Airport, 2017).

Considering the period of analysis of this paper (2013-2016), São Paulo (Guarulhos) airport displays a set of indicators, in the category “Airport infrastructure”, with positive and increasing evaluations between 2013 and 2015. Nevertheless, at the end of 2016 the evaluation of practically all the items presented falls. There were no items in this category in which the airport scored a rate higher than the average of all airports evaluated (4.28), although its overall average increased - from 3.26 in 2013 to 4.35 in 2016. One of the few items that had the best score was the quality of the internet / Wi-Fi, but still the best grade is below 4.0 and this is the one indicated with worse evaluation in the overall picture of the category (Figure 2).

This drop in the indicators is intriguing given that a new international terminal (Terminal 3) is available since 2014, coinciding with the hosting of the FIFA World Cup. On the other hand, the operational and facility discrepancies between the other terminals – mainly Terminal 1 (which was installed in an old adapted cargo terminal) – probably explains the scores in the infrastructure items. By analysing the data, the biggest jump in positive evaluations took place between 2014 and 2015, a probable increase resulting of the improvements brought by the new terminal – a benefit delivered under GRU Airport administration.

Considering the category “Passenger Facilities”, in general, the assigned scores follow the parameters of the previous category: significant improvement between 2013 and 2015, but with decrease in the main items in 2016 – including the general average of the airport, although this score is higher than the average of other airports in the country (Figure 3).

The users’ evaluation regarding parking, one of the sensitive items of any Brazilian big airport, had a visible increase in both quality of the facilities (from 2.96 to 4.09) and the cost-benefit relation (from 1.67 to 3.29). Although the final score on cost-effectiveness remains low, it is important to note that this item presents a constant improvement. This could be explained by the start-up of a new multi-storey car park (in 2013, after only 7 months of construction), with capacity for approximately 2,600 spaces and well integrated with Terminal 3.

Another positive cost-benefit assessment refers to the prices of food and other products available at the airport. In a similar situation to the parking lot, although they are still low on the general average of the airport, there is a tendency to increase in this area - probably linked to the supply of cheaper food places (including a recent providing of snacks and drinks machines) and to the greater offer of businesses brought by the inauguration of Terminal 3 (where several chain stores were installed, with prices that tend to be standardized).

At large, if the general average of São Paulo Airport (Guarulhos) places it in a higher position than the average of other Brazilian airports, it is certainly not for an expressive contribution in the evaluated items in these two categories (“Airport infrastructure” and “Passenger Facilities”). The other categories – not focused on this study – can mean a greater participation in the general score. In this case, these items do not depend directly on the performance of the concessionaire – such as services provided by public agencies (immigration, customs, etc.) and airlines. Therefore, the trajectory of improving the quality of services may be more associated with the performance of other parties, than with the concessionaire (GRU Airport, 2017). However, it should not be overlooked that the

coordination of actions among various airport stakeholders is also a result of the airport concessionaire's performance.

3.2 Brasília International Airport

The history of Presidente Juscelino Kubistchek de Oliveira International Airport (BSB) is entangled with the construction of the city of Brasília itself, designed to be the new capital of the country. The project of the city, founded in 1961, had as one of its purpose to internalize the development of the country, concentrated until then on the Atlantic coast. The airport served as a reference for the connections between the Central Plateau and the various regions of the country, especially in view of the connections of the central public administration to the states and municipalities throughout the country (Silva, Sobrinho & Fortes, 2015; INFRAMERICA, 2017).

Brasília, currently with more than one million inhabitants, has become one of the most important metropolitan regions of the country, with a much more diversified and substantial demand for air travel than in the 1960s. In this context, the airport expanded its functions, becoming a major hub of domestic airlines (mostly for connecting the South and North-Northeast parts of the country), and started to count on more international routes (mainly from/to South and North America) (Silva, Sobrinho & Fortes, 2015) (ANNEXES Figure A and Figure B).

Among the 14 items evaluated in the "Airport Infrastructure" category, almost all of them improved between 2013 and 2016, resulting in scores above the airport average (4.44). Overall, there was a significant improvement in items related to procedures (queuing times and ways of providing services in the safety control or cleaning of toilets and the airport as a whole) or requiring specific physical interventions (departure/arrival panels, toilets and seats in the departure lounge). From the concessionaire's point of view, being able to structure and maintain good levels of user-friendly service (e.g. cleaning) is a strategy that certainly contributes to the overall airport assessment (ANNEX Figure C).

The availability of power plugs and the quality of Wi-Fi seem to be related to each other: being the aeromobility experience of contemporary passengers' dependent on their connections to remote spaces while on the move, the possibility of connecting via cell phones, tablets or computers must have an importance in the overall evaluation of the terminal.

In turn, three items remain with ratings far below the airport average (4.44) and the overall average for airports in the country (4.28): ease of boarding/disembarking at the curb, feeling of security in the public areas of the airport and acoustic comfort. These elements are related to the macrostructure of the terminal, indicating difficulties of adjustments by the concessionaire. Brasília Airport has been implemented under the principle of open and modernist constructions, since its conception has not been foreseen a controlled environment both in access to public areas and for air conditioning – exposing people, for example, to excessive noise coming from the airside for those who are in the food court. This may explain the fact that these elements remain relatively low, when the overall airport rating is continuously improving since certain interventions may imply more structural or budgetary restrictions.

In the category "Passenger Facilities", parking, food and shopping facilities and services are essentially evaluated. Like the previous category, all items showed improvements between 2013 and 2016, highlighting the availability of these services and structures, with scores close to the average of the airport and the overall of the evaluated airports. On the other hand, in the cost-benefit evaluation, the scores in 2016, although better than in 2013, are quite low: parking with 3.36, food and beverage options with 2.60 and commercial products with 2.26. This suggests limitation for improving non-aeronautical revenues,

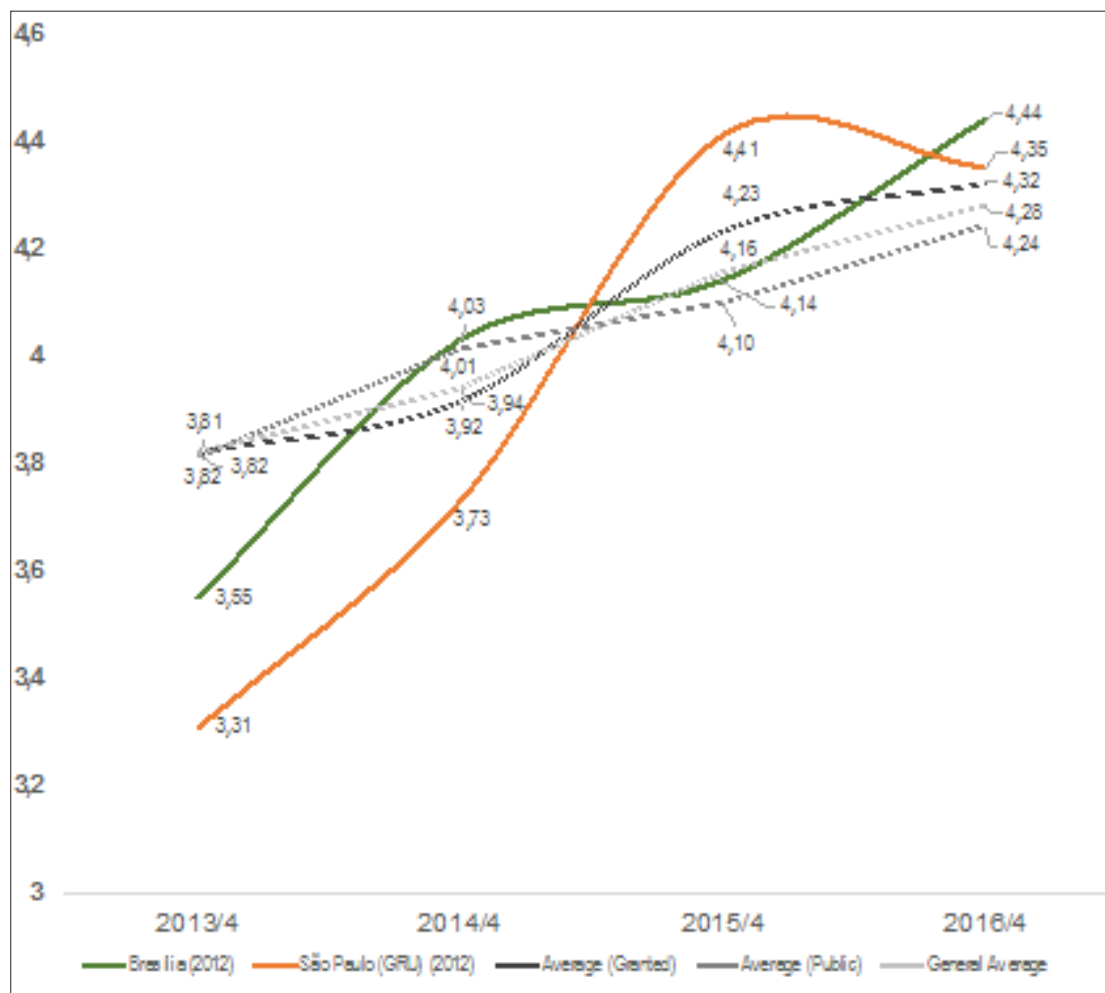
assuming that passengers understand that consuming at the terminals is not advantageous – despite evaluating how positive the quantity and quality of services (food services and other businesses) are (ANNEX Figure D).

This may also suggest some limits to the logic of integration of airport terminals with the tourist and commercial dynamics of the cities, since if even the cost-benefit ratio is perceived as disadvantageous, other publics (non-passenger) will probably have a similar perception. If, in general, Brazilian airports are poorly connected to cities by public transport, the need for access by individual transportation is almost a rule – which imposes another restriction, since, as seen, the cost-benefit ratio of parking lots was assigned bad scores.

3.3 An analysis of the quality of services provided at airports

There were small variations between the groups formed by airports granted to the private initiative (N = 6) and the others, which are still under the management of Infraero (N = 9), but all of them showed improvement in the period (2013-2016) (Figure 2).

Figure 2. Airport general scores – Brazil (2013-2016)



Source: Own elaboration with data provided by the Civil Aviation Secretariat

The airports surveyed had a lower than 4.0 rating at the end of 2013 (before the 2014 FIFA World Cup and the 2016 Olympics). By the end of 2016, all airports had scored higher than 4.0, with the airports awarded a higher average score (4.32) than the general average (4.28), while airports managed by Infraero scored slightly lower (4.24). In any case,

the data indicate a growth trend in all groups – although the country context has changed considerably since 2016.

Overall, this general improvement could be attributed to the measures and investments oriented towards the accomplishment of mega-events in Brazil, which, in part, has taken over the policy of airport concession since 2012. Thus, it is not possible, in a specific way, to assume that private investment alone has been responsible for improving the quality of services at the country's airports.

In turn, in line with the literature (Graham, 2011; Halpern & Graham, 2013), it is reasonable to admit that the improvements that are being implemented in private airports – including Brasília and São Paulo (Guarulhos) – tend to raise the level of quality of services, especially because the concession contracts depend on this variable for its continuity. As for public airports, after a long period of strong investments aimed at preparing the country for a set of mega-events, it is not possible to guarantee that quality levels will be maintained, considering a scenario of economic retraction and a public airport management system grounded in fragmented performance evaluation.

Indeed, since 2016, Brazil has experienced a very troubled political scenario, which, in the administrative field, indicates for policies with less participation of the State in various sectors of the economy. Thus, as the privatization program progresses, it is likely that more airports will be managed privately (as in the Porto Alegre, Florianópolis, Fortaleza and Salvador auctions in March 2017), pointing to a general improvement in the standard of services at Brazilian airports – judging by the performance of the current granted airports.

It is also necessary to consider in the analysis of future scenarios the instability of the concessions, which are going through a series of difficulties. On the one hand, consortiums consist of large Brazilian infrastructure companies, some of which are implicated in recent corruption schemes and are at risk of having their operations impacted (both regarding the credibility with shareholders, as well as loss of business and the obligation of paying significant fines).

On the other hand, the Brazilian economic situation suggests a less expressive demand than expected when granting many airports, frustrating revenues and jeopardizing the fulfilment of contracts. In the demand studies carried out for the concession, the forecast was that Viracopos would handle 17.9 million passengers in 2016 – however, the flow record was 9.3 million passengers (52% of predicted). Thus, recently, Concessionária Aeroportos Brasil Viracopos S.A. (ABV) announced that it intends to withdraw from the management of this airport, demanding that the Federal Government conduct a new bidding process, for example (Aeroportos Brasil, 2017).

When considering the airports of São Paulo (Guarulhos) and Brasília, in this context, one can see that both have indicators of quality of services well below the averages for public airports, airports granted or even the global overall average at the end of 2013. However, by 2015, these airports have higher-than-average ratings, remaining in place until 2016 – despite the visible drop in São Paulo (Guarulhos) in 2016.

The average scores of Brasília (4.44) and São Paulo (Guarulhos) (4.35) – both granted at the beginning of the airport privatization process in Brazil and in the midst of a large increase in air travel demand in the country – display scores closer to the average of the airports granted (4.32) than to the public airports (4.28) or even the global average (4.24). This suggests that the privatization of airports has a role in improving the quality of services, particularly in those that depend directly on the performance of the enterprises in charge of the concession.

4. CONCLUSION

Although in Brazil the airport concession is a recent phenomenon, two aspects deserve to be highlighted: first, the attention in the follow-up of the transformations from the perspective of the user, focusing on systematically evaluating the quality of services since the concessions started in 2012 and, secondly, the evolution perceived by the users of the airports granted, indicating that, in the cases studied, the concession process contributed – directly or indirectly – to the evolution of the quality of services provided in such terminal.

However, further studies – with more data and new information crossings, such as passenger characteristics, for example, as highlighted by Bezerra and Gomes (2015) – are needed. Other qualitative approaches would also contribute to understanding subtle aspects of airport experience. As Bogicevic *et al.* (2016) and Bogicevic *et al.* (2013) stated, specific elements (temperature, odors, ambience, and many others), when considered in its global presence, comes to influence the users' experience in a given terminal. These aspects could be assessed by alternative methods, including the large array of mobile methods (Urry, Büscher & Witchger, 2015), not without disregarding the importance of the remarkable use of new technologies of information and communication not only by passengers, but also as a tool for researchers and airport administrators.

From this study, the mobility of global capital associated with airport management deserves to be further observed, in the expectation to assess if the expertise of large companies (with remarkable background on airport management) will contribute to the increase in the quality of services provided at Brazilian airports. A closer analysis on privatized airports in “emerging countries” – for instance, South Africa and Argentina – should be a constant strategy, since these contexts impose different political, economic and institutional pitfalls compared to those where such international airport companies emerged.

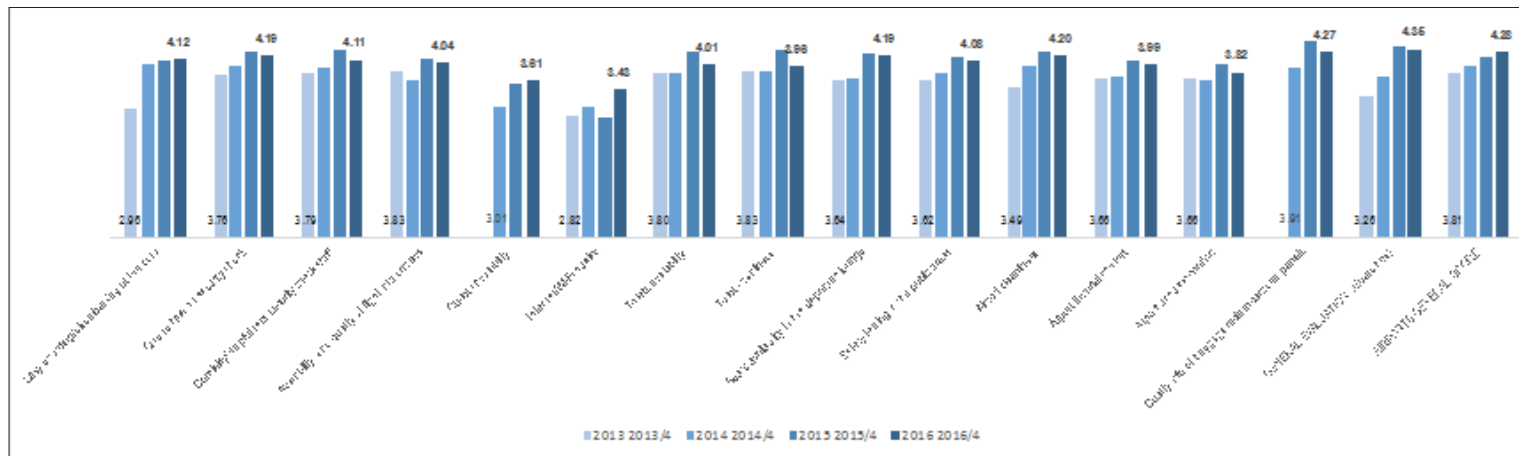
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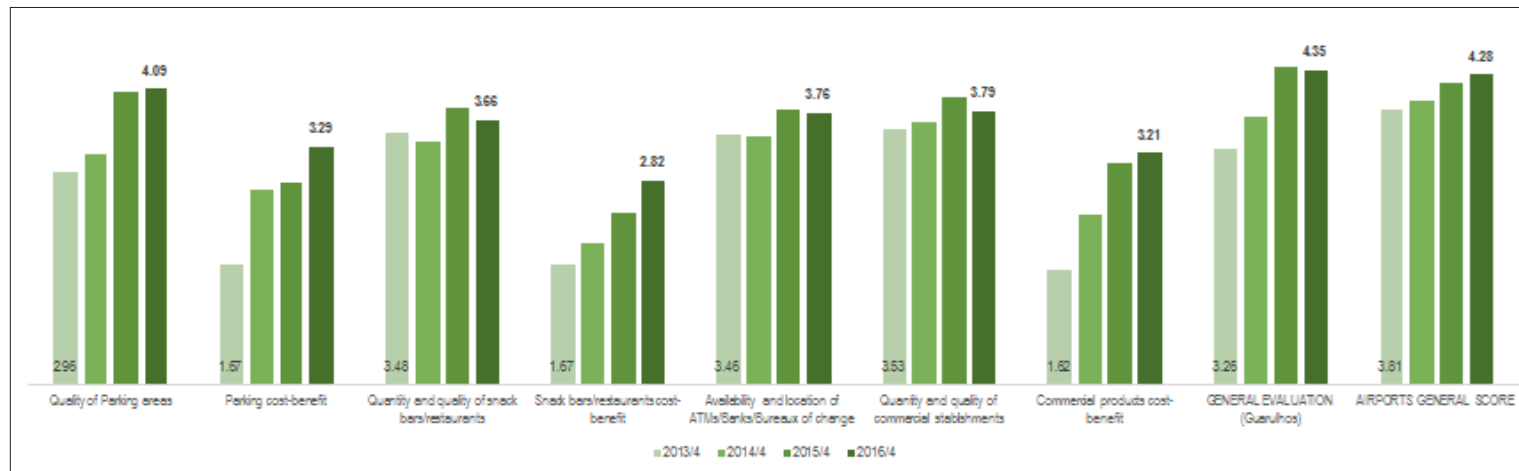
ANNEXES

Figure A. Service Quality Indicators (Airport Infrastructure) - São Paulo (Guarulhos), 2013-2016



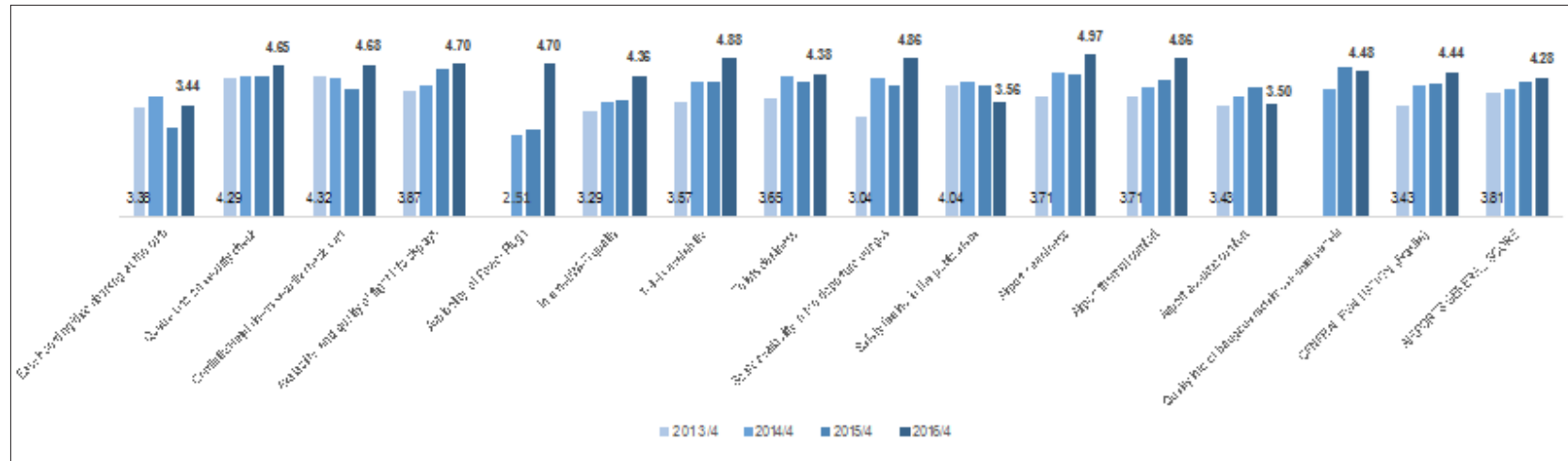
Source: Own elaboration with data provided by the Civil Aviation Secretariat (2013, 2014, 2015, 2016)

Figure B. Service Quality Indicators (Passenger Facilities) - São Paulo (Guarulhos), 2013-2016



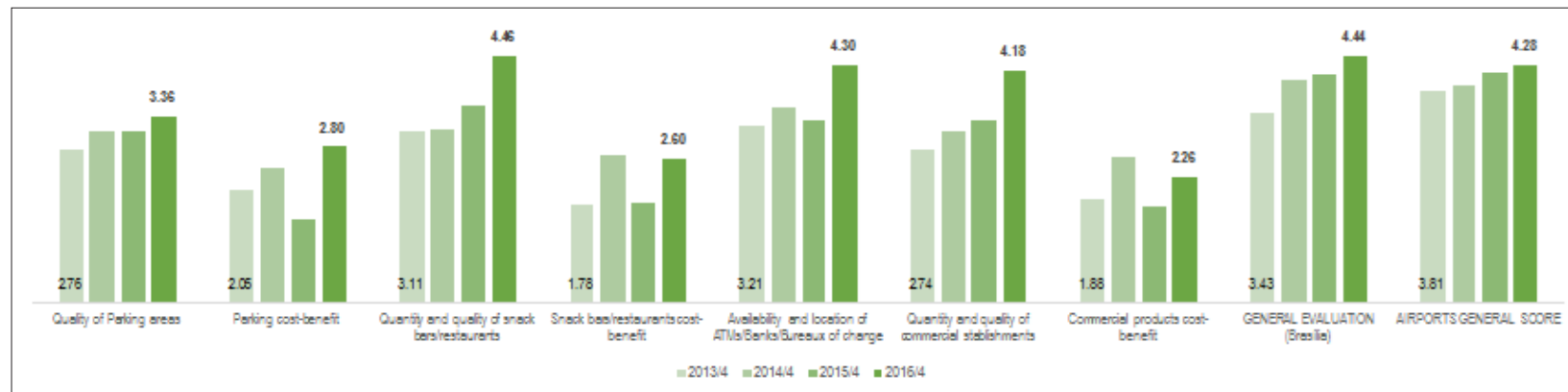
Source: Own elaboration with data provided by the Civil Aviation Secretariat (2013, 2014, 2015, 2016)

Figure C. Service Quality Indicators (Airport Infrastructure) – Brasília, 2013-2016



Source: Own elaboration with data provided by the Civil Aviation Secretariat (2013, 2014, 2015, 2016)

Figure D. Service Quality Indicators (Passenger Facilities) – Brasília, 2013-2016



Source: Own elaboration with data provided by the Civil Aviation Secretariat (2013, 2014, 2015, 2016)

ESTABLISHING A PRIORITY HIERARCHICAL FOR REGIONAL AIRPORT INFRASTRUCTURE INVESTMENTS ACCORDING TO TOURISM DEVELOPMENT CRITERIA: A BRAZILIAN CASE STUDY

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ABSTRACT

The Brazilian government stepped up investments in works related to improving access to cities, when it was announced as the venue for the 2014 Football World Cup. The difficulties observed to guide these investments were to select regional airports of greater relevance for the tourism sector. Given the unavailability of data that could serve this purpose, the present study sought to define, from secondary and qualitative information extracted from government documents, five indicators to allow a priority hierarchical. The methodology applied the hierarchical analysis method (AHP) and standardization procedures, resulting in the selection of five airports in the North region, four airports in the Southeast, South and Northeast regions, and one in the Center-West region of Brazil. The main advantage of the methodology was the significant reduction of cost and time in the decision-making process. An important conclusion was the understanding of tourism as an option for regional economic diversification.

Keywords: Regional Airport, Analytic Hierarchical Process (AHP), Tourism, Development.

JEL Classification: O180, R4, R580

1. INTRODUCTION

The significant increase in domestic and international demand for air transport services has been an outstanding issue over the last ten years. Deregulation of services planning and air fares and increased concern for time-saving have produced controversial effects such as the concentration of services offers in airports with greater demand and more operational infrastructure. The effects stemming from the deregulation model, which has already been applied in many countries, have to some extent stimulated competition on the most profitable routes and in some cases fares have come down. Another consequence, however, has been that some countries have had to subsidize less profitable routes or routes of interest to their governments.

The reason for government interventions like those in Canada (Metrass-Mendes, Neufville & Costa, 2011) and the United States of America (Grubestic & Matisziw, 2011) has been to foster accessibility of isolated regions and promote national integration. Considering that Brazil has also deregulated fares and the services offer, and that the routes are increasingly concentrated in certain cities, it is now necessary to implement measures to ensure access to

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civil aviation for places that government considers to be essential (Queiroz, 2014). However, there are few tools available to support decision-making processes and the definition of priority locations for investment and, furthermore, government administrators are not very familiar with the tourism sector's nuances or its indicators.

Against that background this study set out to address a demand of the Brazilian government which, starting in 2007, intensified its investments in access infrastructure for tourism destinations. In that year the International Football Federation announced that Brazil would be hosting the 2014 World Cup, a mega sports event that aroused great expectations of investment and foreign currency gains for the country. After the announcement, government began to invest more financial resources in actions designed to improve regional airports.

It must be underscored that air transport affects and contributes to development in Brazil just as it does in the world at large (Prideaux, 2000; Kunz, 2013; Silva, 2014). Transport, in its aspect as a driver of development, when associated to tourism activities boosts the effective achievement of planning goals and objectives (Silva, Sobrinho & Fortes, 2015; Gazoni, Silva & Fortes, 2017). In that case, airport infrastructure is seen as an important mediating element of the transformation of tourism regions.

To invest in regional airports it was necessary to select, from a list of 174, those that met the criterion of "greater importance" for the tourism sector. Roughly speaking, the government needed to establish a methodology for determining a priority hierarchical for investments in regional airports, considering tourism-related indicators. That methodology also needed to consider airport planning in the face of overall demands from society, bearing in mind the role transport plays in social and economic development. Thus, the overriding objective of this study was to develop an indicator for the hierarchical classification of regional airports in order of priority for investment in infrastructure and capacity expansion, based on tourism development criteria.

In the tourism programs, plans and policies that Brazil Ministry of Tourism elaborated in the periods 2004 to 2012 (MTur, 2007; 2009a; 2009b), the criterion for defining the tourism destinations was their capacity to induce regional development among the municipalities that were part of the tourism itineraries. That included improvements in conditions of accessibility to transport infrastructure and services (Silva, 2014). Accordingly, those documents have been taken as references for identifying and defining indicators capable of representing the relation between airports and tourism for the purposes of this study.

The methodology was developed by means of a cooperation agreement involving the Ministry of Tourism, the Brazilian Association of Regional Air Transport Companies/ Associação Brasileira das Empresas de Transporte Aéreo Regional - ABETAR, the University of Brasília (UnB) and the Technological Institute of the Airforce (Instituto Tecnológico de Aeronáutica - ITA), who took responsibility for the conception of a hierarchical for investments in regional airports considering economic criteria and the aspect of airport infrastructure.

This article presents a methodology for establishing a hierarchical classification of regional airports according to tourism interests and it is divided in six sections, namely: the introduction, followed by a contextualization of the importance of regional airports, especially those in regions with great tourism potential. The third section describes the methodology that the study developed and applied. The fourth section describes the study method. The actual application and the analysis of the results are described in the fifth section and that is followed by the final remarks, concluding the article.

2. AIPORTS IN THE REGIONAL TOURISM CONTEXT

2.1. Regional concept and hierarchical – theoretical discussion

According to Pires (2004) the analytical approach to regional territories is quite different from that to national ones. In the regions there are few barriers to the circulation and migration of goods, services and capital. However, that greater mobility of resources among regions may mean that a given area exercises considerable influence over the others in terms of attracting production resources or dominating markets. That may be because it is allocated more financial resources, has more material resources, has a bigger consumer market or a more specialized work force or other factors.

Schumpeter and Perroux's (1935) were critical of the Euclidean spatial approach and, instead, viewed the region as being a set of abstract relations, not directly related to geographic location but represented by their typical economic vectors and delimited as the field that encompasses the activities of its institutions or public bodies. Another concept of region that Pires (2004) indicates is based on the hypothesis of the Central Place Theory originally elaborated by Walter Christaller (Eaton & Lipsey, 1982), whereby regions naturally tend to organize themselves according to the principle of centrality. That means it should be feasible to establish a hierarchical of various regions according to their position in a network of economic interdependencies involving various other places.

Using Christaller and Perroux's (Schumpeter & Perroux, 1935; Eaton & Lipsey, 1982) theoretical models, it is possible to determine a region's degree of centrality and its interconnecting functional network based on: the populations served by the less central nuclei; the proportions of residents and non-residents and their production; and, consequently, how they are positioned and articulated in a functional manner. The third concept of a region is that of a homogeneous space in which, by using one or more pertinent indicators, a relation of identity can be established among areas whose parameters are similar but at the same time distinct from those of other regions.

Thus, based on the capacity of each nucleus to provide a central offer of goods and services, it is possible to establish a hierarchical among the places; the characteristics of the goods and services offered by each location can be used to position them in comparison to the others. The goods and services concentration is not determined by geographic factors alone. Far more important than the geographic distances involved are the economic distances separating the centers. These are represented by the respective costs of freight, packaging and storage and, in the case of services, by the costs associated to transportation, trip time and the quality standards involved in transporting passengers.

The traditional localization and regional growth theories are insufficient to explain the development of a given region but they can be reinforced by adding the concept elaborated by Douglas North (Oliveira, Nóbrega & Medeiros, 2013). He reverses the direction of determination whereby, classically, reduced transport costs lead to a concentration of the activity. He shows how some regional pioneers, as in the case of the United States of America and Canada, have achieved their development by specializing in certain exportable products and diversifying their export portfolios. The concept that is worth underscoring here is that of an exportation base, because it fosters a redefinition of the 'region' concept. It aggregates areas that have the same export base, articulating them in an interdependent development to address the external economies that condition them.

It is understood that the exportation base will also generate multiplying effects and stimulate increased investment, not only in exportation activities but also in other economic activities in the region. Another important inference based on this approach is that the growth in regional income will increase the savings rate of the local population and make

other kinds of activity feasible, initially directed at satisfying local demands but eventually tending to enter external markets as well, thereby expanding the region's exports as a whole.

One of the fundamental elements determining regional development is the existence of a demand for its goods on the part of other regions or countries. Furthermore, according to Lemos (1993) and Silva (2006), regionalization is also marked by heterogeneous social and economic factors in a given locality and by the economic domination of one place over the others. That definition presupposes a characterization of the regions' production processes or specializations. In the case of tourism flows, it refers to differentiation of the places according to their greater or lesser attractiveness for tourists and their capacity to attract investors. These would be places with possibilities for intervention and super-structural modifications such as providing or enhancing airport infrastructure.

2.2. Regional airports and tourism

Regional airports are notable elements of transport infrastructure in general not just because of the size of their installations but also because of the pressure they exert in their areas of implantation with their demand for urban services and infrastructure. That naturally leads to new growth in other directions or consolidates existent growth tendencies (Kawamoto, 1994; Linhares, 2012).

Prideaux (2000) states that in tourism regions transport drives: technological development, infrastructure and services availability; higher quality and efficiency of transport systems and the integration of the local networks to regional, national and international ones. In that sense, the national integration fostered by regional aviation stimulates the community's economic development, enhances accessibility, induces and expands business and trade relations and boosts tourism and leisure activities (McKinsey & Company, 2010; EMBRAER, 2012). Such airports are visibly associated to greater interaction among regions and the maturing and development of tourism destinations (Portugal & Torres, 2012; Lohmann, Fraga & Castro, 2013).

In their aspect as gateways for the entry of passenger flows, especially visitors, regional airports have a preponderant influence on regional economic development, especially tourism. The operational characteristics attributed to these airports, especially their spatial dimension, centrality and intermediation role in the air transport network, enhances operational efficiency within the overall transport system (Lohmann & Pearce, 2012; Lohmann, Fraga & Castro, 2013). That is because regional airports establish equilibrium between demand and supply in the airlines network helping to meet the needs for the circulation of goods, merchandise and people.

Prideaux (2000) studied the impact of transport on tourism regions and showed how transport infrastructure influences the volumes of passengers by attracting different tourism flows motivated by the ease of access associated to land or air transport provision. In turn, Silva (2014), analyzing a case study conducted in Brazil, corroborated Prideaux's findings. He singled out those elements of transport and tourism systems whose combination expresses the relations of complementarity between tourism destinations and transport provision in fostering regional development.

Both studies delineate the explicit relations between transport and regional development and further contribute by defining the explanatory elements of the object of analysis. In the view of Gazoni, Silva and Fortes (2017), the various aspects of transport systems related to the tourism demand are highly correlated within the respective territory. Actually, tourism activity expansion occurs concomitantly with the formation of a more complex and hierarchic transport network. Transport to meet tourism needs depends on the viability and power of attraction of the destination and the destination, in turn, depends on transport

to provide tourists with access. In short, transport is constituted as a structure that drives tourism development.

2.3. Airports in regional tourism development in Brazil

In Brazil, the importance of airports in regional development was formally tested by Gazoni, Silva and Fortes (2017) using simple linear regression in a principle component analysis. It was found that a 100% increase in airport capacity generates an 18.4% increase in the number of tourists. That number lies in a range of 95% reliability from 14.9% to 21.8%. Increases in the service offer at more well-structured gateways to tourism destinations have a greater influence on the activities of regional services than others precisely because they amplify tourism production and dynamics.

Those results corroborate the conclusions of other studies conducted in Brazil (Kunz, 2013; Silva, Sobrinho & Fortes, 2015) which reported that the air transport network configuration influences the volume and direction of tourism flows and, consequently, the territorial dynamics involved. It must be remembered that the flows presume the existence of networks articulated in central and auxiliary nodes. That being so, the passenger (tourist) air transport network becomes an instrument of transformation insofar as it has a strong influence on the regions, including those with a vocation for tourism.

Regional airports meet the specific demand associated to tourism but also the demands of other economic activities and to do so they need to be fitted with the elements of supply, namely, terminals and operational roads and equipment. In the sphere of Brazil's Regional Aviation Development Plan (Brazil, 2014) they are defined as all those airports that do not serve the great metropolitan regions, state capitals or the Federal District. The Brazilian National Development Bank (BNDES, 2001) defines regional air transport as that which meets the needs of locations with low to medium traffic potential. Thus regions where such airports are located are considered to be those determined on the basis of physical and economic criteria and by attempts made to create homogeneity among places they embrace. They are sometimes also characterized by social-environmental, economic, cultural and political relations (Beni & Cury, 2012) and above all by the discontinuity of structures, so that transport infrastructure is what ensures the circulation of goods, merchandise and people.

In Brazil, geo-economic regionalization and de-concentration processes began in the 1970s, reinforcing the national urban network, making its integration more complex and engendering new forms of articulation among its spatial structures. Production integration and functional articulation processes among the regions and/or urban centers took the form of two distinct but complementary movements. There was also an amplification and diversification of the functions performed by the urban centers, making their activities more complex while, on the other, there were increasing demands for integration and articulation among them. The two movements presented themselves simultaneously as a reflection of, and a support for the de-concentration of economic activities and diffusion of development to the interior. However, it was development with a pattern of urbanization that had previously been restricted to the great national urban centers.

The Institute of Applied Economic Research/Instituto de Pesquisa Econômica Aplicada – IPEA (2001) reported that in recent years there has been increased population growth in areas that were once peripheral in national economic terms (North and Northeast macro-regions) and in the medium-sized urban centers. That has led to a spreading out of urbanization, especially towards the west of the country – a phenomenon completely different from the previous tendency for urbanization to only occur in the country's coastlands. Furthermore, various other urban agglomerations have formed and amplified their role in the cities

network, making the configuration of the Brazilian urban network all the more complex and poorly integrated by the transport networks.

Nevertheless, up until recently in Brazil there has been no evidence of any guiding standard in regard to airport infrastructure planning to address the increased demand associated to the new national dynamics. The growth of the Brazilian economy in the period from 1990 to 2000 and the increase in average income created favorable conditions for the expansion of the market but the expansion of infrastructure in terms of handling aircraft and passengers has been widely identified as entirely insufficient (Palhares & Espírito Santo Jr., 2001; Salgado, 2009; Jesus Jr. & Ferreira Jr., 2010).

The Brazilian Aeronautical Corporation (EMBRAER, 2012) predicted that within 20 years (2012 to 2031) the Brazilian domestic demand for aviation services, especially regional ones, would expand significantly. That was due to the mega-events that were to be held in Brazil starting in 2014 (Football Confederations Cup, Football World Cup, Olympic Games and Para-Olympic Games), to the expansion of the middle class (54% of the population) and also due to the precarious terrestrial transport conditions at the time. The ANAC (National Civil Aviation Agency/Agência Nacional da Aviação Civil – ANAC, 2017) statistical yearbook for 2007 reported 59,675,248 passengers transported by airlines of whom 47,366,034 were on domestic flights and 12,309,214 on international flights. In the first half of 2017, the air transport sector in Brazil carried 109,609,463 passengers of whom 88,677,618 were on domestic flights and 20,931,845 on international flights. That represents an overall increase in passenger demand for the period of 87.7% (87.2% in internal demand and 70% in external demand).

Lastly, it is important to realize the important role played by regional airports in developing regions with a vocation for tourism. Their influence has a considerable outreach and the more they incorporate available techniques and technology and effectively engage in the air transport network associated to tourism, the more they tend to occupy the top echelons in the hierarchical. That network is undergoing a globalization process insofar as it articulates regional, national, international and global air transport networks (Kunz, 2013). Regional airports also influence institutions and entrepreneurs' decisions regarding where to invest, production decisions and goods, merchandise and services flows. That means airport infrastructure plays an outstanding role in the economy and that government can stimulate its performance by implanting public policies embodying measures to that end.

3. ANALYTIC HIERARCHICAL PROCESS AND INDICATORS TO DETERMINE REGIONAL AIRPORT HIERARCHIES

3.1 Analytic Hierarchical Process

The main feature of Multi Criteria Decision-Making (MCDM) methods is their flexibility because they permit strong iteration of the model to be constructed together with the decision-makers and their perceptions of the set of problems being studied. The participation of all decision-makers in constructing the model is of fundamental importance to ensure in-depth discussion and generate better understanding of the decision context (Pereira, 2001). The MCDM premise is that there should be: (a) consensus regarding the fact that any decision-making process needs to satisfy multiple criteria; and (b) consensus regarding the fact that the quest is for a solution that best addresses the needs of the “decider” in the context of the decision” (Dutra *et al.*, 2007).

The Analytic Hierarchical Process – AHP (Saaty, 1991) is a multi-criteria method that has proved to be most appropriate for establishing investment priority hierarchies among regional airports because the respective decisions involve aspects of a socio-economic,

environmental and political nature. Various transport studies (Gartner, Rocha & Granemann, 2012; Cruvinel & Fortes, 2015) have underscored the suitability and assertiveness of AHP as it permits the analysis of complex and sometimes even qualitative indicators.

In that light, the method was selected for this study because it propitiates the generation of indicator weightings in decision-making to address the problem and the incorporation of qualitative considerations to the quantitative perspective. Its application is associated to solving problems of practical interest as it simultaneously analyzes various criteria in interactions among various elements, thereby providing a more global vision. According to Saaty (1991) the method has four advantages:

- a. The hierarchic representation of a system can be used to describe how changes in priority ratings among the higher levels affect the lower levels;
- b. Hierarchically structured natural systems develop more efficiently than those structured in other ways;
- c. Hierarchies provide detailed information on a system's structure and functions in its lower levels thereby providing an overall vision of the actors in the higher levels and their purposes; and
- d. The hierarchical model is stable and flexible; stable because slight modifications only bring about slight effects and flexible because eventual additions to a well-structured hierarchical do not upset its performance.

The weight factor attributed to an indicator by a group of experts provides an expression of its relative importance in a multiple criteria decision-making process. It makes it possible to take social, cultural and other non-economic aspects into consideration and incorporate them to the hierarchic classification process.

After comparing AHP to other multiple criteria methods to support decision-making, namely: Fuzzy Decision Approach – FDA; Measuring Attractiveness by a Categorical Based Evaluation Technique -MACBETH); Technique for Order Preference by Similarity to Ideal Solution - TOPSIS; and Analytic Network Process - ANP, Salomon, Montevechi and Pamplona (1999) reported good results for AHP and recommended it. They corroborated Cruvinel and Fortes (2015) conclusions but with the proviso that there should be no more than nine alternatives and all alternatives and decision-making criteria should be totally independent. Gartner, Rocha and Granemann (2012), however, identified limitations inherent to the use of AHP because of the considerable degree of subjectivity incorporated to the model. Those limitations could be overcome by the additional use of other multiple criteria methods.

3.2. Indicators

In the wake of the popularization of planning in various public and private contexts, in different strategic, tactical and operational decision-making spheres and the emergence of information management seeking to generate necessary information for those who need it when they need it, the use of the term 'indicator' has become widespread. The Organization for Economic Co-operation and Development (OECD, 2009) define indexes and indicators in this specific context as qualitative or quantitative measurements derived from a set of observed facts that are capable of revealing the relative positions of the regional airports in a given area. When assessment is made periodically, the indicator can identify the direction of changes in different units over the course of time. That being so, the indicator is any *datum* that signals something important about a broader system.

Indicators are concise, easy to interpret, representative parameters used to illustrate the main characteristics of a given object of analysis (Cities Environment Reports on the Internet - CEROI, 2004). In another version, indicators are socially endowed with additional meaning to that stemming from their own scientific configuration; they synthetically mirror social concern and insert it coherently into the decision-making process (MMA-Spain *apud* Royuela, 2001).

Royuela (2001) states that an indicator's functions are to: (i) provide information on the problem in hand; (ii) subsidize the development of policies and the establishment of priorities by identifying key factors; (iii) contribute to enabling the accompaniment of given actions, especially integration actions; and (iv) perform as a tool for the diffusion of information at all levels. An index is expressed in real numbers and is derived from a set of components that make up the indicators by a method that may involve aggregation or, more simply, indexes are a set of aggregated parameters or indicators (Saisana & Tarantola, 2002; OECD, 2003; OECD, 2007; Grupp & Schubert, 2010).

A hierarchy is established by attributing a value and consequently a weighting to indicators that have been identified and grouped by affinities in distinct sets and according to their mutual influences and, consequently, they make it possible to: i) define discussed and accepted criteria through the process of constructing a consensus among the main stakeholders; ii) reduce monitoring process costs; iii) automate the process, given its predictability and the scope of the data and the gathering procedures; and iv) reapply the experience obtained in the process of standardizing procedures and equipment.

To sum up, indicators condense information and make it possible to address complex problems by simplifying them. They also serve to diffuse information. The purpose of establishing a methodology is to create an index and rationalize the classification of regional airports, thereby helping to establish priorities for allocating public investments as well as establishing their relation with the regional tourism development process. Consequently, the method that was defined and is presented in the next section investigates the Brazilian federal tourism plans, programs and policies and regional tourism's structuring parameters, thereby making it possible to define the indicators and the criteria to be used for classification, and, following that, the establishment of a hierarchy of the airports.

4. METHODOLOGY

Based on the plans and programs formulated by the Brazilian Ministry of Tourism in the period 2004 to 2012, this study selected five indicators to establish a hierarchy of regional airports according to their priority for airport infrastructure investments in the tourism development. These indicators were: Tourism Region, Tourism Inducing Destination, Host for 2014 World Cup Games, Client Choice Destination and Tourist Attraction Potential. The main reason for choosing these indicators was there were no readily available disaggregated quantitative data for tourism that could satisfy the demands of the study objectives.

Given the subjectivity inherent to the qualitative registrations considered as references to elaborate the indicators, each indicator was weighted and combined according to the Analytic Hierarchical Process (Saaty, 1991). This procedure obtained the following results: it generated a homogeneous indicator; it established a hierarchy between airports; it defined an index representing their investment priority. The Geographic Information System (GIS) techniques generated thematic maps, representing regional airports according to the selected indicators.

4.1 Hierarchical Index

Based on the bibliographic references and on empirical studies, the six activities of methodology used to develop indicators that could represent tourism regions sufficiently significant to justify the existence and allocation of investments in airport infrastructure were:

1. Definition of the tourism region: it is to define the conceptual approach for the tourism region and influence of the airports on this approach and to select the public policy guidelines for the development of these regions;
2. Selection of indicators: this step defines the criteria for the selection of the indicators that resulted in the hierarchical index. This index informs the potential of each airport to generate changes in the dynamics of the tourist flows in its region;
3. Validation of indicators: selected indicators are evaluated and validated by experts in transportation and tourism. These experts should also validate the established metrics for the indicators;
4. Simulation of indicators: this step evaluates the selected indicators and their conformity with the methodological options of standardization and aggregation;
5. Normalization of the indicators: this normalization is performed for comparison and susceptibility of indicators to aggregation. The evaluation of each locality through the selected indicators should be performed considering intervals (for example, scale from 0 to 4) according to each of the characteristics;
6. Analysis of results: this step generates the Hierarchical Index and it also identifies and corrects any flaws and distortions found in the results of the indicators.

The selected indicators are showed in Table 1 below. The Hierarchical Index (CI) is obtained by adding together the values of the indicators shown in Table 1 and is expressed by equation:

$$CI = RT + DI + SEDE + DECA + PAR$$

Table 1. Indicators to establish a hierarchical among airports according to their importance for tourism

Description	Metrics and Weights
Tourism Region (RT) - Obtained from the Brazilian Ministry of Tourism's definition and classification of the country's 276 Tourism Regions (MTur, 2009b). Indicates whether or not a city Belongs to a tourism region.	<p>4 – Yes 0 – No</p> <p>If a given destination does not belong to any of the classified tourism regions what is its distance from the main city of the nearest tourism region in Km?</p> <p>4 – to 100</p> <p>3 – from 101 to 200</p> <p>2 – from 201 to 300</p> <p>1 – from 301 to 400</p> <p>0 – more than 401</p>

Description	Metrics and Weights
Tourism Inducing Destination (DI) - This indicator was used to orientate the National Tourism Plan for the period 2007-2010 (MTur, 2007). The MTur, using its own specific methodology, defined 65 destinations with international quality standards which were tourism municipalities and their associated regions and considered to be priorities for technical and financial investments on the part of the Ministry. Those municipalities were endowed with strong tourism propensity for their economic development and were viewed in the light of a system of articulations and partnership arrangements with other ministries, state and municipal public bodies and private institutions. According to the MTur (2009b) the purpose of that National Plan was to identify and select municipalities capable of inducing regional development among the municipalities that integrate tourism routes.	If the destination is at a distance from the Priority Inductive Destination of the Federal Government in Km? 4 – to 100 3 – from 101 to 200 2 – from 201 to 300 1 – from 301 to 400 0 – more than 401
City hosting mega-events in the period 2013 to 2016 (SEDE) - The “SEDE” indicator is related to the cities that would be hosting mega-events in the period from 2013 to 2014. Although it did not specifically derive from an MTur study it was decided to include the Mega-event indicator associated to the 12 cities involved because it represented the kind of event that stimulates regional development, especially tourism, leisure and sport, on a grand scale, leveraging various investments.	0 – Yes 4 – No If the destination is not hosting a mega event, how far is it from the nearest host city in km? 4 – more than 401 3 – from 301 to 400 2 – from 201 to 300 1 – from 101 to 200 0 – to 100
Destination Chosen by the Client (DECA) - DECA was obtained from a poll conducted by the Vox Populi Institute contracted by the Ministry of Tourism to investigate Brazilians' tourism consumption habits (MTur, 2009a). The qualitative survey interviewed a sample of 2,322 persons between the dates of 17/06 and 07/07/2009, targeting Brazilian tourists over 18 belonging to the social classes A, B, C or D and with the following profiles: present day clients, that is tourists that had purchased tourism services in package deals or in part during the preceding two-year period, and potential clients who were consumers that could possibly purchase tourism services or products in packages or in parts in the next two years. The indicator in question took into account the places visited by the person being interviewed in the preceding two years. The information was elicited by asking the question “The last time you travelled in Brazil, which state did you go to?”	What is the percentage of interest among present day clients in the micro-region where the destination is? 4 – over 10% 3 – from 7.1% to 9.9% 2 – from 4% to 7% 1 – from 1.1% to 3.9% 0 – less than 1%
Regional Power of Attraction (PAR) - The PAR is an indicator of the power to attract (local, regional, national or international) tourist flows according to the classification released by Embratur since 1990 (as explained in Section 4.2).	What is the degree of power to attract (local, regional, national or international) tourist flows? 4 – Varies from 3.26-4.00 3 – Varies from 2.51-3.25 2 – Varies from 1.76-2.50 1 – Varies from 1.00-1.75

Source: Own Elaboration

4.2 Classification and Hierarchic Position

The AHP method was used to analyze, evaluate and classify the RT, DI, SEDE, DECA and PAR indicators, determining the value and consequently the weightings, grouped in distinct sets with influence over one another, and done in such a way as to make comparisons among peers feasible. Five tourism and transport experts attributed weightings from 0 to 4 to each indicator. The experts selected all held a Masters degree or a Ph.D. in the fields of either tourism or transportation and had with renowned experience in their respective areas. They

were the means of attributing relative importance to the indicators in the ambit of a multi-criteria decision-making process.

For classification purposes, the experts considered the fundamental criteria for the regional development of tourism such: as what were the preponderant tourism segments; the incorporation of the population to the tourism activities; the importance of tourism in the economies of the respective municipalities; and the existing set of natural and cultural attractions. Table 1 above shows the metrics attributed to the indicators and the respective weightings used in the classification process.

To classify the RT, DI, SEDE and DECA indicators associated to the spatial and policy data it was decided to use an ordinal metric scale from 0 to 4. The hierarchic classification of the indicators is cited below. In that way the 174 airports were classified in a hierarchical order.

- Hierarchic level 0: unimportant;
- Hierarchic level 1: slightly important;
- Hierarchic level 2: essentially or important;
- Hierarchic level 3: of well-proven importance;
- Hierarchic level 4: very important.

In the PAR analysis of the power to attract (local, regional, national and international) tourism, the classification adopted and disseminated by the EMBRATUR ever since 1990 was used:

- Hierarchic level 4 (Variation from 3.26 to 4.00): corresponds to tourism regions of exceptional value and great significance for the international tourism market being capable, on their own, of motivating important potential or actual flows of visitors, both national and international;
- Hierarchic level 3 (Variation from 2.51-3.25): applicable to very important tourism regions, in national terms, capable of motivating, on their own or together with other tourist attractions, important potential or actual flows of visitors, both national and international;
- Hierarchic level 2 (Variation from 1.76 to 2.50): applicable to tourism regions with some degree of interest, capable of stimulating potential or actual local and regional tourist flows and of interesting national and international visitors arriving for other tourism reasons.
- Hierarchic level 1 (Variation from 1.00 to 1.75): applicable to tourism regions merely complementary to others of greater interest, capable of stimulating local tourist flows. In that way, the 59 tourism regions were classified according to their potential for attracting demand.

The criteria adopted in regard to weighting the PR indicator were in accordance with principle of tourism attractiveness. First the data was sequenced according to the degree of preference and the score obtained for the region. Secondly, the least preferred was identified and attributed the lowest score for the region.

The SEDE, DECA, DI, RT and PAR indicators adopted for the study of regional airports all have weightings varying from 0 to 4. It must be underscored that for the SEDE indicator specifically, the causality relation of the distance parameter occurs as an inverse relation because, in the cities that hosted the mega-events, very big airports already exist. It must be pointed out that prioritizing regional airports that are a long way off from those host-cities

helps towards achieving a better spatial distribution of regional tourism development and of other socio-economic activities, as well as fostering a better distribution of visitor flows.

The hierarchic position of the airports is calculated by adding up the weightings attributed to the indicators. The totals vary from 0 to 20. The results are then classified into 4 categories of priority whereby figures in the 0 to 5 range represent the lowest priorities; in the 6 to 10 range, low priority; in the 11 to 15 range, priority; and those in 16 to 20 range are the highest priority. Lastly each range of values was classified on an ordinal scale from 1 to 4 with 1 being the lowest priority and 4 the highest. This last classification provided the priority index for investments in regional airport infrastructure according to their importance for tourism.

4.3 Sensitivity Analysis

A sensitivity analysis was carried out to see whether there were any effects stemming from a variation in the given indicator weighting. To that end, all the municipalities with a zero score for the RT indicator were discounted because the Ministry of Tourism considers that only the others have any tourism development potential. Accordingly, it follows that the RT indicator only classified those others, not those discounted.

In the case of the inverse relation between PAR and DI – PARM MOD 1, if PAR is inversely proportional to DI, then any values less than 2 will mean that there will an increase in PAR ($DI \leq 2$; $PAR * 1,5$; PAR). The result was that the PAR indicator was found to be sensitive only for the municipalities of Fernando de Noronha (PE) and Coari (AM). None of the others experienced any influence in this test. That analysis did not lead to any great changes in the hierarchies deriving from the changes in the weightings. From the mathematical standpoint, an analysis of sensitivity of the indicators involved in the proposed hierarchic classification would probably not reveal any important information for decision-making purposes because, in principle, they continue to have the same weighting.

5. RESULTS AND DISCUSSION

The spatial configuration of transport in Brazil reveals a structure that is highly concentrated in the country's coastal lands, in the great metropolitan areas and in the medium-sized cities. That fact has been largely responsible for the notable increase in tourism's presence and concentration in the same locations. The concentration of tourism activities mirrors the concentration of economic activities themselves in the Brazil's South and Southeast macro regions and along the coast. That geographic concentration is due to the availability of technical, informational, financial and human resources.

The economic development model Brazil has adopted has generated, and continues to generate, glaring disparities and contradictions. In a continental-sized country, historically marked by regional discrepancies, which by their very nature limit the development of tourism, air transport has taken on a strategic role in consolidating the process of national integration. Operating an integrated system of regional airport terminals is an essential step towards ensuring the provision of services capable of boosting the power to attract tourist flows.

The method proposed here helps to change the direction of investment and accordingly, to favorably intervene in regional development through the installation of infrastructure in regional airports located in areas with poor economic dynamics but recognized tourism potential. The 174 cities are distributed in Brazil's five macro regions in this way: 27 in the Central-west, 27 in the Northeast, 54 in the North, 41 in the Southeast, and 25 in the South. The results obtained by analyzing, evaluating and establishing a hierarchical

of the 50 major municipalities that are home to regional airports are set out in Table 1. The classifications of the remaining 124 municipalities are displayed in Table 2 attached below. The columns display the Cities and their respective States and the lines display the indicators created on this study (SEDE, DECA, DI, RT, PAR) and the Hierarchical Index (CI). The result of hierarchical index shows that in a political and geographic perspective, among those at the top of the list, (with a classification score of 4 in Table 1) are 18 cities in isolated areas or in areas that are difficult to access by other means of transport but which, nevertheless, have great tourism potential (Figure 1).

Figure 1 displays those regions with the highest potential for attracting local, regional, national and international tourist flows. The greatest concentrations of attractions of the greatest interest and capable of motivating greater tourism flows are in the North and Central-west of Brazil. The figure identifies a change in the direction of the vector associated to investments in airports, towards the west, where the sport angling segment of ecotourism is preponderant but where access is still merely incipient. That is a counterpoint to the traditional logic whereby concentration is associated to a consolidated transport network and the predominance of the sun and beach segment in the coastal regions.

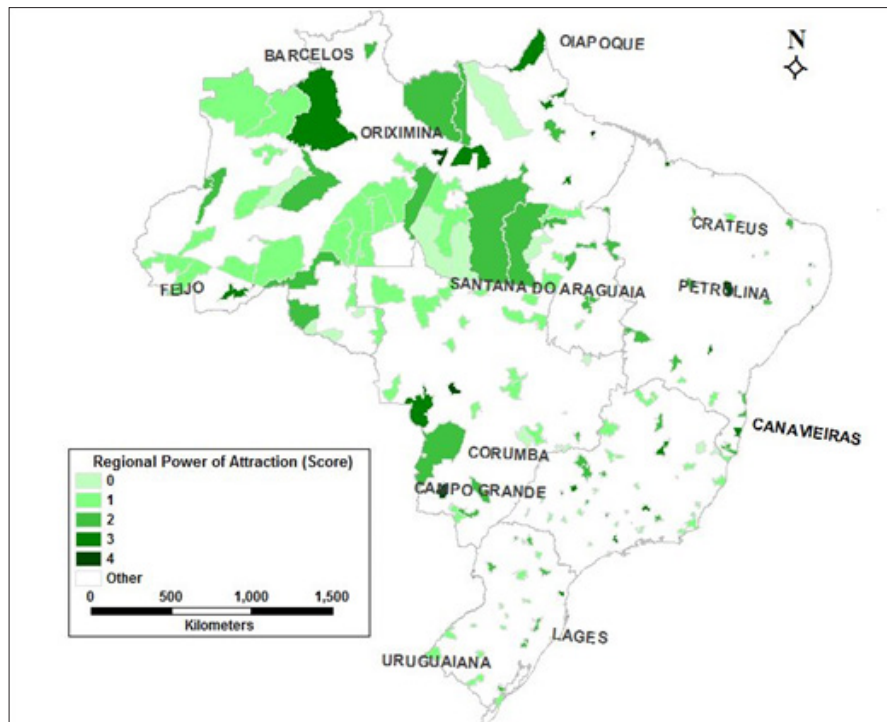
Table 2. Hierarchy of the top 50 regional airports associated to tourism interests (CI)

City/State	RT	DI	SEDE	DECA	PAR	CI
Lençóis/BA	4	4	3	4	3	18
Porto Seguro/BA	4	4	3	4	3	18
Foz do Iguaçu/PR	4	4	4	2	4	18
Juazeiro do Norte/CE	4	4	3	3	2	16
São Luís/MA	4	4	4	1	3	16
Bonito/MS	4	4	4	0	4	16
Belém/PA	4	4	4	0	4	16
Florianópolis/SC	4	4	2	3	3	16
Rio Branco/AC	4	4	4	0	3	15
Parintins/AM	4	4	3	0	4	15
Macapá/AP	4	4	4	0	3	15
Vitoria/ES	4	4	3	1	3	15
Diamantina/MG	4	4	1	3	3	15
São Joao Del Rei/MG	4	4	1	3	3	15
Santarém/PA	4	4	4	0	3	15
Cascavel/PR	4	3	4	2	2	15
Lages/SC	4	4	2	3	2	15
São Jose dos Campos/SP	4	4	0	4	3	15
Barcelos/AM	4	4	3	0	3	14
Caldas Novas/GO	4	4	2	2	2	14
Campo Grande/MS	4	4	4	0	2	14
Corumbá/MS	4	4	4	0	2	14
São Raimundo Nonato/PI	4	4	4	0	2	14
Teresina/PI	4	4	4	0	2	14
Cabo Frio/RJ	4	4	1	3	2	14

City/State	RT	DI	SEDE	DECA	PAR	CI
Porto Velho/RO	4	4	4	0	2	14
Navegantes/SC	4	4	1	3	2	14
Aracaju/SE	4	4	2	1	3	14
Porto Nacional/TO	4	4	4	0	2	14
Canavieiras/BA	0	4	3	4	2	13
Caravelas/BA	0	3	4	4	2	13
Teixeira De Freitas/BA	0	3	4	4	2	13
Catalão/GO	4	4	2	2	1	13
Goiânia/GO	4	4	1	2	2	13
Itumbiara/GO	4	4	3	2	0	13
Cáceres/MT	4	4	1	1	3	13
Cuiabá/MT	4	4	0	1	4	13
Óbidos/PA	4	3	4	0	2	13
Joao Pessoa/PB	4	4	1	1	3	13
Parnaíba/PI	4	4	3	0	2	13
Macaé/RJ	4	4	1	3	1	13
Natal/RN	4	4	0	1	4	13
Barreiras/BA	0	2	4	4	2	12
Bom Jesus da Lapa/BA	0	2	4	4	2	12
Ilhéus/BA	0	4	2	4	2	12
Mucuri/BA	0	3	4	4	1	12
Fernando de Noronha/PE	4	1	3	2	2	12
Petrolina/PE	0	2	4	2	4	12
Caxias Do Sul/RS	4	4	0	2	2	12
São Jose do Rio Preto/SP	0	1	4	4	3	12

Legend ; AC = Acre; AL = Alagoas; AP = Amapá; AM = Amazonas; BA = Bahia; CE = Ceará; ES = Espírito Santo; GO = Goiás; MA = Maranhão; MG = Minas Gerais; MS = Mato Grosso do Sul; MT = Mato Grosso; PA = Pará; PB = Paraíba; PE = Pernambuco; PI = Piauí; PR = Paraná; RJ = Rio de Janeiro; RN = Rio Grande do Norte; RO = Rondônia; RR = Roraima; RS = Rio Grande do Sul; SC = Santa Catarina; SE = Sergipe; SP = São Paulo; TO = Tocantins.

Figure 1. Brazil - Regional Power of Attraction



Source: Own Elaboration

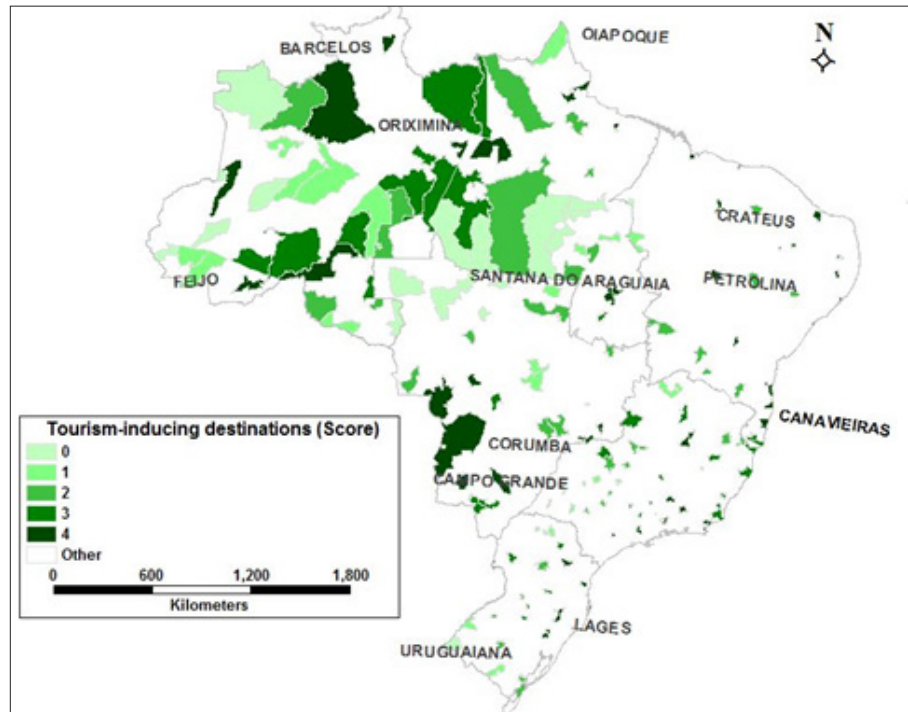
The distribution of tourism-inducing destinations demonstrated the need to set priority on airports located in regions with low concentrations of transport services, as is the case with Barcelos (State of Amazonas), Rio Branco (State of Acre), Parintins (State of Pará), Corumbá (State of Mato Grosso do Sul) and São Raimundo Nonato (State of Piauí) (Figure 2). Equipping those municipalities with airport infrastructure would channel investments to them and could mitigate the effects of the dispersion of public financial resources, stimulating private sector investment in services and equipment needed for regional tourism development. That result is in harmony with the theories of Christaller and Perroux mentioned in section 2 of this article.

Figure 3 displays the spatial distribution of the hierarchical according to the DECA indicator which refers to the destination chosen by clients; the tourists' choices revealed in research survey interviews. On analyzing the most sought-after destinations, the results identify the coastal cities that historically have been furnished with the best transport infrastructure, including air transport infrastructure, as result of the dominant economic cycles in the past and even today. Accordingly, those regions with tourism development potential have merely peripheral status due to their dearth of systems that have a strong influence on tourist flows, particularly transport systems. The municipal airports in the central and southern regions of Brazil are provided with the best infrastructure and consequently greater investments, attracting, in turn, greater interest in destinations located in those regions of Brazil. That is why any public policy directed at fostering more even development among the Brazilian regions must set investment priorities on those regions classified as 2 and 1 in Figure 3; just the opposite of the destinations indicated by the current client-choice analysis.

Figure 4 displays the results obtained by calculating the hierarchical indexes of the municipalities with regional airports associated to a tourism interest. Five airports in the macro-region North were included in the hierarchical, four for the macro-regions South, Southeast and Northeast and just one for the Central-west region. The figure shows that the regional areas covered by those airports located in the North and Central-west are very

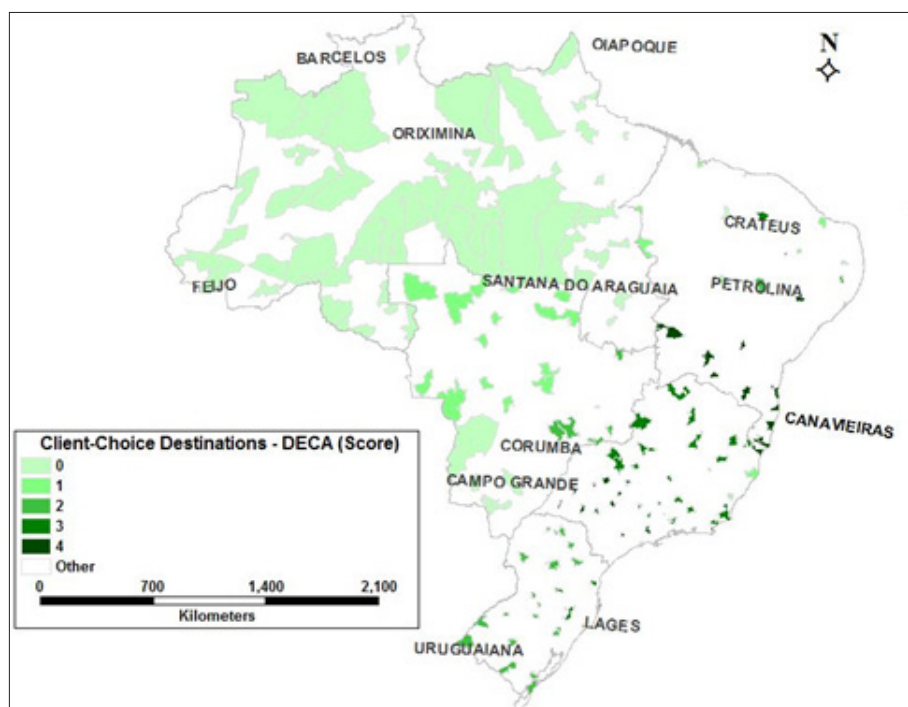
much larger than those in the Northeast, South and Southeast, corroborating the premise of contributing to the endowment of airports where infrastructure is not consolidated and the potential effects on the surrounding territory.

Figure 2. Brazil - Tourism-inducing destinations (DI)



Source: Own Elaboration

Figure 3. Brazil - Client-Choice Destinations (DECA)



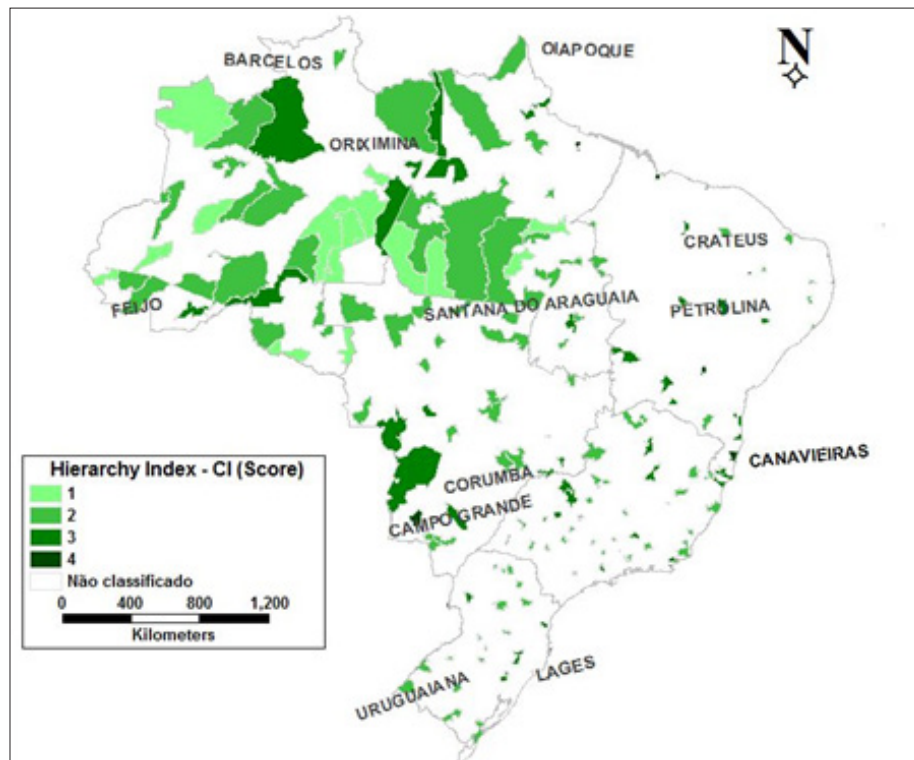
Source: Own Elaboration

The study results indicate that the choice of methodological procedures was correct insofar as they revealed the relative priority for investment of airports associated to tourism interests in regions where tourism is a consolidated activity or in other developing regions like the Brazilian Northeast, or remote regions but with great tourism potential, like the North of Brazil. On the other hand, reinforcing the degree of specialization of locations, whether it is as tourism destinations or as trading, agribusiness or industrial centers in which there is a real relation of complementariness and integration achieved by transport infrastructure, boosts the regional network and makes it more concise.

Accordingly there is a need to encourage the installation of airport infrastructure and to create a mechanism that can induce regional development in Brazil given the country's current state of poor integration of the regions in the country's social and economic dynamics. With that aim of inducing regional development, an effort was made to stimulate greater equanimity in the functioning of the sector that would include a better distribution of local air transport nodes and fostering and leveraging public and private investments that would lead to the creation of more jobs and more business. An airport that is installed to connect with national and international networks expands the respective municipality's radius of action and its capillarity in regard to attracting tourist flows. The sector's importance in regional development, in regard to the geographic aspect, lies in its offshoots and its potential for stimulating the integration of other spatially de-concentrated sectors

In that vein Douglas North (Oliveira, Nóbrega & Medeiros, 2013) states that the region that stands out most is the one companies belong to and where external economies generate local inter-relations that constitute a production chain and which consequently install relations of competitiveness among the internal and external entities contributing to the generation of a base for the exportation of tourism products. That approach to development implies an emphasis on various aspects of the accumulation process, including innovation actions and their incorporation by the agents of production, by the institutions and by society as a whole, as part of the quest for new forms of development. It also includes the participation of social groups and economic agents, investments in capacity building for human resources, institutionalization, quality of life and the self-organization of local resources, in addition to improvements in productivity and competitiveness (Silva, 2006, 2014).

**Figure 4. Brazil - Hierarchical of regional airports according to their importance for tourism-
Hierarchical Index (CI)**



Source: Own Elaboration

6. CONCLUSION

The research method was a response to the various challenges posed by the decision-making process regarding government investments in regional airports of interest to the tourism sector, particularly in the wake of the announcement that Brazil would be hosting the World Cup. Every effort was made to overcome the problem of lack of de-aggregated tourism data and to achieve the study objectives by making use of secondary data and quantitative-qualitative procedures to support decision-making.

The proposed methodology made it possible to establish a priority hierarchical of the regional airports associated to tourism for investment in infrastructure and capacity expansion. The considerable advantage propitiated by using those indicators, with their corresponding data readily available and their simplified formulation, was the reduction of costs and of the time taken up by decision-making processes. In that regard, establishing a hierarchical-forming methodology for airports contributes to the creation of a tool to support decision-making regarding investments in infrastructure and helps to channel political and technical efforts and resources to foster equilibrium in transport supply.

There is a clear need to improve the use of this method in association with administration tools, especially policies and participative tools, with a view to accelerating community relations and performances. Another point is that of understanding tourism to be an option for achieving economic diversification but not as the only alternative. It is important not to stimulate the instauration of monopolistic economic systems with clearly defined life cycles and low levels of social investment, particularly in the aftermath of the installation of infrastructure for the mega-events.

Given that it is a new activity, still at the investigation and testing stage, we understand that any proposed regional tourism development model may appear to be incomplete and precipitate. That, however, does not make it impracticable to conduct an analysis and make a profound reflection on the nuances of tourism development based on the portrait of the reality in Brazilian national territory and using the existing historical, political and economic conceptions of Brazil.

Obviously the definitions and theories that have been discussed above do not represent a single pattern of regional development and there is no reference standard. The performance of subjects who are the agents of territorial transformation processes are what will identify the necessary connotations of regional developments. Even more than the performance of such subjects, the very dynamics of the territories themselves, with their resources, populations and their fixed structures and flows will actually indicate the connotation of regional tourism development in which airport equipment comes to the fore as a strategic structure capable of imparting dynamism to local activities.

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ANNEX

Table 3. Hierarchic positions of 174 regional airports important for tourism

City	RT	DI	SEDE	DECA	PAR	CI
Lençóis/BA	4	4	3	4	3	18
Porto Seguro/BA	4	4	3	4	3	18
Foz Do Iguaçu/PR	4	4	4	2	4	18
Juazeiro Do Norte/CE	4	4	3	3	2	16
São Luís/MA	4	4	4	1	3	16
Bonito/MS	4	4	4	0	4	16
Belém/PA	4	4	4	0	4	16
Florianópolis/SC	4	4	2	3	3	16
Rio Branco/AC	4	4	4	0	3	15
Parintins/AM	4	4	3	0	4	15
Macapá/AP	4	4	4	0	3	15
Vitoria/ES	4	4	3	1	3	15
Diamantina/MG	4	4	1	3	3	15
São Joao Del Rei/MG	4	4	1	3	3	15
Santarém/PA	4	4	4	0	3	15
Cascavel/PR	4	3	4	2	2	15
Lages/SC	4	4	2	3	2	15
São Jose dos Campos/SP	4	4	0	4	3	15
Barcelos/AM	4	4	3	0	3	14
Caldas Novas/GO	4	4	2	2	2	14
Campo Grande/MS	4	4	4	0	2	14
Corumbá/MS	4	4	4	0	2	14
São Raimundo Nonato/PI	4	4	4	0	2	14
Teresina/PI	4	4	4	0	2	14
Cabo Frio/RJ	4	4	1	3	2	14
Porto Velho/RO	4	4	4	0	2	14
Navegantes/SC	4	4	1	3	2	14
Aracaju/SE	4	4	2	1	3	14
Porto Nacional/TO	4	4	4	0	2	14
Canavieiras/BA	0	4	3	4	2	13
Caravelas/BA	0	3	4	4	2	13
Teixeira De Freitas/BA	0	3	4	4	2	13
Catalão/GO	4	4	2	2	1	13
Goiânia/GO	4	4	1	2	2	13
Itumbiara/GO	4	4	3	2	0	13
Cáceres/MT	4	4	1	1	3	13
Cuiabá/MT	4	4	0	1	4	13

City	RT	DI	SEDE	DECA	PAR	CI
Óbidos/PA	4	3	4	0	2	13
Joao Pessoa/PB	4	4	1	1	3	13
Parnaíba/PI	4	4	3	0	2	13
Macaé/RJ	4	4	1	3	1	13
Natal/RN	4	4	0	1	4	13
Barreiras/BA	0	2	4	4	2	12
Bom Jesus da Lapa/BA	0	2	4	4	2	12
Ilhéus/BA	0	4	2	4	2	12
Mucuri/BA	0	3	4	4	1	12
Fernando de Noronha/PE	4	1	3	2	2	12
Petrolina/PE	0	2	4	2	4	12
Caxias Do Sul/RS	4	4	0	2	2	12
São Jose do Rio Preto/SP	0	1	4	4	3	12
Maués/AM	4	3	2	0	2	11
Guanambi/BA	0	2	4	4	1	11
Paulo Afonso/BA	0	2	3	4	2	11
Montes Claros/MG	0	3	3	3	2	11
Uberaba/MG	0	2	4	3	2	11
Uberlândia/MG	0	3	3	3	2	11
Joinville/SC	0	4	1	3	3	11
Barretos/SP	0	1	3	4	3	11
Santos/SP	0	4	0	4	3	11
Coari/AM	4	1	3	0	2	10
Vitoria da Conquista/BA	0	2	3	4	1	10
Araxá/MG	0	2	3	3	2	10
Juiz de Fora/MG	0	4	1	3	2	10
Poços De Caldas/MG	0	3	1	3	3	10
Boa Vista/RR	0	4	4	0	2	10
Criciúma/SC	0	4	2	3	1	10
Presidente Prudente/SP	0	1	4	4	1	10
Ribeirão Preto/SP	0	2	2	4	2	10
Palmas/TO	0	4	4	0	2	10
Maceió/AL	0	4	1	1	3	9
Tefé/AM	4	1	4	0	0	9
Linhares/ES	0	3	4	1	1	9
Governador Valadares/MG	0	3	2	3	1	9
Nanuque/MG	0	2	4	3	0	9
Patos de Minas/MG	0	2	3	3	1	9
Varginha/MG	0	3	2	3	1	9
Dourados/MS	0	3	4	0	2	9
Oriximiná Trombetas/PA	0	3	4	0	2	9
Tucuruí/PA	0	2	4	0	3	9
Campos dos Goytacazes/RJ	0	3	2	3	1	9
Resende/RJ	0	4	1	3	1	9
Mossoró/RN	0	4	2	1	2	9
Caçador/SC	0	3	2	3	1	9
Chapeco/SC	0	2	3	3	1	9
Araçatuba/SP	0	0	4	4	1	9

City	RT	DI	SEDE	DECA	PAR	CI
Araraquara/SP	0	2	2	4	1	9
Bauru/SP	0	2	2	4	1	9
Franca/SP	0	1	3	4	1	9
Marília/SP	0	1	3	4	1	9
Sorocaba/SP	0	4	0	4	1	9
Boca do Acre/AM	0	3	4	0	1	8
Humaitá/AM	0	3	4	0	1	8
Labrea/AM	0	3	4	0	1	8
Oiapoque/AP	0	1	4	0	3	8
Crateus/CE	0	2	2	3	1	8
Cachoeira do Itapemirim/ES	0	3	3	1	1	8
Jataí/GO	0	2	4	2	0	8
Rio Verde/GO	0	2	3	2	1	8
Carolina/MA	0	1	4	1	2	8
Divinópolis/MG	0	3	1	3	1	8
Ipatinga/GM	0	3	1	3	1	8
Januária/MG	0	1	3	3	1	8
Paracatu/MG	0	3	1	3	1	8
Pouso Alegre/MG	0	3	1	3	1	8
São Lourenço/MG	0	3	2	3	0	8
Teófilo Otoni/MG	0	2	3	3	0	8
Ponta Porã/MS	0	3	4	0	1	8
São Félix do Araguaia/MT	0	2	4	1	1	8
Altamira/PA	0	2	4	0	2	8
Breves/PA	0	2	4	0	2	8
Conceição do Araguaia/PA	0	2	4	0	2	8
Itaituba/PA	0	3	4	0	1	8
Cajazeiras/PB	0	3	3	1	1	8
Campina Grande/PB	0	3	1	1	3	8
Caruaru/PE	0	4	1	2	1	8
Londrina/PR	0	1	3	2	2	8
Maringá/PR	0	1	3	2	2	8
Ponta Grossa/PR	0	4	0	2	2	8
Guajará-Mirim/RO	0	2	4	0	2	8
Ji-Paraná/RO	0	3	4	0	1	8
Erechim/RS	0	3	2	2	1	8
Passo Fundo/RS	0	3	2	2	1	8
Pelotas/RS	0	2	2	2	2	8
Santo Ângelo/RS	0	2	3	2	1	8
São Borja/RS	0	1	4	2	1	8
Gurupi/TO	0	3	4	0	1	8
Santa Isabel do Rio Negro/AM	0	2	4	0	1	7
São Paulo de Olivença/AM	0	4	1	0	2	7
Imperatriz/MA	0	0	4	1	2	7
Barra do Garças/MT	0	1	4	1	1	7
Confresa/MT	0	1	4	1	1	7
Nova Xavantina/MT	0	1	4	1	1	7
Pontes e Lacerda/MT	0	2	3	1	1	7

City	RT	DI	SEDE	DECA	PAR	CI
Santana do Araguaia/PA	0	2	4	0	1	7
Apucarana/PR	0	1	3	2	1	7
Guarapuava/PR	0	2	2	2	1	7
Telemaco Borba/PR	0	3	1	2	1	7
Bagé/RS	0	1	3	2	1	7
Rio Grande/RS	0	2	2	2	1	7
Santa Maria/RS	0	2	2	2	1	7
Uruguaiana/RS	0	0	4	2	1	7
Araguaína/TO	0	1	4	0	2	7
Feijó/AC	0	1	4	0	1	6
Tarauacá/AC	0	1	4	0	1	6
Fonte Boa/AM	0	1	4	0	1	6
Tabatinga/AM	0	0	4	0	2	6
Minacu/GO	0	2	2	2	0	6
Alta Floresta/MT	0	0	4	1	1	6
Aripuana/MT	0	0	4	1	1	6
Juara/MT	0	0	4	1	1	6
Juina/MT	0	4	0	1	1	6
Lucas do Rio Verde	0	2	2	1	1	6
Matupa/MG	0	0	4	1	1	6
Rondonópolis/MT	0	3	1	1	1	6
Sinop/MT	0	0	4	1	1	6
Monte Dourado/PA	0	2	4	0	0	6
Parauapebas / Carajas/PA	0	0	4	0	2	6
Redenção/PA	0	1	4	0	1	6
São Felix do Xingu/PA	0	0	4	0	2	6
Cacoal/RO	0	2	4	0	0	6
Cruzeiro Do Sul/AC	0	0	4	0	1	5
Borba/AM	0	3	1	0	1	5
Carauari/AM	0	0	4	0	1	5
Eirunepe/AM	0	0	4	0	1	5
Itacoatiara/AM	0	3	1	0	1	5
Manicore/AM	0	1	3	0	1	5
Novo Aripuana/AM	0	2	2	0	1	5
São Gabriel da Cachoeira/AM	0	0	4	0	1	5
Marabá/PA	0	0	4	0	1	5
Costa Marques/RO	0	1	4	0	0	5
Vilhena/RO	0	0	4	0	1	5
Jacareacanga/PA	0	0	4	0	0	4
Novo Progresso/PA	0	0	4	0	0	4
Ourilandia do Norte/PA	0	0	4	0	0	4

Legend:	1 0 to 5	2 6 to 10	3 11 to 14	4 15 to 19
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Legend: AC = Acre; AL = Alagoas; AP = Amapá; AM = Amazonas; BA = Bahia; CE = Ceará; ES = Espírito Santo; GO = Goiás; MA = Maranhão; MG = Minas Gerais; MS = Mato Grosso do Sul; MT = Mato Grosso; PA = Pará; PB = Paraíba; PE = Pernambuco; PI = Piauí; PR = Paraná; RJ = Rio de Janeiro; RN = Rio Grande do Norte; RO = Rondônia; RR = Roraima; RS = Rio Grande do Sul; SC = Santa Catarina; SE = Sergipe; SP = São Paulo; TO = Tocantins.

AN ANALYSIS OF THE OPEN SKIES POLICY AND ITS EFFECTS ON THE TOURISM INDUSTRY IN MEXICO

Juan Manuel Tello Contreras¹

ABSTRACT

The New Bilateral Air Services Agreement between Mexico and the United States specifies that all cargo and passenger aircraft of both countries will allow any airline to flight from one point in the neighboring country and make a stop at another airport to pick up and unload passengers or cargo in the airports of both countries. This paper analyzes the 2016 “open skies agreement” between United States of America and Mexico and its expected effects on the Mexican airlines industry. After reviewing the evidence and analyzing the performance of Mexican and US airlines, it is inferred that the bilateral agreement will increase foreign investment in Mexico due to the entry into the market of a greater number of North American passenger and cargo airlines, but above all, will increase international trade in goods and services, being the United States airline industry the one that will benefit the most due to the superiority of the air fleet over the Mexican. The theoretical Cournot model adapted from Alves and Forte (2015) indicates that airlines that do not have the ability to compete for new routes will be adversely affected, their profits will decrease, an assertion that contradicts the expected effects in the literature.

Keywords: Open Skies Agreement, Air Transport, Cournot Model, Mexico.

JEL Classification: D43, D21

1. INTRODUCTION

Tourism in Mexico as an export sector has presented favorable results in recent years, however, in terms of aeronautical regulation, was not up to date, especially with its main neighbor and business partner, United States. As a result of this situation, since 2013, the governments of both countries have started negotiations to create an “open skies” agreement that will allow the aeronautical industries of both countries to be strengthened. In addition, it should be remembered that tourism activities in Mexico have a generalized impact on the GDP of the services sector. In this regard, the contribution of passenger transports services stands out; restaurants, bars and nightclubs, government activities; tourist trade and lodging services of hotels and motels. According to the Ministry of Tourism of Mexico Sectur (2016) in 2013, the tourism sector contributed 8.34% of total GDP, this percentage meant returning to the level it had in 2007, prior to the global crisis of 2009. The relationship between the aviation industry and tourism is that air connectivity, defined as the level of service that includes schedules, rates, frequencies, reliability and destination diversity, is an element that contributes to three main aspects of the tourism; a) enhances competitiveness; b) contributes to the economic growth of the country; and c) is an element that fuels the demand that tourism represents (UNWTO, 2015).

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Mexico's bilateral air service agreement with the United States of America stems from an "open skies" policy that the United States began in 1992 with the Netherlands. The 2007 agreement with the European Union was the most ambitious of them, since it covers 27 European countries, adding the latter agreement to the United Kingdom, one of its main commercial and historical partners but that paradoxically had a mutual protectionist relationship. At the microeconomic level, the essence of open skies agreements is to improve cooperative aviation marketing agreements such as codeshare, franchising and leasing and the creation of joint committees to improve deregulation in subsequent years and facilitate air flow of goods.

Bilateral agreements are expected to increase trade between the two countries, to expand cooperative opportunities between airlines, to flex their operations and to liberalize regulations. In addition, the commitment of the governments in the application of security measures for the inhabitants of both countries is expected. The governments of both countries argue as the main benefits of this agreement: increased competitiveness of the sector, increased competition, lower tariffs, increased passenger flow, creation of new direct jobs. Finally, the strengthening of companies in the aeronautical and information technology sectors is expected, which in turn would generate more direct foreign investment in national airports (Brattle Group, 2002).

It is important to mention the theoretical-descriptive sense of this document, which although it presents numerous tables and graphs, are used to describe the current situation. In this context, questions arise about the effects of the implementation of the agreement. In this context, the purpose of this document is to identify whether the flow of tourists from the United States will increase and determine whether air fares will increase or decrease due to the new agreement between the two countries. Finally, it will also try to know which airlines would benefit the most.

The present document is divided into four major sections, the first provides the background, a second section describes the bilateral air services agreement between the two countries, describes the legal aspects that shape the agreement, presents evidence on the possible economic effects of the agreement. Later in this second section, evidence is presented on the performance of national and foreign airlines within the national aviation industry. In the third section of the document a theoretical model is presented that allows considering the possible economic effects that the bilateral agreement could generate. Finally in the last section of the document the conclusions are established.

2. BACKGROUND

The aviation industry has represented one of the great transformations of the twentieth century, has boosted tourism by reducing distance and time, has allowed more and more people to know different places in the world. In the last decades, the airplane as means of transport has allowed to communicate to a greater number of travelers and move of merchandise, covering great distances to a smaller cost. According to the United Nations World Tourism Organization, UNWTO (2015), during the year 2014, more than half of the international tourists arrived at the destination by plane (54%). According to the Ministry of Tourism of Mexico, SECTUR (2016), during the first half of 2016, 75.4% of the total number of seats programmed in operation was recorded in the United States as the most important tourist market for Mexico.

A global trend that has been presented for a couple of decades is the increasing opening of borders to economic movements and particularly to tourism. The Bilateral Air Services Agreement between Mexico and the United States, which entered into force in January

2016, has been a controversial public policy, necessarily supported by both governments but has not been welcomed by all sectors, in particular by the unions. The entry agreement could hasten the bankruptcy of Mexican airlines, given that the commercial air fleet is about 350 aircraft compared to about 7 thousand that have US companies (Grupo Preferente, 2015).

The concept of “open skies” according to Button (2009) emerged in the late 1970s when the United States began to liberalize the domestic freight market and the passenger segment. It aims to make regulations more flexible for airlines and thus achieve a free environment with the least government intervention (Pitfield, 2009).

In Mexico there was a deep crisis of the tourism sector in the period from 2009 to 2011 (due to the economic crisis of 2009 and the epidemic of influenza); currently the tourism industry is experiencing a positive moment in the international component. Although the improvement in the country’s tourism sector began in mid-2012, it was not until 2014 that its activity increased significantly. Starting in 2016, Mexico occupies the eighth place according to the arrival of international tourists; a possible explanation is based on a transport system that has been growing, but mainly by the geographical comparative advantage of Mexico represented by the proximity of two major issuing markets, the United States and Canada.

The previous regulatory framework mandated that as many as 2 or 3 designated airlines per country could serve a couple of cities, there was also a slow response capability out of the changing market needs, ultimately these regulations limited purchase options for the consumer. The information indicates that there are well-connected tourist destinations, Mexico City, Monterrey, Guadalajara, Cancun, Los Cabos and Puerto Vallarta, it is also clear that greater connectivity is required to cities in the interior of the country. When there are no direct flights, connections through Mexico City or other connection centers provide access routes for most passengers. However, Mexico has weak air connectivity with Europe, Latin America and particularly Asia.

The governments of both countries argue many benefits derived from the implementation of the bilateral agreement. However, there are voices that contradict government statements. Among the negative aspects that would bring a bilateral negotiation with the United States in the air transportation, Martinez (2014) points out an uneven competition since, while the United States operates 7,064 aircraft and transports 787 million users, Mexico has an air capacity of approximately 350 aircraft to carry 49 million passengers. Under this argument, the air transport unions grouped in the Federation of Trade Unions of the Sector, composed of pilots, ground workers, air traffic controllers, formed a common front to postpone the bilateral negotiation with the United States First suggesting the revision of the internal aviation law in Mexico, before negotiating with the United States, since the current regulations date back to the 1950s and require modernization. In addition, for the Federation of Airline Trade Unions, opening up the total traffic of passengers, cargo and charters to the United States would affect more than 158 thousand jobs in Mexico (Martínez, 2014).

In recent years, according to Song (2012) in the global aeronautics industry, there have been several horizontal integrations, in which groups of airlines have been created in the form of alliances (Star Alliance, One World and Sky Team) that has frequent flyer agreements and shared codes on routes. In the case of Mexico, at the end of 2008, 13 airlines operated, after Mexicana de Aviación ceased operations in 2010, and after closing a total of seven airlines (Azteca, Aerocalifornia, Aviaca, Avolar, Alma, Nova Air and Aladia), there are only nine, according to data from the Ministry of Communication and Transport of Mexico, SCT (2016), has resulted in an increase of up to 40 percent in tariffs and a significant number of complaints about the poor service they provide.

Over the past 15 years, US airlines have filed a series of mergers and bankruptcies, moving from 10 major airlines in 2001, to four major airline groups (CNN, 2013). In 2001

the airline TWA was acquired by American Airlines. In 2005, America West was acquired by U.S. Airways, the latter in turn was acquired by American Airlines in 2013 to form the largest airline in the United States. In 2008, the Northwest airline was acquired by Delta Airlines to form the second largest airline. In 2010, United and Continental airlines were merged to form the third largest airline. Later that year, Southwest acquired Airtran to form the fourth largest airline in the United States. Of those ten airlines that existed, five have operated in periods of filing for bankruptcy. The airline U.S. Airways filed for bankruptcy during 2002 and 2003, United for the years 2002 to 2006, Delta and Northwest from 2005 to 2007 and finally American Airlines from 2010 to 2012 (CNN, 2013). From 2005 to 2008, about 70 of the airlines in the United States were under the protection of chapter 11 bankruptcy.

But what explains this behavior in the industry? According to Driskill (2016), the main reason leads to the reduction of fuel prices, substantial efforts have been made in fuel economy. During the last five years fundamental changes have been made, mergers and acquisitions, new forms of income, additional seats such as the direct sale of tickets, this prevents payment of commissions to intermediary companies. Other forms of income are the commissions for sale of hotel rooms while buying the plane ticket, selling food and beverages on flights. The sustained growth of the aviation industry has been reflected in the increase in the arrival of tourists, an increase in the number of routes and an increase in the number of aircraft orders

3. THE BILATERAL AIR TRANSPORT AGREEMENT

The “open skies” policy is based on the realization and entry into force of bilateral agreements between several countries, in the case of Mexico, the open skies policy has to do with the recent “Air Transport Agreement Between the Government of the United States of America and the Government of the United Mexican States”, the document establishes the type of operations that the airlines of one country can carry out in the territory of the other (Diario Oficial de la Federación, 2016).

3.1 Analysis of legal aspects

The underlying framework for the regulation of international aviation is contained in the 1944 Convention on International Civil Aviation, which is commonly referred to as the Chicago Convention. The framework of the type of operations includes the concept of air freedoms, defined as nine types of operations accepted internationally by the signatory countries of the Chicago Convention of 1944 (Convenio sobre Aviación Civil Internacional, 1944). Briefly, the nine freedoms can be classified into three groups: a) freedoms that do not involve a commercial operation; b) freedoms involving only the countries that negotiate, and c) freedoms involving countries other than those that negotiate. Likewise, under bilateral agreements, air freedoms may be agreed by both countries as open, limited or closed in relation to the type of aircraft, the frequency of flights, the permitted cities or destinations and also the airlines designated for fly.

International aviation is governed by a series of government to government bilateral treaties determining levels of market access for countries respective airlines. In the legal framework, the new Air Transport Agreement between both governments replaces that approved by the Senate on November 29, 1960, which was amended seven times: July 1970, September 1988, November 1991, September and December 1997, February 1999 and December 2005. The current agreement replaces the first agreement between Mexico

and the United States signed on August 15, 1960. The agreement entered into force on January 1, 2016, the decree enacting the agreement is dated August 19, 2016.

The main points to highlight of the previous agreement are: a) the same conditions are established for passenger and cargo flights; b) the previous agreement only contemplates from the 1st to the 5th freedom, that is to say the 6th, 7th, 8th and 9th freedoms are closed; c) for the first two freedoms there are no limitations on aircraft type, flight frequency or destination cities; d) for the 3rd, 4th and 5th freedoms a limit of two designated airlines per country is established for each pair of cities, arriving even to three when they are tourist destinations and; e) fifth freedoms are limited only to certain cities incorporated in 1970 and modified in 1988 and 1991.

Table 1 shows the new freedoms negotiations between the two nations. The shaded cells indicate that the freedoms that were closed in the previous agreement are now open. For passenger flights, which are the sector that impacts the most in tourism, the modifications are presented in the elimination of the limit of designation of airlines for the 3rd, 4th and 5th freedoms, maintaining as existing these freedoms. The essence of the agreement is that the airlines market for both countries is opened, meaning it is no longer limited to a number of airlines per route. It is important to mention that derived from this agreement, the United States allows to process requests of alliances between airlines of both countries. However, it is in freight flights where greater freedoms are opened, Mexico is an exporting country so the 6th and 7th open.

Table 1. Air Transport Agreement between the Government of the United States of America and the Government of the United Mexican States

Freedoms	PASSENGERS				CARGO			
	Aircraft	Frequency of flights	Permitted Cities	Airlines designated for fly	Aircraft	Frequency of flights	Permitted Cities	Airlines designated for fly
1	Open	Open	Open	Open	Open	Open	Open	Open
2	Open	Open	Open	Open	Open	Open	Open	Open
3	Open	Open	Open	Open	Open	Open	Open	Open
4	Open	Open	Open	Open	Open	Open	Open	Open
5	Open	Open	Limited	Open	Open	Open	Open	Open
6	Closed	Closed	Closed	Closed	Open	Open	Open	Open
7	Closed	Closed	Closed	Closed	Open	Open	Open	Open
8	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed
9	Closed	Closed	Closed	Closed	Closed	Closed	Closed	Closed

Source: Own elaboration with data from SCT (2016)

As mentioned, the new agreement allows the US Department of Transportation to process and evaluate alliances between airlines in both countries. However, proposals for alliances require the approval of the competent authorities of both countries to ensure that they benefit the final consumer.

3.2 Analysis of economic aspects

This part of the paper discusses the economic aspects that have been identified in countries that have carried out bilateral air services agreements. The international literature analyzes aeronautical deregulation and its impacts on competition between airlines can be divided into three large groups (Wang, Bonilla & Banister, 2016). The first group discusses the

economic reasoning of liberalization; the second group focuses on the spatial characterization of deregulation, particularly on the characteristics of the airlines' networks (Dobruszkes, 2009; Goetz & Vowles, 2009; Ramos-Pérez & Sánchez-Hernández, 2014; Cristea, Hillberry & Mattoo, 2015). The third group refers to the analysis of the evolution of deregulation from the institutional point of view. According to Wang, Bonilla and Banister (2016) deregulation has had failures as well as success stories. In addition to the economic studies on the subject, studies have been carried out on the connectivity, the benefits of accessibility and the configuration of networks, all from the geographical point of view.

Studies such as Pitfield (2009) and Button (2009) examine the impacts of air transport liberalization policies on variables such as economic growth, traffic volume; they have concluded that liberalization has contributed to substantial growth in passenger traffic. Due to, among other causes increased competition and efficiency gains in the aviation industry, as well as positive externalities for the economy as a whole. By supporting the benefits of such agreements, Christidis (2016) argues that liberalization allows airlines to optimize their route networks within and outside their domestic markets. As a result, traffic flow patterns change. One scenario that has also favored industry performance is that of strategic alliances that have increased as a result of the decrease in restrictions (Yimga, 2017).

One issue that is worth mentioning has to do with the expansion of the low-cost model in airlines as a result of liberalization. The rapid growth of low-cost airlines increases competition, stimulates passenger traffic, and increases the competitiveness of the national aviation industry (Mootien, 2012). For the particular case of the "open skies" agreement between the United States and the European Union, the U.S. Department of Commerce (2007), has estimated the economic gains to consumers by \$ 4 billion dollars annually through such agreements. It also estimates a 16% growth in the flow of air traffic in the United States and the support of 9 million jobs in aviation and related industries. Similar conclusions were obtained by Stober (2003) stating that the open skies agreements benefit the US aviation industry by creating larger passenger volumes, but above all by expanding the network of airlines that improve service and lower the tariffs paid by consumers.

For the United States, open skies agreements have allowed cities such as Dallas, Denver, Detroit, Las Vegas, Minneapolis, Orlando and Portland to significantly increase their international connectivity. Using a quantitative methodology, the authors Button, Neiva and Yuan (2014) conclude that transatlantic air transportation has increased as a result of the open skies agreement between the United States and the European Union. Also using a quantitative methodology, in particular a data panel analysis, Whalen (2007) confirms that alliances among airlines increase passenger volumes.

Most of the revised articles that have analyzed the impacts of open skies policy conclude that the US aviation industry has benefited, however, large American airlines (American Airlines, Delta and United) have complained about unfair competition from Gulf Airlines (Emirates, Etihad & Qatar Airways), received subsidies and privileges from their governments (Oxford Business Group, 2016).

3.3 Analysis of the commercial and tourist aviation industries in Mexico

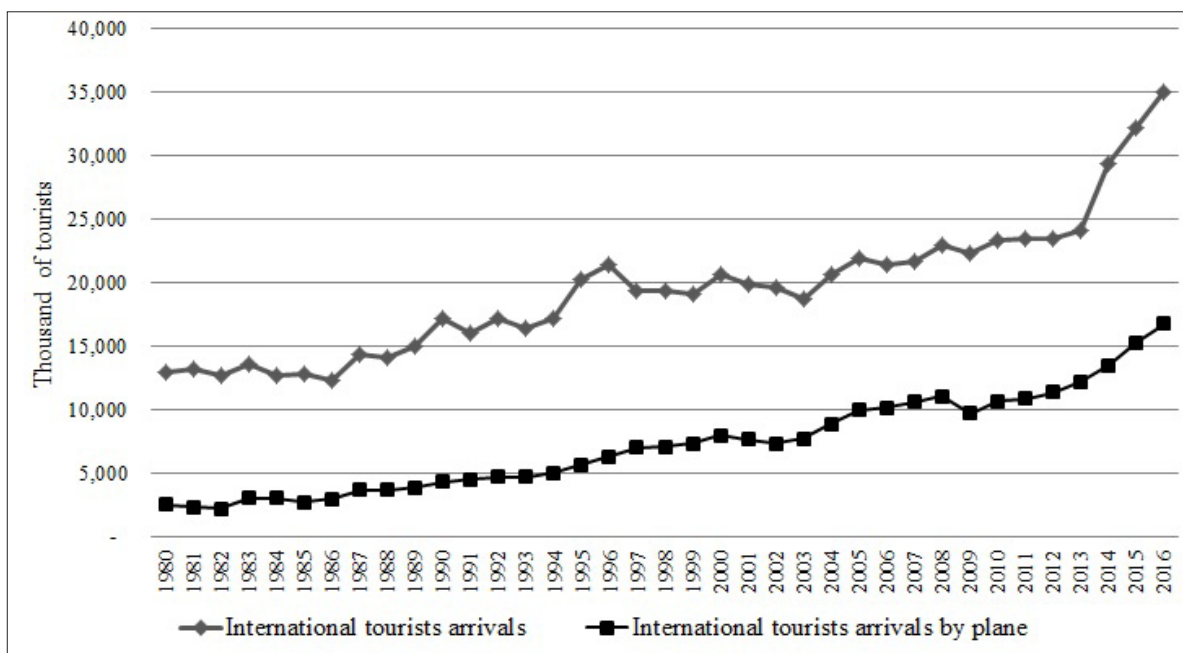
At the beginning of the document it was mentioned that the commercial aviation industry has very characteristic aspects that limit the performance of the airlines. The following is a brief analysis from the point of view of the company. The industry is characterized by information asymmetries where dynamic pricing policies of airlines make it difficult for consumers to understand pricing.

In general, it is an industry characterized by low profit margins caused by unique cost structures and demand shocks (CNN, 2013). The cost structure depends on each airline and its business model, but on average 30% of the costs are allocated to wages, 18% to fuel costs,

both of which are the main concepts. In recent years the global commercial aviation industry has recovered mainly from declining fuel prices and an increase in demand after the 2009 economic crisis. The bargaining power of buyers is high, as leisure customers are extremely price sensitive, there is little customer loyalty, product differentiation is very limited (United States Department of Transportation, 2017). The bargaining power of airline suppliers is high since there are very few, basically a duopoly between Boeing and Airbus companies when large-capacity passenger aircraft is involved. The threat of entry of new airlines is low as it is an industry intensive in capital and labor. Established airlines benefit from alliances and economies of scale (United States Department of Transportation, 2017). Finally, the threat of substitute transport services is average when it comes to short distances since users can be transported by car, bus and high-speed rail (Dobruszkes, Dehon & Givoni, 2014). However when distances are wide, the threat of substitute transportation is low. The International Air Transport Association (IATA) expects industry worldwide to double net profits in 2016 due to low fuel costs and rising demand.

The following is a brief diagnosis of the tourism industry in Mexico and the importance of air transport. Figure 1 shows the total international tourist's arrivals to Mexico from different countries of the world and the international tourist's arrivals by plane. It is observed that during the period from 1980 to 1986 there was no substantial change in the arrival of international tourists to Mexico. However, since 1988 there has been a significant growth in the arrival of tourists, surpassing since 1990 the barrier of the fifteen million international tourists.

Figure 1. Mexico's total international tourist's arrivals and international tourist's arrivals by plane from 1980 to 2016



Source: Own elaboration with data from Banco de Mexico (2017)

It is observed that in 1980, 12.9 million international tourists arrived in Mexico, of which 2.4 million arrived by air, these figures indicate that 19.1% of all international tourists arrive by air. In 1990 this figure increased to 25.1%; in 2000, the percentage was 38.6%. Finally in 2016, 48% of international tourists arrived in Mexico by plane.

The years 1995 and 1996 stand out, where for the first time more than 20 million tourists arrived to Mexico. During the period from 2005 to 2013 the arrival of international

tourists to Mexico remained in the range of 22 to 24 million tourists. In addition, the case of the Mexican tourism sector is very interesting due to the negative effects it has experienced fundamentally in the last 10 years, particularly in 2009 where there was a global financial crisis and influenza type AH1N1. However, in 2010 there was a 4% increase in the arrival of international tourists, which was insufficient to offset the losses of the previous year.

Table 2 shows tourist's arrivals and air travelers to Mexico by main nationalities at the end of 2013 and a comparison with 2011 and 2012. As mentioned, the United States is the main market for tourists to Mexico, as shown in table 2, the United States market represents 55% of total arrivals to Mexico by air, this figure represented 6.4 million arrivals in 2013, in addition it shows a growth rate of 9% with respect to 2012 and of 13.1% compared to 2011.

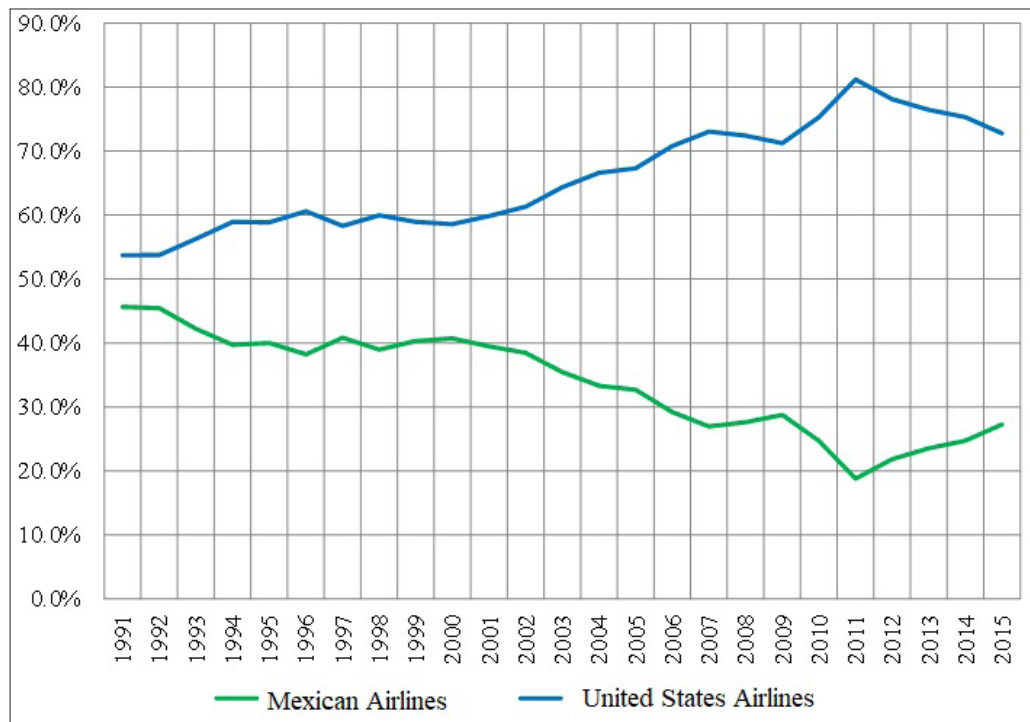
Table 2. Country of origin of tourists arriving in Mexico by plane

2013 Ranking		Tourists 2011	Tourists 2012	Tourist 2013	Market Share 13´	Variation 13/12
TOTAL		10,143,220	10,804,749	11,774,155	100%	9.0%
1	United States	5,728,166	5,941,911	6,478,968	55.0%	9.0%
2	Canada	1,563,150	1,571,543	1,599,409	13.5%	1.8%
3	United Kingdom	330,072	363,42	414,039	3.5%	14.0%
4	Spain	279,531	278,812	282,255	2.4%	1.2%
5	Brazil	196,267	248,899	267,507	2.2%	7.5%
6	Colombia	125,882	163,725	262,654	2.2%	60.4%
7	Argentina	200,694	251,221	257,820	2.1%	2.6%
8	France	186,780	202,855	199,866	1.6%	-1.5%
9	Germany	165,136	172,841	187,141	1.5%	8.3%
10	Venezuela	88,806	129,331	164,968	1.4%	27.6%

Source: Elaborated by the author with data from SECTUR (2016)

The favorable evolution of the number of US tourists to Mexico is probably due to an improvement in the economic conditions of that nation, particularly the income of its inhabitants and the greater preference for short trips to nearby places.

Figure 2. Market share of the number of passengers transported in regular service between Mexican airlines and United States airlines



Source: Own elaboration with data from Banco de Mexico (2017)

In addition, information from the Ministry of Tourism, SECTUR (2016) indicates that for the first half of 2016, there was an increase in the number of frequencies and the opening of 15 new routes in international operation to have a total of 361 routes. Direct operations to Mexico began with the incursion of three new foreign airlines. The first Dynamic Airways (American) to cover the following routes: Los Angeles-Cancun and New York-Cancun; Alitalia covers the route Mexico City-Rome; Finally the Portuguese airline Orbest that connects the city of Lisbon with Cancun. In the same period of time, seats programmed in international operations registered growth of 9.9%, going from 11.8 to 13.0 million scheduled seats (SECTUR, 2016).

In 1991 Mexican and United States airlines carried almost the same amount of passengers, about 5 million. While Mexican airlines have carried about six million passengers during the last 24 years, US airlines transported more than 18 million passengers in 2016. Another way of presenting the information is shown in Figure 2, which shows the market share of Mexican and US airlines in the transportation of passengers in Mexico. Fundamentally since the last 25 years, Mexican airlines have lost market share.

3.3.1 Performance of national airlines in the Mexican aviation industry

This section of the document characterizes the main topics of analysis of the tourism industry in Mexico, from the number of passengers, frequencies and routes, in order to better understand the aviation industry and have a much clearer vision of its performance. Table 3 shows the 20 routes that represent 41.1% of the total number of passengers transported in regular international service during the year 2015.

Table 3. The 20 international routes of Mexico with greater flow of passengers in 2015

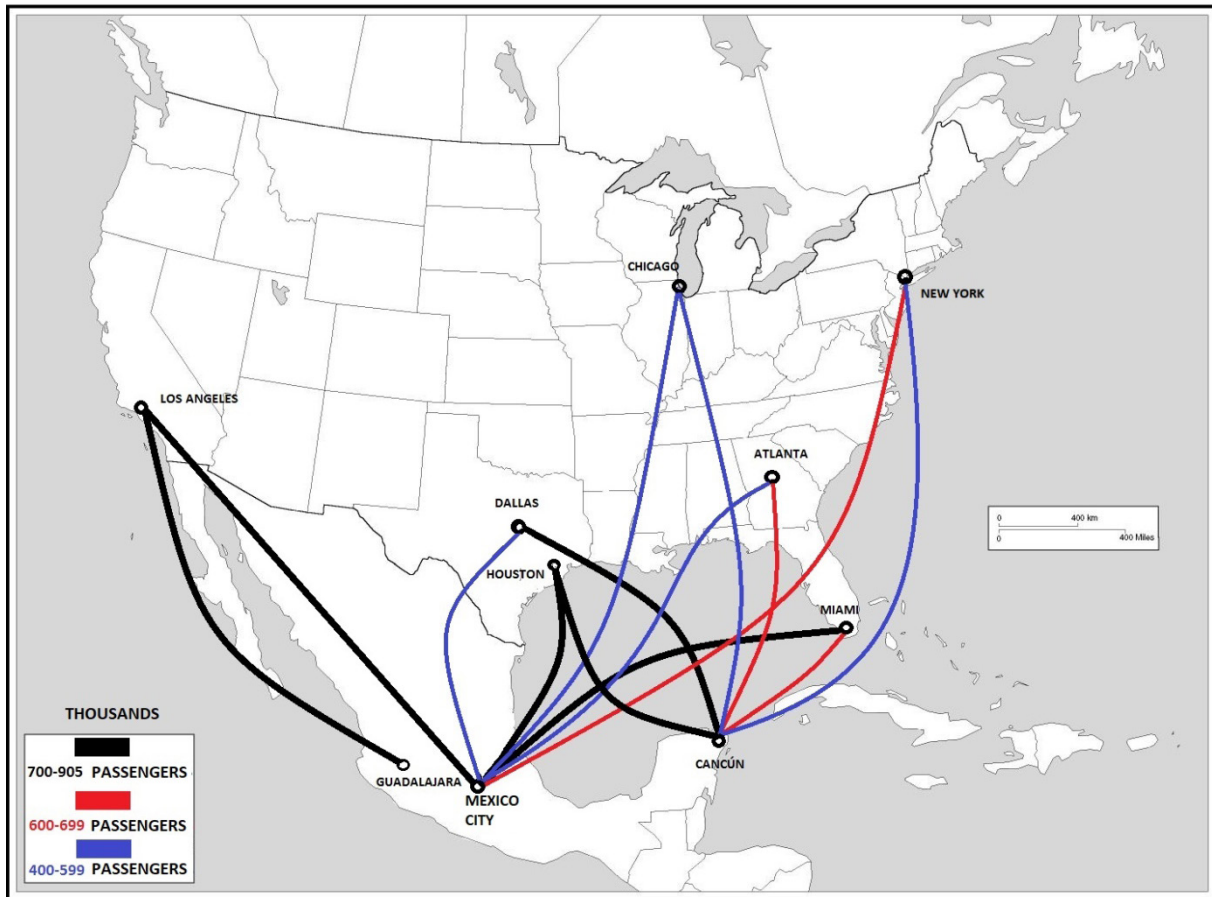
Route	Origin	Destination	Passengers transported 2015	Change 2014 vs 2015
1	Mexico City	Los Angeles	903,283	11.2%
2	Los Angeles	Guadalajara	798,443	2.2%
3	Miami	Mexico City	768,682	10.8%
4	Mexico City	Houston	751,453	8.5%
5	Dallas – Fort Worth	Cancun	737,728	8.8%
6	Houston	Cancun	711,062	21.6%
7	Cancun	Atlanta	682,645	-3.1%
8	New York	Mexico City	669,193	120.5%
9	Mexico	Bogota	661,166	15.6%
10	Toronto	Cancun	605,718	15.1%
11	Miami	Cancun	601,117	15.1%
12	Mexico City	Madrid	596,163	9.9%
13	New York	Cancun	562,172	109.6%
14	Chicago	Cancun	535,452	22.3%
15	Panama	Cancun	530,643	1.0%
16	Mexico City	Dallas - Fort Worth	524,166	9.1%
17	Mexico City	Chicago	501,261	8.0%
18	Panama	Mexico City	428,471	16.1%
19	Paris	Mexico City	426,363	1.4%
20	Mexico City	Atlanta	418,183	-5.3%

Source: Own elaboration with data from SECTUR (2016)

In Mexico, only three destinations are really connected to the United States (Mexico City, Cancun and Guadalajara). Mexico City is very well connected to destinations on the East Coast of the United States. As can be seen in figure 3, there are no routes with a lot of passenger flow connecting Mexico and the West Coast of the United States, only have solid routes with Los Angeles. Figure 3 is very important since it indicates the lack of connectivity and the number of routes between both countries; fundamentally it is observed that the United States is better connected than Mexico. Cancun is very well connected by air; it is precisely this connectivity that has allowed it to position itself as the most important tourist destination in Mexico.

There are also several destinations with opportunities in the business segment, so the need arise to deconcentrate the traffic of the international airport of Mexico City and increase the connectivity in other tourist destinations.

Figure 3. Air routes between Mexico and the United States with greater flow of passengers in 2015



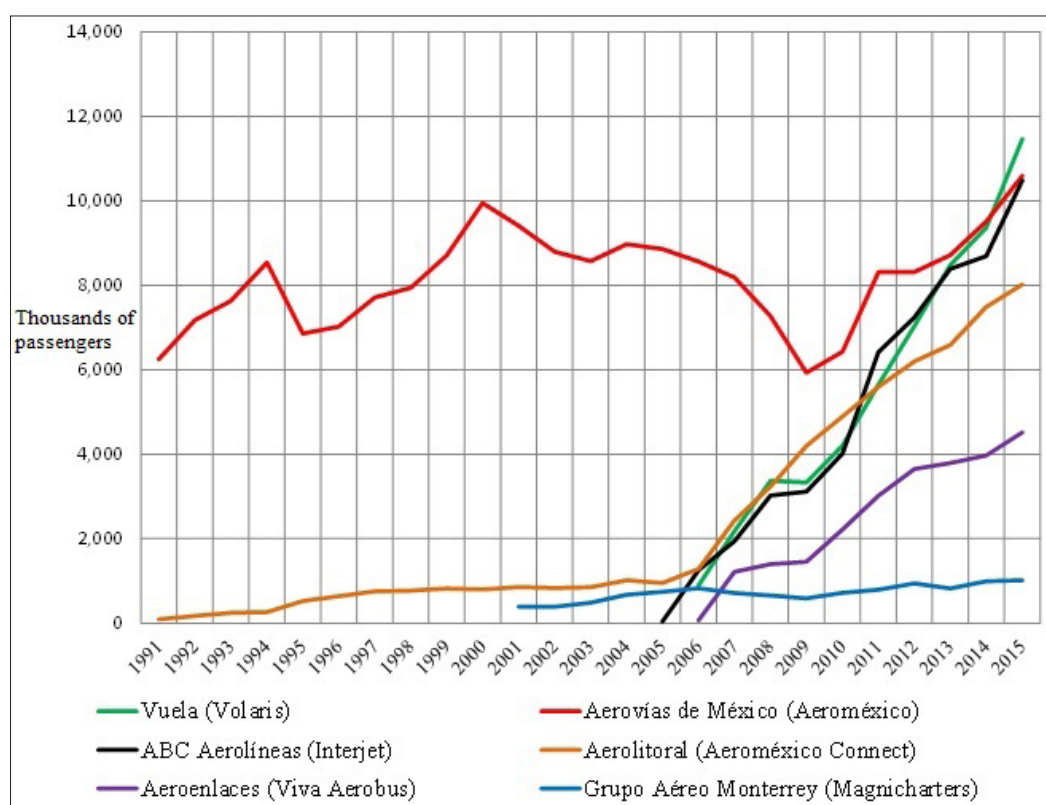
Source: Own elaboration with data from SCT (2016)

With respect to the number of Mexican cities served by regular national companies, in 1991, 60 cities were served, reaching a maximum of 66 cities in 2001, and in 2015, 58 cities were served. That is, there has been a decrease in the number of Mexican cities served by domestic airlines. On the other hand, in 1991, 24 international cities were served by national companies, showing a sustained growth until reaching the maximum of 63 cities in 2014, part of this growth is explained by the fact that the national airlines have formed part of alliances with foreign airlines by means of codes (SCT, 2016).

The data shows that the arrival of international flights to Mexican airports reached 124,114 flights in 2010. This figure represents an increase over the next four years to reach 148,930 international flights in 2014. In addition to the increase in the number of flights, there is an increase in the arrival of passengers coming from international flights, from 13,277,307 passengers in 2010 to 17,125,580 in 2014.

When analyzing the aviation industry in Mexico from a micro-economic perspective, the six Mexican airlines with the largest number of passengers transported both in domestic service and in international service can be observed in figure 4. It draws attention to the fact that only two airlines operating in 1991 are still operating, in fact Aerolitoral is a subsidiary company of Aeromexico. It can also be observed that Interjet and Volaris have had a significant growth in the number of passengers transported, obviously boosted by the bankruptcy of Mexicana de Aviación, which necessarily generated a rearrangement of routes and slots at the main airports in Mexico.

Figure 4. The six Mexican airlines with the largest number of passengers transported in domestic and international service



Source: Own elaboration with data from SCT (2016)

The following table 4 shows a measure of economic concentration of the market of Mexican airlines, as well as the number of airlines that operate and the dominant company for different years. Thus, based on the Herfindahl-Hirschman (HHI) concentration index, in 1991, there was a moderately concentrated market in Mexico. Although there were 18 airlines, Mexicana de Aviación had a 49.6% market share. Until 2005, Mexican airlines disappeared but, paradoxically, the market became deconcentrated, being now Aeroméxico the dominant company. Since 2008, the number of airlines has been decreasing and the companies have been distributing the market, making it deconcentrated. Already in 2015, the dominant company is Volaris, in Mexico 9 airlines operate with an HHI of 888.

Table 4. The 20 international routes of Mexico with greater flow of passengers in 2015

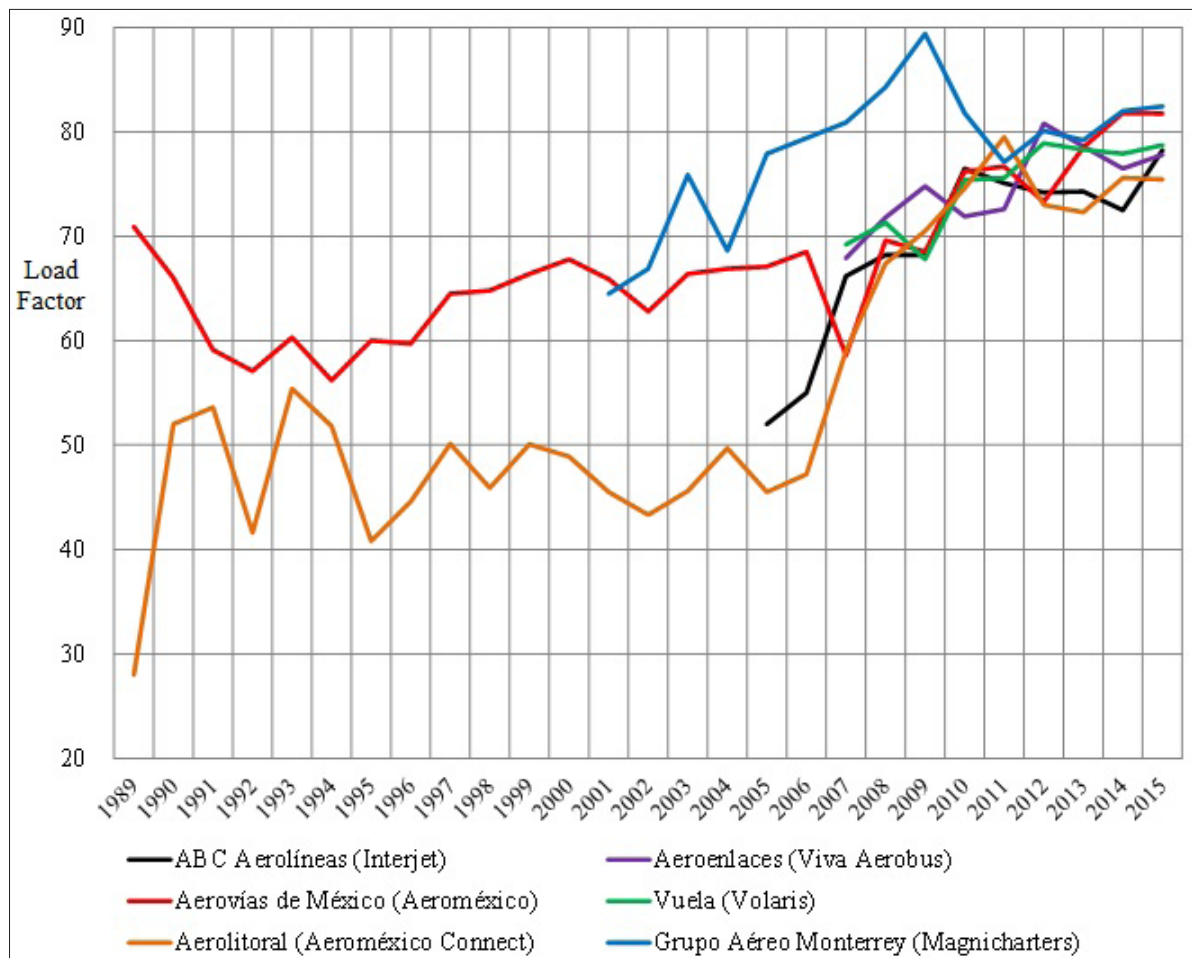
Year	HHI*	Number of airlines in operation	Dominant firm
1991	2,494	18	Mexicana de Aviación, 49.6% of market share (Declared bankrupt on 28 August 2010)
1995	1,418	19	Aerovías de México (Aeroméxico), 35.5% of market share.
2000	1,441	11	Aerovías de México, 40.7% of market share.
2005	1,294	11	Mexicana de Aviación, 31.9% of market share.
2008	870	14	Mexicana de Aviación, 23.3% of market share.
2009	934	12	Mexicana de Aviación, 21.6% of market share.
2010	763	11	Aerovías de México, 20.7% of market share.
2015	888	9	Vuela (Volaris), 24.4% of market share.

Note: * The Herfindahl-Hirschman index of market concentration is calculated by adding the squares of the individual shares of the firms making up the market. When the value of the HHI is less than 1500, the market is considered to be deconcentrated. HHI values between 1,500 and 2,500 are considered as moderately concentrated markets. When the value is greater than 2,500 it is considered a highly concentrated market (The United States Department of Justice, 2010).

Source: Own elaboration with data from SCT (2016)

According to data from the Ministry of Communication and Transportation SCT (2016), in 2015 the five national companies that carried the largest number of passengers in domestic and international service and accounted for 95.9% of the total market in that year, are stated As follows: Volaris (24.4%), Aeromexico (22.5%), Interjet (22.3%), Aerolitoral (17.1%) and Viva Aerobus (9.6%). In the last 25 years, in Mexico, 35 airlines have operated, in 2015 only nine operated, without considering the charter companies. Regarding the passenger load factor used as a measure of performance for each of the six main airlines operating in Mexico, it has been that until before 2007, the performance was not good since dominant companies like Aeromexico and Aerolitoral had factors of Occupancy less than 70% and 50% respectively. Aeromexico operated airplanes with 30% of idle seats (see figure 5).

Figure 5. Passenger load factor of the six regular national airlines in Mexico



Source: Own elaboration with data from SCT (2016)

It can also be seen that as of 2009, the load factor reported by the six airlines improved considerably, in fact, all airlines report load factors greater than 75% in 2015, with Aeromexico and Magnicharters, reporting the highest load factors greater than 80%. In

Mexico there are only eight national airlines that carry the largest number of passengers, the supply they generate is very small compared to that of the United States airlines. The flight team available in 2015 to operate by these eight airlines is 301 aircraft only. This number of aircraft generates a total offer of 39,473 seats. Aeromexico and its subsidiary Aerolitoral hold a dominant position since both airlines have 125 aircraft (41.5%) and 15,638 seats available (39.6%). With regard to employment, the eight airlines in 2015 employed 16,974 people, Aeromexico being the largest employer. Deepening the subject of personnel, it is observed that Aeromexico absorbs a large part of the administrative staff of Aerolitoral, which makes the latter company more profitable.

Some of the inefficiencies of Mexican airlines are observed in the high percentage of administrative staff they own, particularly Volaris. The most efficient companies are those with a higher percentage of personnel assigned to pilots and crew. Data from SCT (2016) indicates that Mexico's airport infrastructure in 1991 consisted of 82 airports, 44 were international. In 2005, 29 airports were classified as nationwide. By 2015, 63 were international airports.

3.3.2 Performance of United States airlines in the Mexican aviation industry

With respect to the number of Mexican cities served by foreign airlines, in 1991, only 12 cities were served, reaching a maximum of 38 cities in 2007, and by 2015, 32 cities are served. There has been a growth of 316% in 25 years in the number of Mexican cities served by foreign airlines. The supply of US airlines is much higher than the Mexican one, the five companies that carry more passengers to and from Mexico are: United Airlines, which owns 713 aircraft, American Airlines 687, Delta Airlines 882, U.S. Airways 340 and Alaska Airlines 137 aircraft. Among those five airlines own 39% of the total US commercial aircraft fleet. Together they own 2,759 aircraft out of a total of 6,788 (U.S. Department of State, 2007). In 1991, United States airlines transported 83.9% of the total number of passengers transported by foreign companies. From that date onwards, they lost market share, reaching 74.4% in 2010 and 69.8% in 2015.

Table 5. Total passengers transported by foreign companies in regular operation in Mexico (thousands)

Year	United States Airlines	Canadian airlines	European Airlines	Center and South American Airlines	Asian Airlines	Total	Market Share of United States Airlines
1991	4,599	115	416	307	42	5,479	83.9%
1995	5,212	153	580	509	74	6,528	79.8%
2000	7,872	63	1,085	725	54	9,799	80.3%
2005	11,998	584	1,577	961	59	15,179	79.0%
2010	13,431	1,697	1,662	1,255	2	18,048	74.4%
2015	18,357	2,742	2,314	2,884	0	26,298	69.8%

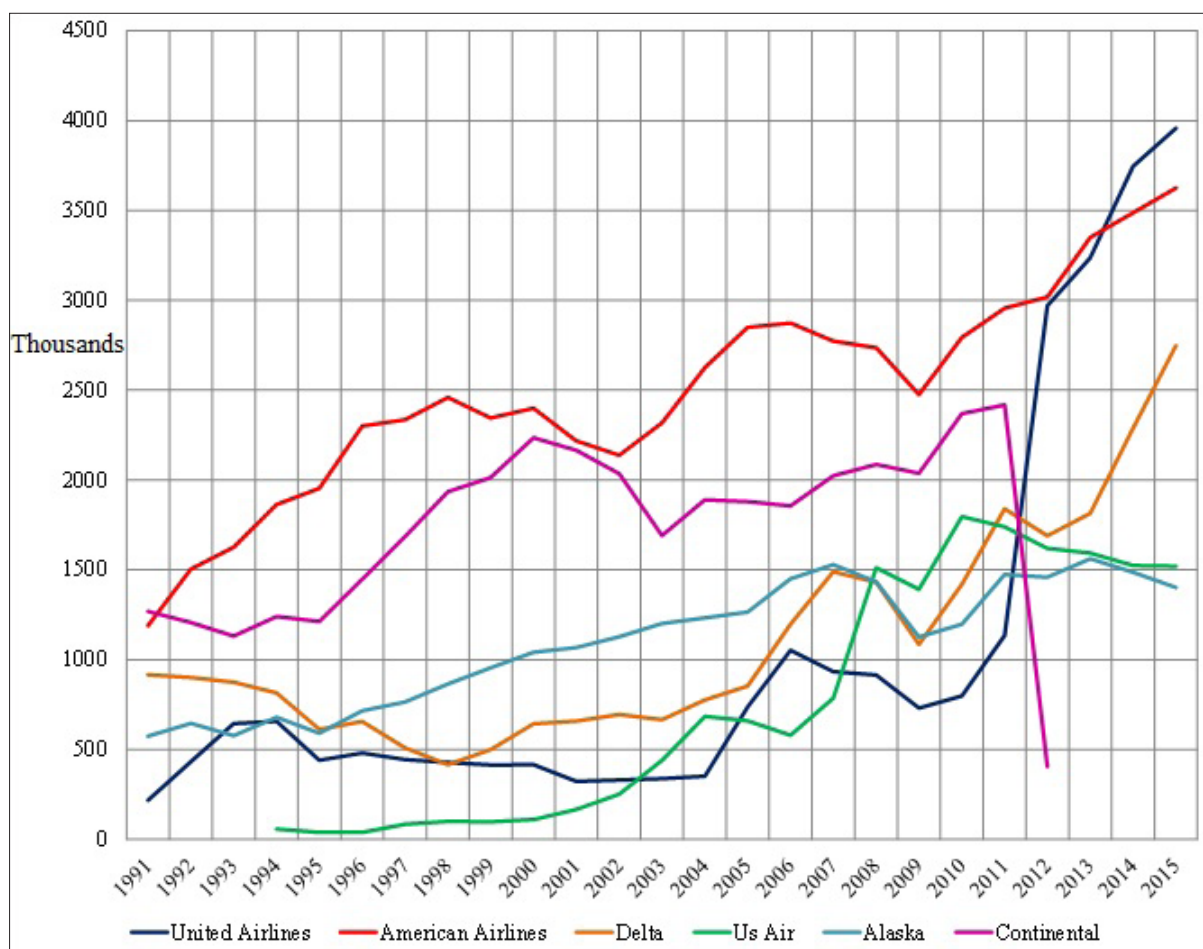
Source: Own elaboration with data from SCT (2016)

By 2015, according to data from SCT (2016), the five companies that carried the largest number of passengers in Mexico and accounted for 72.2% of the total market in that year are as follows: United Airlines (21.5 %), American Airlines (19.7%), Delta Airlines (14.9%), US Airways (8.2%) and Alaska Airlines (7.6%). Historically, American Airlines has been the dominant firm by number of passengers in Mexico since 1991 and until 2013. The second airline with the highest passenger flow since 1991 and until 2011 was Continental Airlines,

which in May of 2010 merged with United Airlines, making it the most transported airline in 2014 and 2015 (see figure 6).

Based on the Herfindahl-Hirschman concentration index (HHI), the market for US airlines operating in Mexico during 1991, 1995 and 2000 was moderately concentrated, with seven airlines operating in 1991 to 13 firms in 2000 in subsequent years, a greater number of airlines operated in Mexico until reaching 23 airlines with an HHI of 1,093 in the year 2008. From 1995 to 2010, American Airlines has been the dominant carrier with market shares ranging from 19.3% to 27.4%. In the year 2015, the dominant company has been United Airlines, derived from its merger with Continental. As a summary, it can be inferred that the market of airlines operating in Mexico has been concentrated, but maintains acceptable levels of competition.

Figure 6. The six United States airlines with the largest number of passengers transported to and from Mexico on regular service



Source: Own elaboration with data from SCT (2016)

4. THEORETICAL MODEL

This section of the document presents a theoretical Cournot model proposed by Alves and Forte (2015), the authors analyze the case of an open skies agreement between Brazil and the European Union, and it can be adapted without any problem to the case addressed in this document.

4.1 Cournot model for the analysis of the effects of the Agreement

As mentioned, in the case of open skies agreements, a greater number of airlines can operate a certain route. This part of the document tries to analyze whether the open skies agreement, which allows the entry of new airlines, would increase competition, reduce tariffs and therefore benefit consumers. In this sense, the scenarios are related to the entry of airlines in certain market segments and the implementation of collusion between two airlines, one of which is the incumbent.

The profit of a firm depends on how much it produces and sells. But the profit of a firm depends also on how much its rival produces and sells. The more its rival sells, the lower the market price will be, and the lower its profits. There is a payoff interdependency. Each firm knows that if it can unilaterally increase its market share by producing more, its profits will increase. However, each firm also knows that if all firms compete aggressively for more market share, they will be all worse off. Thus lower prices will lower both aggregate and individual profits. The theoretical model is adapted from Alves and Forte (2015); the description of the model is depicted in the annex.

The model assumes constant marginal costs for each airline. The reverse demand (price) function of a particular airline is defined as the function of the traffic or flow of passengers that is satisfied by the competitors (Cournot competition). The adapted model represents the international market between the United States and Mexico and consists of three market segments: New York (JFK) – Mexico City (MEX), from Mexico City (MEX) to Morelia (MLM) and New York (JFK) to Morelia (MLM). It is assumed that in this market only three airlines operate (United Airlines, Aeromexico and Aeromar), the first being a US airline.

In the initial situation, United Airlines is only present in the JFK-MEX segment. While Aeromexico and Aeromar are present on the MEX-MLM route. So none of the three airlines operate the full JFK-MLM route. Under this scenario, a tourist who would like to travel from New York to Morelia must buy two tickets, the first to transport him from JFK to MEX and the second ticket that takes him from MEX to MLM but can be from either of the two local airlines. The first segment of the route is a monopoly; the second part is a duopoly. Under this initial scheme, three possible scenarios are presented.

4.1.1 Expected effects of the Agreement

In the first scenario, United Airlines enters the JFK-MLM route allowing the firm to be present in the three market segments (JFK-MEX, JFK-MLM and MEX-MLM). So while United is the only airline operating international flights (monopoly), competition increases on the MEX-MLM route. When comparing the results of the initial situation and the results presented in this first scenario, the model suggests that prices on JFK-MLM and MEX-MLM routes should decrease. The effect on the JFK-MEX segment is not clear, as it depends on several factors. Because the JFK-MEX route does not have many substitutes, the price should increase, as the open skies agreement does not introduce additional competition, there is no pressure to reduce the price. Again, the JFK-MLM segment should be cheaper because it is offered by United Airlines.

This result is consistent with the conclusions of Cournot (1838), that is, in the case of two complementary goods (JFK-MEX and MEX-MLM routes) that are produced by a single firm, prices will be lower and larger quantities. So it benefits the consumers of the full route. Similarly, United Airlines will have greater profits than the sum of Aeromexico and Aeromar's profits when it comes to the MEX-MLM route and United will have higher profits under the open skies agreement. Aeromexico and Aeromar will have lower profits under the open skies agreement as competition increased and lower prices were established. One important finding is that passengers benefit from the open skies arrangement for the

JFK-MLM and MEX-MLM route segments. Considering the effects on tourism, it would necessarily increase the number of tourists that would travel to Morelia, due to the decrease of prices. On the other hand, passengers on the JFK-MEX route will experience higher prices because the route remains monopolistic.

In the second scenario, United Airlines enters the MEX-MLM market and Aeromexico enters the JFK-MEX market. As a result, JFK-MEX market competition is increased compared to the first scenario, since the JFK-MEX route is operated by two companies while Aeromar only operates the MEX-MLM route. Comparing the expected results from the initial situation, in the second open skies scenario, prices in the three segments (JFK-MEX, MEX-MLM and JFK-MLM) would decrease, increasing the number of passengers and benefiting passengers in all markets. With respect to airlines' profits, the effects of liberalization are not uniform. While Aeromexico earnings increase in this second scenario, Aeromar is damaged by deregulation, which reduces its profits, because the MEX-MLM segment decreases in price. The entry of United Airlines into the MEX-MLM segment increases competition. Finally under this scenario, United's earnings will depend on the level of efficiency of the company.

In the third scenario, United and Aeromexico collude to operate JFK-MEX flights by offering JFK-MEX and MEX-MLM routes to their passengers under the collusion scheme, both firms agree on the amounts they will offer and maximize profits. Comparing the results from the initial situation against this third scenario, once again the price of JFK-MLM decreases and generates greater flow of passengers. The price in the MEX-MLM segment remains the same, as does the number of passengers. Analyzing airlines' earnings, it can be concluded that after the open skies agreement, United and Aeromexico earnings would increase. This increase is expected since the objective of collusion is the joint maximization of the profits of both companies. Finally, traffic in the JFK-MEX segment would be expected to increase or decrease as in the first scenario.

Comparing the expected results of the three scenarios, it is observed that the second scenario is the one that benefits the passengers the most due to the decrease of the prices in the three segments of the flight and is the one that would generate greater flow of passengers and tourists. However, this second scenario is also the one that generates more incentives for the collusion of the airlines since it is the third scenario that generates more profits for the airlines. The above results are summarized in table 6.

Airlines that do not have the ability to compete for new routes will be adversely affected, their profits will decrease, an assertion that contradicts expected effects in the literature. Part of this assertion is explained by the strategic behavior adopted by airlines, the restructuring of routes and networks, frequent flyer programs as well as the limited capacity of airports can delimit the positive effects expected by governments.

This paper has documented the power and market share in Mexico owned by Aeromexico and Delta Airlines. In order to keep their dominant positions in the industry, both airlines notified the Mexican Federal Competition Commission (COFECE, 2016) on May 8th, 2015 of their intention to carry out an alliance based on a Joint Cooperation Agreement, to operate all current and future flights between Mexico and the United States.

Table 6. Summary of expected results of the theoretical model

	Segment 1. JFK-MEX	Segment 2. MEX-MLM	Segment 3. JFK-MLM	Results of open skies against initial situation
Initial situation with no open skies	Only United Airlines (monopoly)	Two options: Aeromexico or Aeromar (duopoly)	No airlines	
First scenario. Because of open skies, United enters the complete route JFK-MLM.	One option: United Airlines (monopoly)	Three options: Aeromexico, Aeromar, and United.	One option: United Airlines	Price decreases in segments 2 and 3, more passengers because of the increase in competition. United get more profits. Aeromexico and Aeromar get less profit.
Second scenario. Because of open skies, United enters the route MEX-MLM and Aeromexico enters the route JFK- MEX.	Two options: United Airlines and Aeromexico (duopoly)	Three options: Aeromexico, Aeromar and United.	Two options: Aeromexico and United	More competition in JFK-MLM route. Decrease in prices in the three segments, so there will be more passengers. Aeromexico gets more profits. Due to deregulation, Aeromar will get less profit. United's earnings will depend on the efficiency level of the company. It is the most beneficial scenario for passengers and the one that attracts more tourists to Mexico. But it is also the one that generates more collusion incentives for airlines.
Third scenario. United and Aeromexico colluded over quantities to operate the JFK-MEX route.	Two options: United Airlines and Aeromexico (duopoly)	Three options: Aeromexico, Aeromar and United.	Two options: Aeromexico and United	More competition in JFK-MLM route. Decrease in prices in the three segments, so there will be more passengers. Delta and Aeromexico get more profits. Aeromar will get less profit.

Source: Own Elaboration

Evidence has also been presented indicating the merger and alliances that have taken place since 2005 both in Mexico and the United States, in response to increasing competition among airlines, as well as the change in consumer behavior and due to the reinforcement of companies operating under the low-cost business model. The traditional airlines that have a dominant position have formed alliances that ideally will allow them to generate savings through economies of scale and that should be reflected in price reductions. However, these alliances must be approved by the responsible agencies in both countries, given the potential risk of affecting the market when the efficiency gains derived from these agreements, instead of being passed on to consumers, translate into price increases (Kwoka & Shumilkina, 2010).

Some of the risks of alliances according to COFECE (2016) are: a) the elimination of competitive pressure in those routes where the airlines collude, being that before the signing of the agreement they competed; b) by increasing their presence and market power in the routes where they originally coincided, can increase prices, reduce the supply of routes or prevent the entry of new competitors and c) generate effects of concentration of slots in the airports where they coincide, which gives them competitive advantage over competing airlines.

Considering this, COFECE (2016) found that the combined market power of Aeromexico and Delta would give them the ability to raise prices without other companies being able

to counteract this effect. Limits were also encountered on the entry or development of competing airlines (current and potential) on the routes to and from Mexico City, due to the saturation of the Mexico City Airport and the hoarding of the designations by part of Aeromexico and Delta.

5. CONCLUSION

The United States open skies policy since 1992 has been very beneficial to that country. However, in Mexico, US airlines have been losing market share to airlines in other countries, from 83.9% in 1991 to 69.8% in 2015. The Bilateral Air Services Agreement between Mexico and the United States specifies that all cargo and passenger airplanes of both countries will allow any airline to make one-way flights from the United States to Mexico and to another airport to collect and unload, and whether passengers or cargo to airports throughout Mexico and within the United States.

In the “open skies” policy, the airlines market for both countries is basically opened. It is important to mention that derived from this agreement, the United States allows to process requests of alliances between airlines of both countries. However, it is in freight flights where greater freedoms are opened, since Mexico is an exporting country, thus opening the 6th and 7th freedoms. Fundamentally since the last 25 years, Mexican airlines have lost market share. For example, in 1991, domestic carriers transported 73.9% of total passengers, now in 2015, transporting 63.2%. The loss of market by domestic companies could be even greater with the entry into force of the new agreement of open skies signed between Mexico and the United States.

In order for Mexico to continue maintaining high levels of international tourist arrivals, it is necessary to improve and strengthen mobility and connectivity policies from the point of origin to the destination. The information analyzed suggests that Mexico should strengthen the Mexican national aviation industry so that it can be more competitive, particularly with the United States aeronautics industry as its main market for tourists to Mexico.

Although air service liberalization agreements with the United States and Canada as an open skies strategy increase Mexico’s connectivity and increase the tourists arrivals, it is recommended to focus on increasing connectivity with those secondary markets with greater potential, particularly using a low-cost business model that allows you to boost tourist destinations from point to point.

One strategy that may represent better scenarios for Mexico is to first strengthen the domestic market, while at the same time strengthening the productivity and capabilities of Mexican airlines. In the last 25 years, in Mexico, 35 airlines have operated; in 2015 only operate 9, without considering the charter companies. The supply of US airlines is much higher than the Mexican ones, the five companies that carry more passengers to and from Mexico are: United Airlines, which owns 713 aircraft, American Airlines 687, Delta Airlines 882, U.S. Airways 340 and Alaska Airlines 137 aircraft. Those five airlines own 39% of the total US commercial aircraft fleet. Together they own 2,759 aircraft out of a total of 6,788 (U.S. Department of Commerce, 2007).

After reviewing the evidence and analyzing the performance of Mexican and US airlines, the bilateral agreement between Mexico and the United States known as “open skies” will increase international trade in goods and services, being the United States aeronautical industry that will benefit most due to the superiority of the fleet of aircraft over the Mexican and to the difference so notorious in the performance of both industries.

Finally in 2016, 48% of international tourists arrived in Mexico by plane, these results indicate the importance of airplanes as a means of connectivity for the tourism industry in

Mexico. Once the arguments and figures are set forth, it is only to be hoped that the open skies agreement will bring with it the positive effects announced, so that empirical research is needed to identify and quantify the true impacts of this policy. For the time being, the theoretical Cournot model presented indicates that airlines that do not have the ability to compete for new routes will be adversely affected, their profits will decrease, an assertion that contradicts the expected effects in the literature.

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ANNEX

The next section describes the Cournot model adapted from Alves and Forte (2015). It is assumed that airlines compete in quantities. The following notation is used:

NL = is the route from New York to Morelia.

NM = is the route from New York to Mexico City.

ML = is the route from Mexico City to Morelia.

P_{NL} = Is the reverse demand function for the market segment New York to Morelia.

P_{NM} = Is the reverse demand function for the market segment New York to Mexico City.

P_{ML} = Is the reverse demand function for the market segment Mexico City to Morelia.

a = is the reserve price in the market New York to Mexico City.

b = is the reserve price in the market Mexico City to Morelia.

c = is the marginal cost.

d = is the reserve price in the market New York to Morelia.

x = is the quantity demanded of the route New York to Mexico City.

y = is the quantity demanded of the route Mexico City to Morelia.

z = is the quantity demanded of the route New York to Morelia.

π = profits of United Airlines.

π_1 = profits of Aeromexico.

π_2 = profits of Aeromar.

The following tables depict the equilibrium prices, quantities and airlines profits under the different scenarios described in this paper.

Table A.1. Before liberalization, is the initial situation with no open skies

Equilibrium prices	Quantities (traffic)	Airline's profits
$P_{NM} = \frac{1}{12}(3a - b + 4c + 3d)$	$x = \frac{1}{12}(9 + b - 4c - 3d)$	$\pi_1 = \frac{1}{72}(3a - b - 8c + 3d)^2$
$P_{ML} = \frac{1}{3}(b + 2c)$	$y = \frac{2}{3}(b - c)$	$\pi_2 = \frac{1}{9}(b - c)^2$
$P_{NL} = \frac{1}{4}(a - b + 4c + d)$	$z = \frac{1}{4}(3d - a - b - 4c)$	$\pi_3 = \frac{1}{9}(b - c)^2$

Source: Adapted from Alves and Forte (2015)

Table A.2. Under first Scenario: because of open skies, United Airlines enters the complete route JFK-MLM

Equilibrium prices	Effect versus scenario before liberalization	Quantities (traffic)	Effect versus scenario before liberalization	Airline's profits	Effect versus scenario before liberalization
$P_{NM} = \frac{1}{2}(a + c)$	Ambiguous effect	$x = \frac{1}{2}(a - c)$	Ambiguous	$\pi_1 = \frac{1}{4}(a - c)^2 + \frac{1}{16}(b - c)^2 + \frac{1}{4}(d - c)^2$	Increase
$P_{ML} = \frac{1}{4}(b + 3c)$	Decrease	$y = \frac{3}{4}(b - c)$	Increase	$\pi_2 = \frac{1}{16}(b - c)^2$	Decrease
$P_{NL} = \frac{1}{2}(d + c)$	Decrease	$z = \frac{1}{2}(d - c)$	Increase	$\pi_3 = \frac{1}{16}(b - c)^2$	Decrease

Source: Adapted from Alves and Forte (2015)

Table A.3. Under second scenario: because of open skies, United Airlines enters the route MEX-MLM and Aeromexico enters the route JFK-MEX

Equilibrium prices	Effect versus scenario before liberalization	Quantities (traffic)	Effect versus scenario before liberalization	Airline's profits	Effect versus scenario before liberalization
$P_{NM} = \frac{1}{3}(a + 2c)$	Decrease	$x = \frac{2}{3}(a - c)$	Increase	$\pi_1 = \frac{1}{9}(a - c)^2 + \frac{1}{9}(d - c)^2 + \frac{1}{16}(b - c)^2$	Ambiguous
$P_{ML} = \frac{1}{4}(b + 3c)$	Decrease	$y = \frac{3}{4}(b - c)$	Increase	$\pi_2 = \frac{1}{9}(a - c)^2 + \frac{1}{9}(d - c)^2 + \frac{1}{16}(b - c)^2$	Increase
$P_{NL} = \frac{1}{3}(d + 2c)$	Decrease	$z = \frac{2}{3}(d - c)$	Increase	$\pi_3 = \frac{1}{16}(b - c)^2$	Decrease

Source: Adapted from Alves and Forte (2015)

Table A.4. Under third scenario: United Airlines and Aeromexico colluded over quantities to operate the JFK-MEX route.

Equilibrium prices	Effect versus scenario before liberalization	Quantities (traffic)	Effect versus scenario before liberalization	Airline's profits	Effect versus scenario before liberalization
$P_{NM} = \frac{1}{2}(a + c)$	Ambiguous	$x = \frac{1}{2}(a - c)$	Ambiguous	$\pi_1 = \frac{1}{8}(a - c)^2 + \frac{1}{8}(d - c)^2 + \frac{1}{18}(b - c)^2$	Increase
$P_{ML} = \frac{1}{3}(b + 2c)$	No change	$y = \frac{2}{3}(b - c)$	No change	$\pi_2 = \frac{1}{8}(a - c)^2 + \frac{1}{8}(d - c)^2 + \frac{1}{18}(b - c)^2$	Increase
$P_{NL} = \frac{1}{2}(d + c)$	Decrease	$z = \frac{1}{2}(d - c)$	Increase	$\pi_3 = \frac{1}{9}(b - c)^2$	No change

Source: Adapted from Alves and Forte (2015)

AIRLINE ITINERARY CHOICE IN A DYNAMIC SUPPLY ENVIRONMENT: RESULTS FROM A STATED PREFERENCE SURVEY

Uzi Freund-Feinstein¹

Shlomo Bekhor²

ABSTRACT

This paper investigates the choice of airline itineraries in dynamic settings using a tailored stated preference survey. The paper hypothesizes that airline itinerary choice is not a one-time event, but a continuous process during a certain time frame. Consumers can choose either to purchase an itinerary, deferring choice up to the end of the sales period, or completely declining the purchase. Understanding such consumers' behavior is specifically relevant to the tourism industry, where firms are extensively utilizing internet websites to offer their products (e.g., airline tickets, hotel rooms) to consumers.

The paper describes the stated preference survey with real itineraries of various airlines on medium and long-haul routes. Choice sets are composed with dynamic and static variables and socio-economic variables. Questionnaires were distributed electronically among various groups of respondents, yielding a sample of 914 persons.

Results show that (i) itinerary choice deferring takes place, with differences between tourists and business-travelers, (ii) the decision whether to defer choice is affected by dynamically changing variables and by the length of each respondent's allocated choice period, and (iii) the proposed methodology is adequate for investigating choice in dynamic settings and thus indicating its potential for further research in transportation planning and in tourism.

Keywords: Air Transportation, Discrete Choice Modeling, Dynamic Choice, Travelers Behavior.

JEL Classification: B49, C33, C35, L93

1. INTRODUCTION

The choice of products and services in many industries and economic sectors is performed in an increasingly dynamic environment, compared to the situation a few years ago. Traditionally, the marketing of products and services, as well as choice behavior, were conducted in a relatively static environment. Consumers relied on suppliers to provide them with pricing and availability quotes during working hours, needing to choose the product in a specific place and in person, which led to consumers enjoying less flexibility and conveniences.

The advent of the internet as a marketing channel created a new environment, which diversified the way in which manufacturers and suppliers market their products and services. This is also true in the air transportation industry, where airlines, travel agents and tour operators are proposing their products to their customers. In addition, this new medium enabled suppliers to diversify the information sources and selling channels for the consumers.

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Up until the establishment of the first web-based online travel agencies (e.g., Travelocity.com by SABRE in 1996) and airline websites (e.g. Alaska Airlines in 1995, quoted in Reed, 2005), consumers could obtain itinerary offers by either traditional offline travel agents or airline tickets sales offices. However, over the years, the implied benefits to both consumers and suppliers positioned this marketing channel as an increasingly important and popular one (Harteveltdt, 2012). As a result of the wide usage of this marketing channel, it is now being utilized by last-minute travel agents and content suppliers, and/or data search engines such as Google.

On the supply side, marketing of airline itineraries (similar to many other products and services) is performed dynamically as part of yield management practices (Talluri & van Ryzin, 2004). Such practices are needed given the nature of the itinerary product (i.e., flight and fare details) (Carrier, 2008) and its selling limitations. Itineraries are allowed to be sold during a sales period which ends at a fixed departure date, resulting in the inability of airlines to store their unsold capacity for future sale, leading to a potential loss of revenues. For example, a Monday morning flight which leaves the gate with 20 unsold seats, each priced at 600 US Dollars (USD), will result in a 12,000 USD of loss revenues because the airline will not be able to sell this capacity after the flight's departure. However, these seats are available again for sale for the following flight.

It is important to put into context such ability of airlines to utilize yield management practices, and communicate its outcomes to the consumers using the internet. These practices originate from the de-regulating of air transportation markets policy in key countries, and the success of these policies. The first and well known attempt in the field of air transportation is the Airline Deregulation Act of 1978 (i.e., ADA) in the United States (Talluri & van Ryzin, 2004). This new law reduced the US Government's intervention in the air transportation industry and allowed airlines to conduct, among others, competitive pricing and capacity management. The success of this policy change in the USA led other nations such as the Netherlands and the European Union to act similarly (Doganis, 2002) with other countries following in the years afterwards.

The combination of change in regulatory regime, which enables airlines to change fares and capacity freely and the ability to present these changes to consumers online and to make their choice through this channel, raises the question whether these dynamic changes and ability to monitor them online affect the consumers' choice behavior. This paper investigates the choice behavior during a sales period, in which alternatives might change partially or completely. The dynamic behavior of the supply side, represented by the product price and unsold capacity (in addition to other non-static itinerary characteristics), may change. We assume here that such changes occur because certain number of consumers are trying to find a desired itinerary and at least some of them are choosing an itinerary, which results in airlines and online travel agencies (OTAs) reacting with changes to capacity and fares.

In addition to this introduction, this paper provides in chapter 2 a literature review on consumers' choice behavior of airline itinerary products. In this chapter it is shown that almost all research efforts in this field treated the itinerary choice problem as a static event, and not as a dynamic one. Chapter 3 describes in detail the methodology employed for this paper, and the formulation of a web-based stated preference (SP) questionnaire which was used to gather airline itinerary product choice information. In chapter 4 we provide selected results from analyzing the SP questionnaire, and in chapter 5 we provide summary and conclusions from this study.

2. LITERATURE REVIEW

Airline itinerary choice was studied using various methodologies, with the first studies being available as early as 1970. Issues such as aircraft choice (Gronau, 1970), flight fare(s) effect on individual's choice of airline tickets on long-haul flights (Kanafani & Sadoulet, 1977; Nason, 1980), service levels and price (Ghobrial & Soliman, 1992), and the effect of frequent flyer program (FFP) membership on business persons' airline choices (Nako, 1992). Since these studies were mostly conducted prior to the first initiatives of online itineraries offerings and choice environment, choice deferring was not included in choice experiments, although it was possible through mediators (i.e., via travel agent). The advent of the internet during the second half of the 1990's, provided the consumers with the ability to eliminate mediators and search for utility maximizing itineraries by themselves. However, this development was not replicated into scientific methodologies in the field of airline itinerary choice.

One of the most frequent topics studied is the general choice of airlines on domestic and/or international services. The factors leading to airline choice in the US domestic air transportation system was investigated by Proussaloglou and Koppelman (1995) and Coldren *et al.* (2003). In addition, itinerary choice was investigated also in other countries, such as Israel and South Korea. Bekhor and Freund-Feinstein (2006) investigated passengers' preferences in the Israeli domestic air transportation system as quality of service indicators. Yoo and Ashford (1996) investigated choice behavior regarding international airlines, with application to South Korea.

In addition to the issue of general airline choice, several studies were conducted on specific issues affecting the choice of airline itineraries. The topic of airline(s) choice affected by FFP membership was again investigated by Chin (2002). Carlsson (1999) investigated the willingness of business and private travelers to pay for various enhancements of service and environmental attributes. Data was collected by a return-by-mail SP questionnaire which was distributed in domestic airlines and rail services in Sweden. The issue of willingness to pay for upgraded quality of service was studied again in 2012 by Zhang in the Chinese market. In this study three logit models were employed to estimate the influence of price and three quality variables on tourists and business-persons' choice of local Chinese airlines. In addition, WTP (willingness to pay) was calculated as well. Not similar to the methodology by Carlson (1999), Zhang used SP survey which was distributed in Shanghai Hongqiao Airport.

Araghi *et al.* (2016) studied the heterogeneity in air travelers' response to various passenger-oriented environmental policies, such as carbon offsetting fees, luggage allowance and ecoefficiency labeling of an airline. In this study the authors used SP surveys distributed among Dutch passengers flying transatlantic and used latent class modeling framework. Adler, Falzarano and Spitz (2005) investigated the tradeoff conducted by consumers when choosing a flight product in the US domestic air transportation system.

Passengers' choice was modeled on the topic of market shares due to its relevance to airlines' revenue management practices and strategies. Coldren and Koppelman (2005) used choice behavior data of passengers without indication to their trip purpose using RP (i.e., revealed preferences) questionnaires. Algiers and Beser (2001) studied the effect of passengers' choice on yield management in domestic and international flights using data from a 1994 SAS airlines research. The topic of choice behavior regarding different airline types, service characteristics, willingness to pay for low-cost airlines flights and passenger types was studied by Chang and Sun (2012). In this study the authors used SP questionnaires with different choice scenarios which was distributed in Taipei Airport, and analyzed using multinomial logit model (MNL).

Theis *et al.* (2006) investigated the effect of minimizing total trip duration on an airline market share with emphasis on minimizing connection time at the hub. The research methodology included an extended time-table survey, SP rating experiment, and a collection of socioeconomic data. Warburg, Bhat and Adler (2006) estimated business passengers' choices with data gathered from SP questionnaires. Research findings show that gender and income levels have the most influence on service attribute sensitivity, while frequent flier program (FFP membership), employment status, and travel frequency are also important determinants.

The possible influence of psychological characteristics on air transportation itineraries choice was researched as well. Fleischer, Tchetchik and Toledo (2012) investigated the effect of fear of flight on itineraries choice. As noted by the authors, such psychological phenomena might affect the consumer's decision making by giving emphasis on characteristics that implies better safety.

Although most studies were treating choice modeling as a static event, several newer studies started to look into dynamic aspects of itinerary choice. However, in these studies the methodological framework is still static in its nature. Among these, Collins, Rose and Hess (2012) investigated online choice of airline itineraries using various web search tools to narrow results according to the consumer's criteria. In order to conduct such investigation, an online SP questionnaire resembling an airline/OTA website was formulated and included searching tools similar to those found in airlines' and OTAs' websites. Although this study looked on an online itinerary search which in reality is being updated continuously, the experiment itself was kept static without changes to the choice sets.

Lin and Sibdari (2009) investigated choice behavior in relation to dynamic pricing. The authors tried to investigate dynamic pricing competition between firms offering similar products. They formulated a game-theoretic model which looks at the supply side, while using discrete-time model in order to emulate the demand side. Drabas and Wu (2013) examined the effect of departure date proximity to the purchase date at discrete levels (i.e., 90, 30 and 5 days prior to departure). Carrier (2008) researched the choice of an airline itinerary and a fare product. In this study, passenger choices data, as reflected by booking data (i.e., RP data) on European short-haul flights was provided for this study by Amadeus' OTA.

Wen and Chen (2017) have studied the booking timing of low-cost carriers' passengers in Taiwan. The authors collected data for 69 days of low-cost carriers only on a single route using fares published only at three airlines' websites serving the Taiwan-Singapore route. The modeling framework included an SP survey and choice data was modeled using continuous logit model. This study is quite different from our study on terms of modeling framework, data ranges, airline types and route types, and therefore compliments this study and provide a different viewpoint.

3. METHODOLOGY

Our methodology was designed to include several elements. First we formulate a theoretical model which includes both the demand (i.e., consumer's decision making) and the supply sides. Following the model section we detail the survey preparation and questionnaires distribution.

3.1 Supply, demand and choice behavior model

On our model we first formulate the demand side and the consumer's decision making process (see Figure 1). Consumers interested in purchasing an airline ticket have the ability

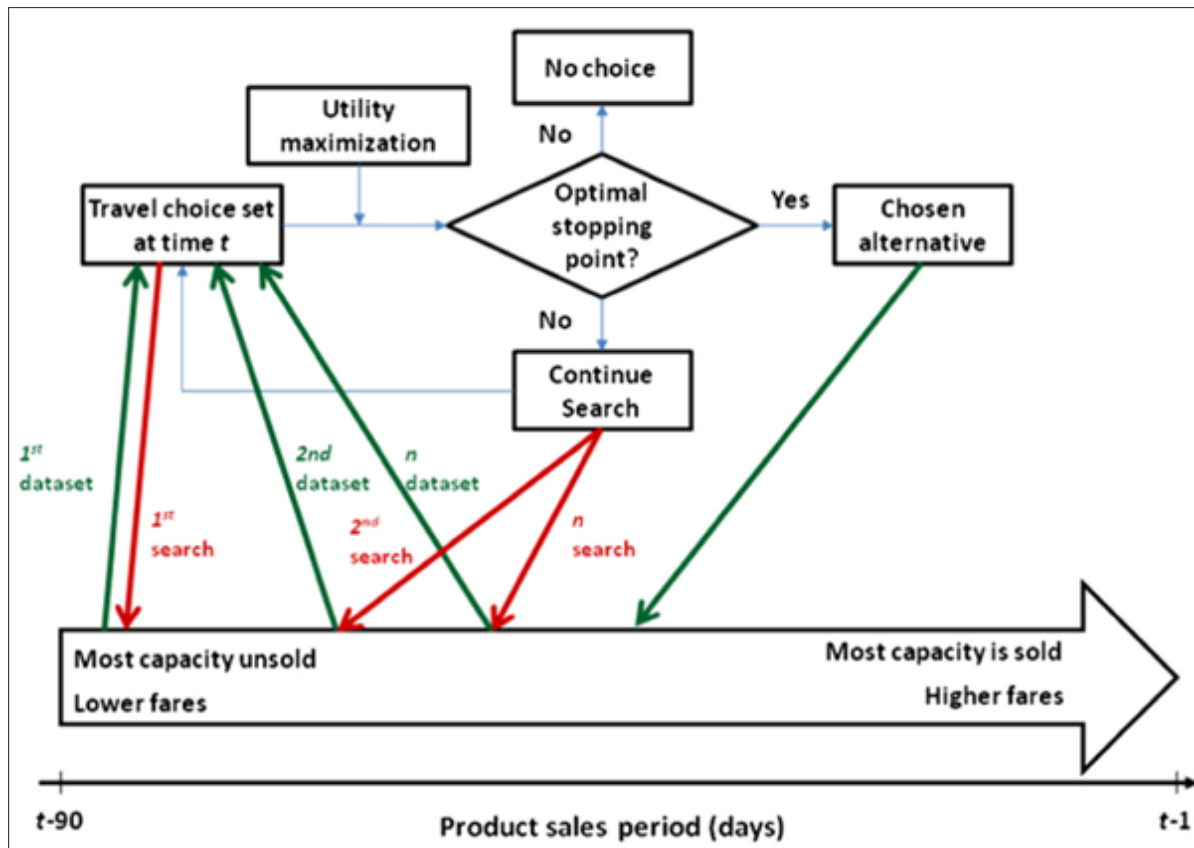
to access the offerings of air transportation firms using their websites or through a mediator's website (i.e., OTA). These online websites allow searching for itinerary products from the beginning of the sales period, till the designated departure date. In this paper we consider a sales period of 90 days. These websites offer consumers with the ability to monitor characteristics changes of these products during the itineraries sales period. These include fares, available capacity levels, and other details (e.g., punctuality and equipment types allocated to each flight). These monitored changes reflect, among others, the suppliers' yield management behavior, and other consumers' choice behavior. The ability to monitor these changes provides valuable inputs to airlines' consumers, who use it for utility evaluation. Consumers will tend to make efforts to maximize it, and choose the itinerary which fits best to their needs and wants. Based on this theory of utility maximization we formulate three possibilities open to the consumer. First possibility is to decide not to choose at all after receiving the initial search results. If consumers decide that the initial offering is not acceptable according to their requirement and/or desires (i.e., reaching optimal stopping point) but still wants to find a better offering, they can continue their search until they find an itinerary which provides them a desired utility maximization, or until the end of the sales period is reached or capacity is completely sold.

On the supply side, depicted on the lower part of Figure 1, airlines offer initial fares, classes and capacity at the beginning of the sales period. As time progress and consumers are starting to choose their itineraries, capacity decreases and fares are starting to rise. The latter is a result of each airline's yield management practices, as described by Talluri and van Ryzin (2004), and is affected also by the degree of competition on each O-D pairs and actions carried out by other airlines' yield management personnel. This might lead to change in fares, unsold capacity and equipment type utilized for each flight.

As can be understood from this model, the choice behavior of consumers and airlines decisions what to offer and when, affect each other. Consumers choices are argued to be affected by the airlines offerings and point in time when their search has begun (i.e., long/short before the end of sales date) which implies a risk of not being able to find a suitable itinerary or any itinerary at all). Airlines are argued to make their decisions based on forecasting and previous knowledge of demand patterns, but also based on how consumers behave during each sales period and how other airlines behave during the same period. Based on such influences, and the abovementioned ability to monitor offerings changes, we can hypothesize that consumer decides when and if to make a choice which maximize their utility which results in being able to purchase an itinerary.

From the research perspective, investigation of choice behavior when product attributes are being changed could be regarded as choice in dynamic settings. Although choice behavior was researched extensively in general and in the air transportation context as well, the majority of these studies dealt with choice in a static environment. Therefore the novelty of this paper is the incorporation of dynamic changing product characteristics to be treated as dynamic and not as static ones. In such scenario, the product/service is not being available all the time and at least some of its attributes do change to a certain degree during itinerary sales period.

Figure 1. Airline Itinerary Model Framework



Sources: Own Elaboration

3.2 Survey preparation

There are different methods to collect data about consumers' preferences. The first method is using real passengers' choices in the form of revealed preferences (RP) data, similar to the work by Carrier (2008). The second method is obtaining hypothetical choice data in the form of SP using real or hypothetical alternatives' attributes. The third method is the combined use of SP and RP methods. The benefits and disadvantages of each methodology are well documented in the literature (Freund-Feinstein & Bekhor, 2017).

In our specific study, a full RP survey requires the permission and cooperation of airlines and airports to collect data about passengers' choice and itineraries, and also to allow researchers to approach passengers for interviews inside airports. However, we could not obtain such permission to conduct a comprehensive RP study. Therefore, we opted to conduct a combined RP/SP survey, in which the revealed characteristics of the individual last flight formed the basis for the SP experiment, described in the following sections.

Given the purposes of this study, a complex questionnaire was designed in order to cover variety of choice scenarios with option to differ choice. Itineraries were formulated to include various types of routes, airline operations, service amenities and other characteristics of airline service and operations in order to genuinely represent real itineraries. Both tourists and business-travelers were included in the choice scenarios, as these passengers comprise the main users of air transportation.

In order to achieve these requirements it was needed to find several suitable medium-haul and long-haul routes for this study. In order to do so, all medium-haul and long-haul

flights originating from Tel Aviv Ben Gurion International Airport in Israel were analyzed, according to the following requirements:³

1. Airline mix. Markets which are served by a variety of airline types (i.e., full-service carriers {FSCs} and low-cost carriers {LCCs}); local airlines (both Israeli and foreign airlines from the destination countries); and, airlines which are members of a global alliance as well as airlines that are not affiliated with any alliance.
2. Multi-airport markets. Markets which are served by at least two airports.
3. Passenger mix. Both tourists and business-travelers for each destination.
4. Passenger volumes: Markets which attract a high number of passengers, reflecting a market's popularity and economic significance.

When we completed our analysis, four routes were chosen for itineraries data collection, as shown in Table 1. These included two medium-haul European routes and two long-haul North American routes.

Table 1. Medium and long-haul routes characteristics

Destination	Airline operations (passenger/flight) ¹	Airline ³	Frequency weekly ²	Airport ¹	Route	Model	Alliance
Berlin	257,000 (2.1%) / 1,815 (2.3%)	LY	13	SXF	Nonstop	FSC	None
		AB	16	TXL	1-stop	Hybrid	Oneworld
		AF	21	TXL	1-stop	FSC	SkyTeam
		BA	27	TXL	1-stop	FSC	Oneworld
		4U	7	SXF	1-stop	LCC	None
		LH	147	TXL	1-stop	FSC	Star Alliance
London	772,000 (6.2%) / 3,698 (1.9%)	LY	26	LHR	Nonstop	FSC	None
		BA	14	LHR	Nonstop	LCC	Oneworld
		U2	7	LTN	Nonstop	FSC	None
		AF	39	LHR	1-stop	FSC	SkyTeam
		LH	140	LHR	1-stop	FSC	Star Alliance
New York	1,194,000 (9.6%) / 4,019 (2.0%)	LY	29	EWR and JFK	Nonstop	FSC	None
		DL	7	JFK	Nonstop	FSC	SkyTeam
		UA	28	EWR	Nonstop	FSC	Star Alliance
		AC	21	EWR	1-stop	FSC	Star Alliance
		AF	42	JFK	1-stop	FSC	SkyTeam
		BA	112	EWR and JFK	1-stop	FSC	Oneworld
		LH	28	EWR and JFK	1-stop	FSC	Star Alliance
Toronto	139,000 (1.1%) / 784 (2.1%)	LY	4	YYZ	Nonstop	FSC	None
		AC	14	YYZ	Nonstop	FSC	Star Alliance
		AF	NA	YYZ	1-stop	FSC	SkyTeam
		BA	26	YYZ	1-stop	FSC	Oneworld
		LH	28	YYZ	1-stop	FSC	Star Alliance
		UA	55	YYZ	1-stop	FSC	Star Alliance

1 Nonstop flights only / 2 Combined number of nonstop and single stopover flights / 3 See Appendix A for list of airline and airport codes⁴

Sources: Airlines websites (2012); Civil Aviation Authority Israel (2013)

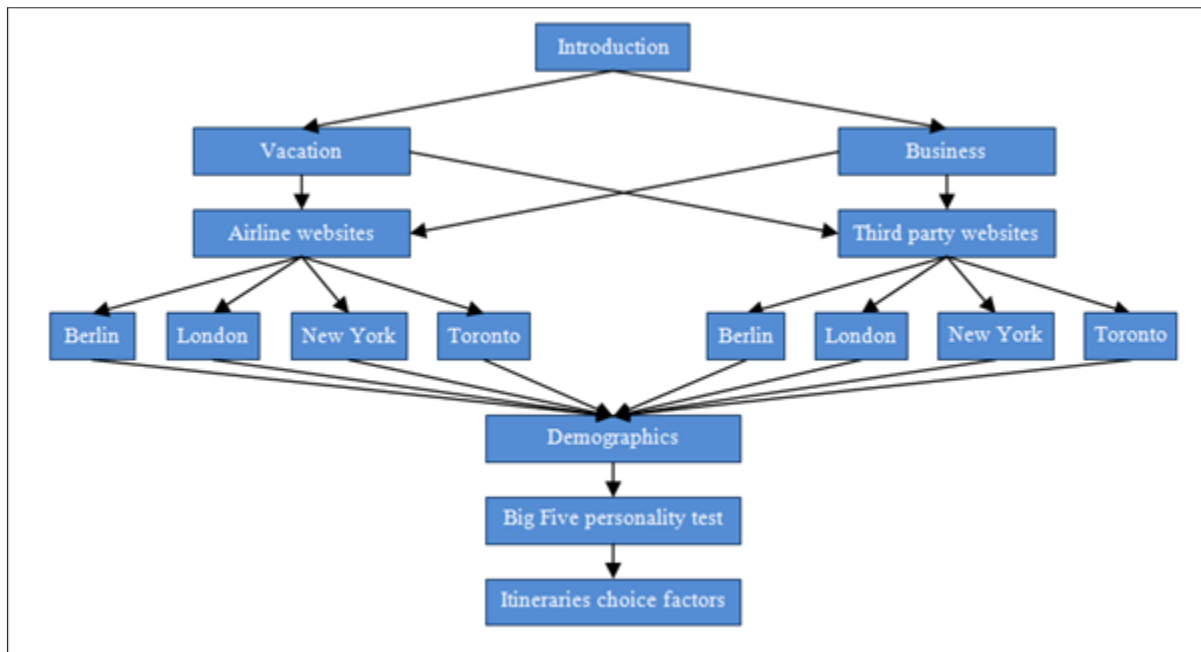
The questionnaire was designed and formulated using the Qualtrics web platform. This platform supplier was chosen based on its availability, this study's technical requirements and the platform's promised performance. Among this study's requirements it is worth mentioning the ease of questionnaires distribution (e.g., link by email, use of mailing lists, etc.), minimal need of local IT infrastructure, ease of questionnaires design and implementation

³ Medium-haul and long-haul flights are the most common types, offerings originating from Tel Aviv Ben Gurion International Airport (i.e., the airport used in the empirical application in this study). Short-haul routes, with flight time of up to three hours, were not included in this study because it was found that there are not many variations between alternatives, the small number of such routes originating from Tel Aviv Airport, and since these routes are mostly serving vacation destinations which are not used by many business-travelers.

⁴ This compilation is based on 2012 airlines' timetables and passenger numbers originating from Tel Aviv Ben-Gurion International Airport. Data was gathered from each airline's website and from the Civil Aviation Administration Israel website. For list of airlines data sources, see in the references section.

and technical assistance provided by the Qualtrics personnel. The questionnaire consisted of three parts, as depicted below in Figure 2.

Figure 2. Questionnaire Structure



Source: Own elaboration, based on Freund-Feinstein (2015)

3.2.1 Part one: introductory information

The first part of the questionnaire included introductory information, filling-in instructions and a link to an ethics declaration which was composed for this questionnaire. Following this introductory section, and prior to continuing to the second part of the questionnaire, several questions were formulated. First, a filtering question was included in order to allow participation to persons which has minimal experience with using international air travel (i.e., flew at least once during the past three years) and/or experience with choosing itineraries online.

Second, in order to match respondents to the questionnaire type appropriate for them, they were asked to state what was the purpose of their last trip (i.e., vacation or business-trip). The last question in this section was the type of travel expense provider (i.e., the respondent himself or the respondents' employer).

3.2.2 Part two: SP experiments

The second part of the questionnaire included SP experiments with choice sets formulated with real airlines itineraries. Since this questionnaire was designed for two types of passengers, four destinations and itinerary details available in two types of distribution channels, a total of 16 versions were needed (see Table 2). Each version consisted of 29 choice sets, representing the available itineraries for each day in a single hypothetical month, which reflected the final stage of the itineraries sales period⁵. Although a large number of itineraries were included in each SP version, not all of them were made available for each respondent. In order to get variations of choice periods and flight destinations offered to the respondents, a random numbers engine was embedded in each questionnaire which gave a different flight destinations and length of choice periods to each respondent. For example, one respondent

⁵ Although regarded as a hypothetical month, the itineraries data was taken from airlines websites and from an OTA's website.

could get a choice set of itineraries to New York with an assigned choice period of 15 days (i.e., choice starts 15 days before departure date), while the next respondent might receive a set representing the itineraries available to Berlin with an assigned choice period of four days, and so on. This variability provides the ability to conduct choice estimation with the effect of variable starting dates compared to a fixed date of departure, and enables the analysis of the effect of short vs. long choice period on choice behavior.

Formulation of itineraries' choice sets required itinerary data from airlines' and OTA's websites. Therefore, requests for providing itinerary products data were sent to various airlines, OTAs and GDS's (i.e., global distribution systems) providers but these were turned down, in many cases on grounds of commercial secrecy. As a solution to lack of cooperation from the above mentioned entities, itineraries data were gathered manually during April and May of 2012 from ten airline websites (Air Berlin, Air Canada, Air France, British Airways, Delta Air Lines, easyJet, El Al, Germanwings, Lufthansa, United) and from one OTA website (Travelocity.com). Itinerary data gathering for choice sets formulation was conducted in a similar way to the method suggested by Pope *et al.* (2009). Under this methodology simultaneous requests for itinerary quotes were placed at the airlines' and the OTA's websites. This data retrieval was carried out by accessing these websites simultaneously on a daily basis at the same time during the data gathering period. These search results were saved as screen shots in a PDF file format, and were converted into an Excel file which contained all itineraries' data. This file, in turn, was used as the basis for compiling the choice sets when formulating the SP questionnaire.

Although airlines and OTA websites provided almost all the needed data, it lacked punctuality information. As a solution, this technical data was gathered from flightstats.com website (Flightstats, 2012). This data provider is a specialized website dedicated for collecting and providing airlines operational indicators.

Table 2. Questionnaire Composition

	Passenger type	Distribution channel	Destinations
1-4	Tourists	Airlines websites (AWS)	Berlin (SXF, TXL), London (LHR, LTN), New-York (EWR, JFK), Toronto (YYZ)
5-8	Tourists	Online travel agencies (OTA)	Berlin (SXF, TXL), London (LHR), New-York (EWR, JFK), Toronto (YYZ)
9-12	Business	Airlines websites (AWS)	Berlin (SXF, TXL), London (LHR, LTN), New-York (EWR, JFK), Toronto (YYZ)
13-16	Business	Online travel agencies (OTA)	Berlin (SXF, TXL), London (LHR), New-York (EWR, JFK), Toronto (YYZ)

Source: Own elaboration, based on Freund-Feinstein (2015)

In order to create itineraries for the questionnaire it was needed to decide which variables would be included. First, a list of variables from past choice studies was formulated (See Appendix Two, in Freund-Feinstein, 2015). Based on this list, variables from the real itineraries that were gathered were chosen. The list included both dynamically changing variables and static itinerary variables, and levels for each variable was added from the before mentioned real itineraries. Table 3 provides the choice variables and their levels. It is important to note that unsold capacity in each day is not revealed to consumers until there are 10 seats or less available for sale. Therefore, we compiled a simple formula using the selling curve of FSC's and LCC's from Carrier (2008) and capacity in tourists class listed in seatguru.com (2012a, 2012b). Selected pictures of the itineraries choice sets are included in Figure 3.

Table 3. Itinerary Variables

Variable	Possible values	Airline websites (AWS)	Online travel agency (OTA)
Dynamic changing variables			
<i>Fare (USD)</i>			
Medium-haul	0-2,000	408.42-1,710.00	546.49-1,430.69
Long-haul	700-3,000	1,168.00-2,595.00	1,035.19-2,782.69
<i>Cancellation fees (USD)</i>			
Medium-haul	0-100% ticket fare	0-1,710.00	0-1,430.69
Long-haul	0-100% ticket fare	0-2,595.00	0-2,782.69
<i>Seats left for sale per flight</i>			
Medium-haul	0-9, ≥10	0-9, ≥ 10 ≤ 432	0-9, ≥ 10 ≤ 432
Long-haul	0-9, ≥10	0-9, ≥ 10 ≤ 432	0-9, ≥ 10 ≤ 432
<i>On-time performance % (OTP)</i>			
Medium-haul	0-100%	0-100%	0-100%
Long-haul	0-100%	0-100%	0-100%
<i>Number of days till departure</i>			
Medium-haul	2-30	2-30	2-30
Long-haul	2-30	2-30	2-30
static itinerary variables			
<i>Airline names</i>			
Medium-haul	AB, AF, BA, U2, LY, 4U, LH	AB, AF, BA, LY, LH, U2, 4U	AB, AF, BA, LY, LH
Long-haul	AC, AF, BA, DL, LY, LH, UA	AC, AF, BA, DL, LY, LH, UA	AC, AF, BA, DL, LY, LH, UA
<i>Time of departure</i>			
Medium-haul	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night
Long-haul	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night	Morning, Day hours, Noon, Afternoon, Evening, Night
<i>Time of Arrival to final destination</i>			
Medium-haul	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival
Long-haul	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival	Morning, Day hrs, Noon, Afternoon, Evening, Night, Next day arrival
<i>Destination airport</i>			
Medium-haul	TXL, SXF, LHR, LTN	TXL, SXF, LHR	TXL, SXF, LHR, LTN
Long-haul	EW, JFK, YYZ	EW, JFK, YYZ	EW, JFK, YYZ
<i>Layover times</i>			
Medium-haul	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs
Long-haul	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs	Non-stop, <2 hrs, 2-5 hrs, >5 hrs
<i>Layover airport</i>			
Medium-haul	Non-stop, CDG, CGN, LHR, MUC	Non-stop, CDG, CGN, LHR, MUC	Non-stop, CDG, CGN, LHR, MUC
Long-haul	Non-stop, CDG, EWR, FRA, LHR, YYZ	Non-stop, CDG, EWR, FRA, LHR, YYZ	Non-stop, CDG, EWR, FRA, LHR, YYZ
<i>Total flight time</i>			
Medium-haul	≤ 4.5 hrs, 4.5-5.5 hrs, >5.5 hrs	≤ 4.5 hrs, 4.5-5.5 hrs, >5.5 hrs	≤ 4.5 hrs, 4.5-5.5 hrs, >5.5 hrs
Long-haul	<12.5 hrs, 12.5-18 hrs, >18 hrs	<12.5 hrs, 12.5-18 hrs, >18 hrs	<12.5 hrs, 12.5-18 hrs, >18 hrs
<i>Legroom (Pitch)</i>			
Medium-haul	Small, Medium, Large	Small, Medium, Large	Small, Medium, Large
Long-haul	Small, Medium, Large	Small, Medium, Large	Small, Medium, Large
<i>In-flight entertainment equipment (IFE)</i>			
Medium-haul	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen
Long-haul	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen	No IFE, Common screen, Personal screen

Source: Own elaboration, based on Freund-Feinstein (2015)

Figure 3. SP Questionnaire Interface

Flights from NYC to Tel Aviv

The following are the flight itineraries available 3 days prior to the flight.

Please consider the flight options presented and decide the extent to which they meet the requirements.

If you choose to purchase one of the available options, rank your three preferred flight options in order of preference, where 1 = most preferred itinerary and 3 = least preferred itinerary.

You may choose to postpone your decision. To do this, click "yes" on the drop-down menu next to the option marked "I prefer to postpone my choice of an airline ticket to the next day".

	Flight Number	Departure Time	Arrival Time	Departure Airport	Layover	Total flight time	On-Time performance	Leg room	In-flight entertainment	Total price (USD)	Cancellation fee	Available seats	
 DELTA	269	00:40	05:30	JFK	Direct flight	11:50	76%	L (32")	Shared TV	1,738.00	Non-refundable	4	V
	027	10:40	15:55	EWB	Direct flight	12:15	26%	L (32")	Personal TV	2,078.99	Free	2	V
	001	01:00	05:40	JFK	Direct flight	11:40	36%	L (32")	Personal TV	1,830.89	Free	10+	V
	085	11:25	16:35	EWB	Direct flight	12:20	68%	M (30")	Personal TV	1,378.99	Non-refundable	10+	V
	085/762	13:10	07:58 (next day)	EWB	Toronto, 12:00	25:48	68%	L (32")	Shared TV	2,782.69	Free	10+	V
	222/006	08:10	16:10	JFK	Paris, 01:45	15:00	95%	L (32")	Personal TV	1,695.99	\$200	10+	V
	162/189	08:05	18:55	EWB	London, 04:35	17:50	95%	M (30")	Personal TV	1,748.19	\$100	1	V
	691/760	05:00	14:00	EWB	Frankfurt, 02:50	16:00	82%	M (30")	Personal TV	1,359.89	\$240	10+	V
	691/400	05:00	12:50	JFK	Frankfurt, 01:50	14:50	77%	M (30")	Personal TV	1,189.19	\$240	10+	V
I prefer to postpone my choice of an airline ticket to the next day													V

Source: Own elaboration, based on Freund-Feinstein (2015)

3.2.3 Part three: Personal data

The third part of the questionnaire consisted of three sections. The first section included socioeconomic questions which contained variables listed in Table 4. The second section is a shortened version of a standard personality questionnaire, Big-Five, which was formulated and tested by Gosling, Rentfrow, and Swann (2003). In general, the Big-Five personality questionnaire is frequently used in academia, is a well-established test of human personality in various scenarios, and thus suitable for this study, as shown by Costa, Terracciano and McCrea (2001); Lönngqvist, Verkasalo and Walkowitz (2011); Mehmetoglu (2012); Lehmann *et al.* (2013). The third section was designed to investigate the respondents' assigned level of importance to itineraries' service attributes, using a 5-point Likert type scale. It is important to note that only the first and second sections' answers were intended to be used in choice modeling, while the third part answers are used under the scope of this research for answers quality testing.

Table 4. Socioeconomic Variables

Variable	Levels
Gender	Male, Female
Age (groups)	Under 18 years old, 18-21, 22-25, 26-34, 35-44, 45-54, 55-67, 67+
Education	High school or less, Student, B.A./B.Sc., M.A./M.Sc./Ph.D
Household size (respondent included)	Single person, Two persons, Three persons, Four persons, Five persons, Six persons or more
Monthly income level	Above average, Slightly above average, Same as average, Slightly below average, Below average

Source: Own elaboration, based on Freund-Feinstein (2015)

3.3 Survey distribution

Following the completion of the questionnaire pretests, which led to a questionnaire improvements phase, a comprehensive distribution strategy was planned and executed, during the first quarter of 2014.⁶ The objective of the questionnaire distribution was to reach a significant number of respondents of various types, which was assumed to result in obtaining a large number of completed questionnaires. Three distribution methods were chosen in order to achieve this objective. The first method was mass distribution of the questionnaire using electronic mailing lists. The second method was using two types of social media allows also the distribution of the questionnaire to a wide variety of potential respondents. Although the two methods seem to be similar, there are a few fundamental differences between them. These include the degree of homogeneity of the target audience, and the ability to create a snowball effect. The third distribution method was distribution of emails to friends and colleagues' and personal face-to-face requests from participants in social events, all of them was conducted by the authors of this study. In all three distribution methods, potential respondents received a participation request of a standardized format, which included a link for the questionnaires. The only difference between them was that on method one and two the participation request was sent directly, and on method three the potential respondents were first asked to provide their email address so they will receive the questionnaire link afterwards. Questionnaires distribution was planned to be carried out during a period of few months with repeated requests to those who didn't respond when first approached.

Distribution was estimated to reach at least 10,000 persons. The main distribution channel consisted of electronic mailing lists with 6,212 entries of employees in several Israeli business entities and public organizations as well as the local academic communities. The latter included students, faculty and staff from all seven Israeli universities. The second distribution channel consisted of social media websites. These included Facebook and six popular Israeli internet forums managed by Tapuz.com, which is a major Israeli internet content provider. The use of such internet activity centers is considered to be a cost effective way to mass distribute questionnaires, since they attract numerous persons to view and share content and thoughts, sometimes on a viral scope. It is important to note that the exact number of persons exposed to this questionnaire through the second distribution channel is not known due to the anonymity of most persons viewing posts. However, it is estimated that at least 2,000 persons were exposed to participation requests, which could be considered a conservative estimation.⁷ The third distribution channel was regular email communications, used for distributing individual requests to persons outside the abovementioned mailing lists. The number of persons contacted through this channel is rather low, consisting of a total 317 persons. More than two-thirds (217) of these persons were mainly friends and relatives and former colleagues of this study's researchers. Although the usage of choice data obtained from such respondents (i.e., the third distribution channel) could be argued to be a source of potentially biased results, the small number of participants (compared to the total number of respondents) is assumed to significantly reduce the magnitude of such outcome in this study. A third of these persons were recruited using personal face-to-face requests to participate in this research. These requests were distributed during cultural activities of the Technion Alumni Organization (i.e., the authors' academic institute). The authors of this study was allowed in three occasions to position a promotional booth in the foyer of the Eretz Israel Museum conventions theater in Tel Aviv, where these activities took place, and

⁶ There is a time gap between gathering of itinerary data, and when the questionnaires were distributed. Such gap is explained by several issues, such as technical difficulties with the questionnaires preparation, bureaucratic issues and gathering of respondents details for the electronic distribution list. However, such a gap is not a problem in terms of validity of results, because the itinerary data is used to for choice games which can be formulated with pure hypothetical data.

⁷ Exposure estimation was based on the number of the participation's request posts views counters at each internet forum and on Facebook and from Qualtrics logs. This method does not include any exposure due to snowball effect which did materialize on a small scale.

approach the organization's members on their arrival. Every approached person was given a short oral description of the research and was asked to give his or her email address for a later delivery of further instructions, information and a link to the questionnaire itself. In addition, email addresses of Technion Alumni Organization members were obtained during these events without interaction with the author by self-filling forms left around the convention hall and collected later by the author. This interaction led to exposing around 100 persons to these participation requests. Finally, further distribution of the questionnaire link was achieved thanks to partial snowball effect. All persons receiving the request to participate in the research were asked also to forward the questionnaire link to whichever person(s) they know and feel comfortable to suggest participation. Although this request was included in all questionnaires distribution, it attracted a very limited response rate.

Based on the literature findings, and given the complexity of the questionnaire used in this research, an appropriate incentive scheme was needed. Such plan was intended to ensure high participation levels, especially of persons with high value of time (e.g., business-travelers, etc.) and increase retention levels which lead to completing the questionnaire, as well as increasing the accuracy of answers from all participants. The chosen incentive was five round-trip domestic airline tickets, which were to be raffled when the research is completed. Airline tickets might be labeled by respondents as a lucrative prize, and could help increasing participation rate and minimize the abovementioned methodological problems. However, valued at an average of 120 USD each, the actual cost of a domestic flight in Israel is relatively cheap due to increased competition with airlines selling tickets as low as 100 USD for round-trip flight. It is important to note that such value levels are relatively similar to other studies which offered attractive prizes in the range of 50-350 USD (Bosnjak & Tuten, 2003; Tuten, Galesic & Bosnjak, 2004; and Bowling *et al.*, 2006).

4. RESULTS

4.1 Response rates

Due to the questionnaire distribution method which, in the case of social media channels and snowball effect, does not communicate the request to participate to a fixed set of persons, it is not possible to estimate an accurate response rate. Although the main body of respondents reacted positively to the requests to participate which were sent using mailing lists, a major distribution source, as mentioned above, is social media sources (e.g., Facebook, etc.). In the case of these media sources, an open request to participate was posted allowing the respondents to forward the participation request to others, adding uncertainty of the total number of participants. As listed in Table 5, it is estimated that at least 10,000 persons were exposed to the participation request. This estimation is based on the actual numbers of persons that were contacted directly, the number of participation requests posts views indicated in the online forums, and the estimated number of persons that were contacted due to partial "snowball effect". Filling out of questionnaires was initiated by 2,236 respondents, which represents an estimated response rate of less than (or equal to) 22.4%.

In terms of valid questionnaires, only 914 questionnaires were found to be usable for data analysis and models calibration, which represents 58.4% out of completed questionnaires.

Table 5. Questionnaires distribution, filling-out numbers, response and response rate

Survey stage	Questionnaires	Response rate
Estimated distribution of questionnaires	>10,000	-
Total questionnaire initiated	2,236	≤ 22%
Questionnaires proceeded after filtering questions	2,172	≤ 21%
Completed questionnaires	1,564	≤ 15%
Valid questionnaires	914	≤ 9%

Source: Own elaboration, based on Freund-Feinstein (2015)

4.2 Descriptive statistics

The sample is composed of 57% males and 43% females. Most respondents are between 26-34 years old, followed by the 35-44 years old group (60.4% and 20.6%, respectively). Over 93% of the respondents in this study have at least a university degree. The distribution of all respondents' across various household sizes was found to be similar to that of the general population in Israel. Almost half of the respondents (45.8%) earn higher than average income.

Air travel serves, traditionally, two major trip purposes – business and leisure, which were both chosen for this study. Vacation was found to be the most prevailing trip purpose indicated in the questionnaire, accounting for 69% of the respondents. The rest of the respondents (31%) indicated that their last trip was for business purposes. Note that the vacation-business proportions are different in comparison to other studies. For example, according to NHTS data (NHTS, 2009) business-travel and leisure travel accounts, each, for almost half of air travel in the USA. On the other hand, according to the UNWTO (2012) calculated in 2012 that business and professional travel accounts for 15% of the global air passengers, so difference can be found on regional basis.

The identity of the entity paying for the travel expenses provides insights regarding the consumers' willingness to pay. Results indicate that most trips were paid by the respondents themselves or someone from their family (74%), while the rest of the trips were funded by the respondent's employers (26%). An interesting result is the difference between business-trip proportion (31%) and the proportion of trips funded by the before mentioned workplace. Generally it is assumed that all business-trips are paid by the employer of the person who travels. However, in this study *business-trip* is defined as “work related trip”, which includes other activities such as conference participations, which is argued to explain this difference.

Two marketing channels of airline itineraries were designated, which are the contemporary main distribution channels of airline itinerary. The first channel is airlines websites which sell to consumers their own offerings.⁸ The second channel is OTAs' websites which markets itineraries of more than one airline per destination. Results indicate that the OTAs' websites are the preferred sources for airline itineraries (66%), compared to airline websites (34%) for searching itineraries of both vacation and business trips alike.

Note that although both marketing channels are using the same infrastructure (i.e., the internet), such differences in preference between both channels is explained by the OTAs' greater convenience because it enable consumers to search for both itineraries and other trip related products (e.g., hotels, car rentals, etc.).⁹ OTAs' websites provide for tourists and business-travelers the ability to view and compare multiple itineraries at the same time, as opposed to airline websites where the consumer needs mostly to search for itineraries individually on several airline websites, and only then to be able to compare results. Furthermore, many tourists, as they are being considered to be price sensitive, are

⁸ This is true in most cases, although certain airlines market other airlines' offerings on their website (e.g., KLM's tickets are distributed also on Air France's website following the two airlines merger in 2004). In this study, however, all airlines market their own itineraries only

⁹ During the time that passed since the completion of this study, airlines has become more and more active in adding offerings of these trip related products, however not all airlines do that. Those who entered this field have mostly limited selection and scope of products than OTAs.

looking for the cheapest fare. The ability to receive on a single screen all itineraries offered by an OTA can help them achieve that goal more easily. Business-travelers can benefit from such itinerary search results presentation characteristics because they must follow their employer's travel rules. Such rules sometime requires providing more than one itinerary option to the business-trips authorizing entity (i.e., employee's boss and/or human resources representative, etc.) in a way that simplifies alternatives comparison and can explain the results of this study.

The proportions of respondents reporting which single FFPs memberships they have was found to be similar to those of airlines market share at Tel Aviv International Airport, in an aggregated form according to alliances (Civil Aviation Authority Israel, 2013). In the case of the local Israeli airline (El Al), where the highest proportion of respondents indicated that they solely hold its FFP card (18.9%), this result is expected. An explanation to this result is the power of this airline's brand among the Israeli population. In the case of the Star Alliance airlines FFPs, which were found to be second in terms of membership among respondents (5.8%), this result was expected as well. We explain this result by the power of this alliance compared to that of its rivals SkyTeam and Oneworld (which came second and third in terms of proliferation among this study's respondents). The Star Alliance, at the time of the study and today as well, is the worlds' major airline alliance in terms of operational and service characteristics, compared to its rivals and therefore can provide some greater advantages to travelers.

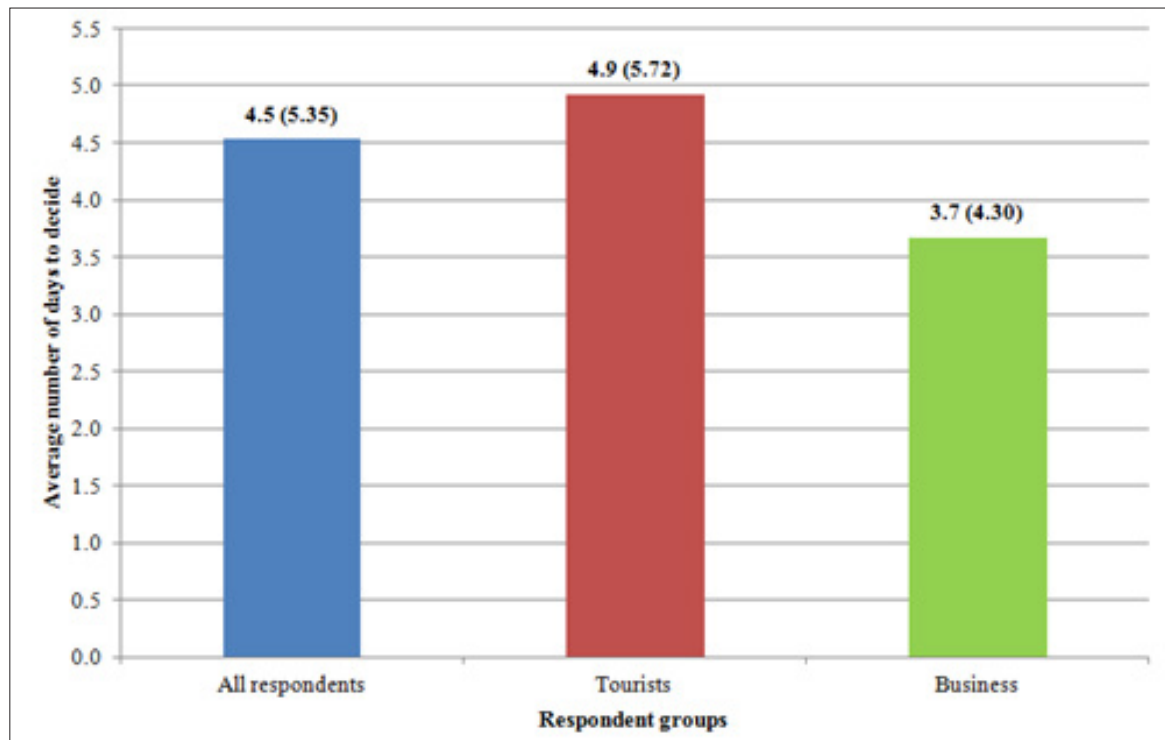
4.3 Choice duration

When choice is treated as a continuous event, the consumer assumed to conduct his search and evaluation process during the itineraries sales period in an iterative manner. For example, when an itinerary is offered for sale during a period of 30 days, the consumer can occupy himself in the choice process for not longer than this period. Therefore, when various numbers of itineraries searches are being executed they provide the consumer with various numbers of choice sets. On the other hand, of course, choice could be an instantaneous decision, as it is traditionally treated in the literature. In both cases it is assumed that the consumer behavior is intended to reach the highest utility. The choice duration available for such search and evaluation activities might change between consumers based on many factors, such as trip purposes and passenger type, fear of not being able to afford air travel and length of choice period (the latter is explained in the next section).

It was found that the ability to defer choice is indeed used to some extent, with an average of almost four-and-a-half days among the general sample of respondents. However, the time needed for this choice activity was found to be different between tourists and business-travelers. Tourists were found to defer choice slightly longer, compared to business-travelers (4.9 days and 3.7 days, respectively), as shown in Figure 4 (with standard deviation in parentheses). Such differences between passengers are expected, based on two possible explanations which are interconnected. In the case of tourists, the general convention is that these passengers are more sensitive to price, compared to business-travelers (Gillen, Morrison & Stewart, 2003). Such sensitivity might imply that higher utility will arise to tourists from finding a bargain fare, with lower (or none) cancelation fees which represents a monetary risk for the tourist. In order to achieve such result a more extensive and time consuming itinerary search might take place by these passengers in the endeavor of finding the lowest cost/risk itinerary. The opposite is argued in the case of the business-travelers, as they are regarded as less sensitive to travel cost and cancelation fees since they do not pay for these expenses out of their own pockets. The second possible explanation for these results is the time available to each passenger group to conduct their itinerary search. In the

case of touristic travel, the consumers normally plans their vacation long in advance which allows them to spread their arrangements over a long period of time, and thus a long period could be dedicated for itinerary search. Business-travelers, on the other hand, are sometimes asked to travel on a short notice, or do not have much time to invest in in-depth search. Both reasons might lead business-travelers to a relatively short search periods, while the opposite might be true in the case of tourists.

Figure 4. Itinerary choice period, according to passengers' groups
(average number of days, standard deviation)



Source: Own elaboration, based on Freund-Feinstein (2015)

The effect of available time length for the consumers to make their choice, on choice duration was analyzed, as depicted in Figure 5. This analysis was conducted on the data received from all respondents, as well as on the data received from those assigned to vacation and business trips. It was found that respondents who received longer period of time to find and choose an itinerary tended to defer choice longer, compared to those who received shorter time periods for the same activity. This finding is expected, since when longer time is available for decision making the consumer can invest in this activity - an ability that is reduced as the itineraries sales period nears its end.

It is important to note that although consumers can sometimes utilize their ability to defer choice for a long period of time, it is also shown in Figure 5 that most consumers do not choose to do so and prefer to make their itineraries choices after shorter periods (i.e., lower number of deferred days). As mentioned earlier, choice deferring was allowed in this study to be up to 30 days prior to departure date. However, 85% of the respondents were found to defer their choice for shorter periods; tourists deferred choice up to nine days, while business-travelers did the same for up to six days. This behavior is explained by the assumed consumer's subjective balance between the strive to find the itinerary which maximizes ones utility on the one hand, and the increasing risk of having to choose from new choice sets which include diminishing variety with increased fares which represents

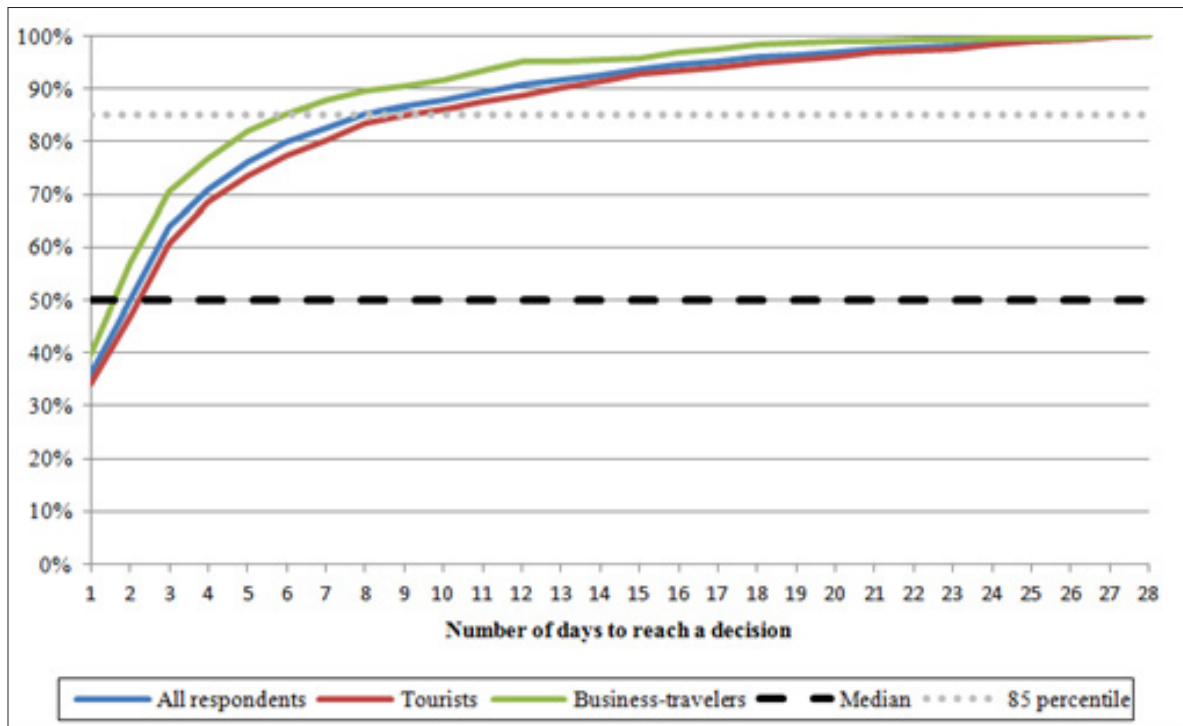
diminishing utility levels on the other hand. In such instances, when the consumer is starting his choice process long in advance (as illustrated in the choice model which was formulated in Figure 1), capacity is relatively high and fares are relatively low, and therefore the risk for having to choose an itinerary which provides lower utility (or finding that all tickets were sold) could be considered low during most of the sales period. However, the consumer which still tries to maximize his utility is facing a knowledge asymmetry regarding the airlines revenue management practices in terms of pricing (i.e., the rate of raising or lowering fares, switching capacity to other selling channels or to business-persons, etc.) on the one hand, and other consumers' choice decisions which leads to capacity being reduced and fares being raised on the rest of the unsold itineraries. Such phenomena where a firm has a much more comprehensive knowledge regarding current product or service attributes and planned changes in such attributes during a sales period, while the consumer is less informed on these issues, was investigated in the past (Teo, Wang & Leong, 2004; Hwang, Lee & Kim, 2014). Under this explanation a consumer will try and find a balance to the two contradicting requirements. These are finding an itinerary which maximizes one's utility, and not continuing with these efforts for a perceived too long time in order to lower the risk of getting stuck without a ticket altogether or with less-preferred possibilities when itinerary choice is compared to what he/she received in the initial search. In addition, quicker decision making is assumed when the departure date is close because the length of the sales period is by itself short enough. In such case the consumers might still defer choice to a certain extent but their ability and willingness to continue their search will probably be limited.

As could be expected, this phenomenon affects both tourists and business-travelers but its manifestation in each population is different. The differences in the average choice period between tourists and business-travelers, which were found in this study, are in line with the above general explanations. Four aspects of tourists and business-travelers characteristics are assumed to be relevant in this case. First, price sensitivities aspect should be considered. Tourists which are assumed to be relatively more price sensitive compared to business-travelers have a higher incentive to defer their choice for longer periods of time in an effort to find lower priced itineraries which maximizes their utility. Contrary to business-travelers, which their expenses are covered by their employers, tourist pay for trip expenses out of their own pockets and thus need to make more efforts to achieve a utility maximizing outcome. A second possible explanation for the longer choice periods conducted by tourists is their assumed lower knowledge with airline practices due to lower number of trips involving the use of air transportation during a given period, i.e., business-persons which fly frequently has a better understanding of airlines behavior in this field. Finally, a possible third explanation is the longer time tourists can start their itinerary search in advance prior to a planned departure date. Most vacation and other touristic air travel are conducted in certain known periods of the year which tourists can prepare themselves for such activity well in advance. However, business-travelers trips might take place in a shorter notice, which results in a much shorter itinerary searches period.

A final finding regarding choice duration is the preference to choose an itinerary from the initial choice set, which received after the first search. Although it was found that choice deferring does occur, a significant proportion of all respondents (36%) were found to choose their itineraries from the initial choice-set (i.e., not deferring at all). Such behavior is regarded as instantaneous. However, differences are visible between tourists and business-travelers also on this issue. It was found that a higher proportion of business-travelers tend to make such instantaneous itinerary choices compared to those performed by tourists (40% and 34%, respectively). In this case, these findings are in line with the above mentioned explanations. Tourists' lower proportion of instantaneous choice indicates the tendency to defer choice in order to search for itineraries which maximizes their utility. In regard to

business-travelers, a relatively lower tendency to defer choice at all is explained by the fact that these passengers are not paying for their travel expenses by themselves and therefore can choose the best offer that they initially receives. In addition, as it is known as one of the main characteristics of business-persons, these travelers has high value of time (VOT), which will dictate lower allocated time to clerical tasks such as searching an appropriate itinerary. Such combination of high VOT and travel cost covered by the employer could indeed provide a sound explanation to this finding.

Figure 5. Respondents choice duration



Source: Own elaboration, based on Freund-Feinstein (2015)

Another issue related to choice duration is the number of days consumers defer their choice. Here we omit all the respondents which choose instantaneously, and look at those who deferred their choice once, or more. The proportion of consumers which preferred to defer choice is shown in Figure 6. It is shown that the proportions of respondents' preference to defer choice is a down slope curve with significant proportion of respondents preferring to defer choice up to three days, while diminishing proportions indicating a preference to continue such choice behavior for longer periods is recorded. When comparing the two segmented passenger groups, it is shown that the proportion of respondents deferring choice once among business-travelers is relatively higher compared to tourists (17% and 13%, respectively). However, the proportion of tourists deferring choice for two days or for longer periods is a bit higher in most cases than the proportion of business-travelers, but the behavior is similar between both groups.

4.4 Choice decision time frame

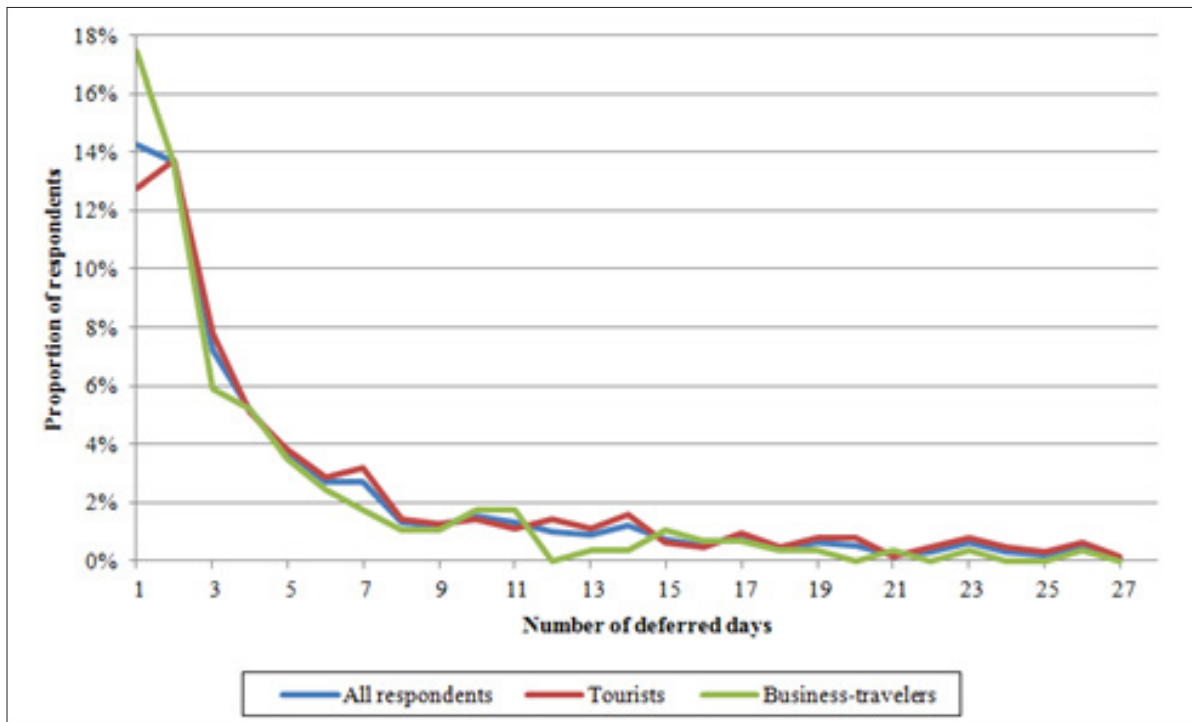
The duration it takes a consumer to choose an itinerary might be affected by the time frame available to conduct such activity. Certain consumers (e.g., tourists) can plan their trip long in advance before their departure date, which might lead to initial search a long time in advance. Others might need to travel in a short notice, so their available time period for

similar choice task is shorter. Given the fact that capacity diminishes over time and prices might increase as the end of the sales period approaches, it might lead to different levels of urgency to make a choice before a preferred airline's (or all airlines) capacity(ies) is totally depleted and fares reach their peak.

Descriptive analysis of the effect of various available time frames on the consumer's choice period is showed in Table 6 and Figure 7. Due to limited number of respondents this analysis is conducted on the complete sample of respondents only and not on segmented population as well. Five choice starting points were arbitrarily chosen, out of 30 points available, to provide evidence on the effect on choice behavior of long and short time frames on itinerary choice.

It was found that as the time frame available for itinerary choice gets shortened, a larger proportion of the respondents made their choice based on the initial choice set. However, another evidence is that large proportion of the respondents were still postponing their choice, although the risk to be left without a seat, or using an itinerary that they prefer less and pay a higher fare is supposed to increase. Such findings seem to support the argument proposed in section 4.3 of this study. It is stated that consumers are balancing their efforts to maximize utility by continuous searching of an itinerary which best suit their needs, while on the other hand taking into consideration that they are facing knowledge a-symmetry. Under this argument, it is expected to have increased proportion of consumers deciding to choose instantaneously as the maximum decision time is reduced given the fixed departure date in this study.

Figure 6. Number of deferred days



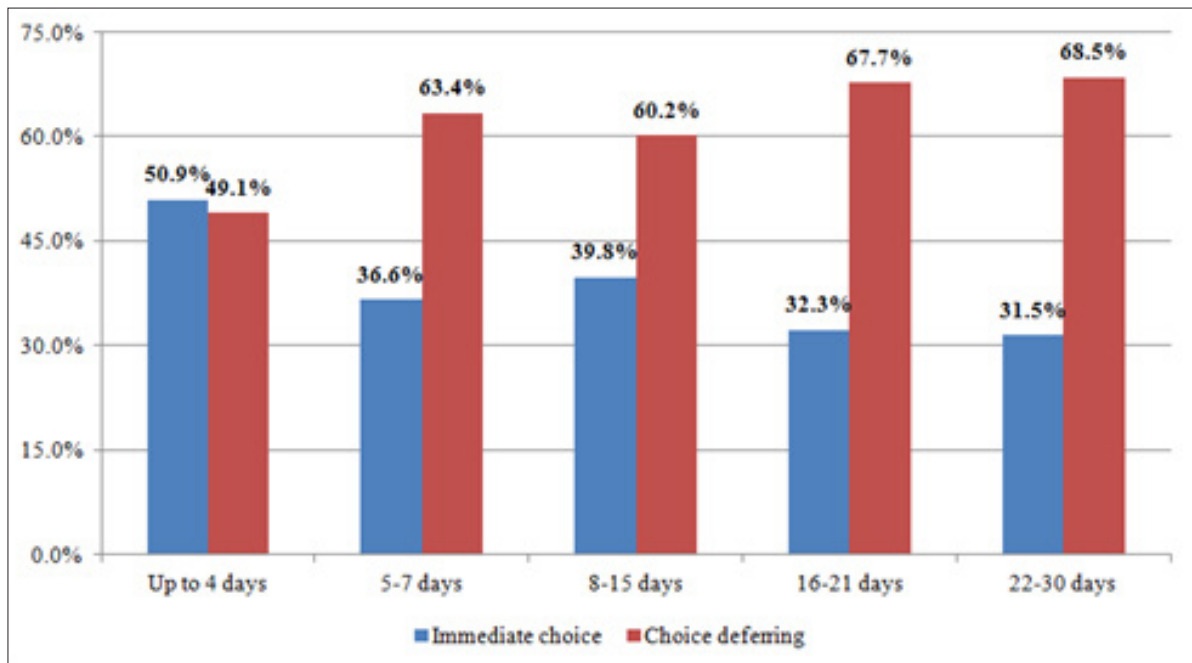
Source: Own elaboration, based on Freund-Feinstein (2015)

Table 6. Choice decision time

Days	All participants	
22-30 days		
1 day	90	31.5%
2-7 days	116	40.6%
8-15 days	39	13.6%
16-30 days	41	14.3%
Total	286	100%
16-21 days		
1 day	60	32.3%
2-7 days	84	45.2%
8-15 days	26	14.0%
16-21 days	16	8.5%
Total	186	100%
8-15 days		
1 day	113	39.8%
2-7 days	134	47.2%
8-15 days	37	13.0%
Total	284	100%
5-7 days		
1 day	37	36.6%
2-7 days	64	63.4%
Total	101	100%
4 days		
1 day	28	50.9%
2-4 days	27	49.1%
Total	55	100%

Source: Own elaboration, based on Freund-Feinstein (2015)

Figure 7. Choice proportions with various choice periods - immediate choice and choice deferring, all participants



Source: Own elaboration, based on Freund-Feinstein (2015)

5. CONCLUSION

In this paper the effect of the consumers' ability to defer choice on itinerary choice behavior is analyzed. Two issues related to the effects of the time frame available for the consumers to make their itinerary choices were discussed. The available choice duration on decision making affect the respondents' choice to a certain extent. Choice deferring took place in this study for several days, on average, and was found to be higher among tourists than among business-travelers. However, as a significant number of respondents made their decisions based on the initial itineraries choice set, and preferred not to defer their choice, the deferring durations could take place up to twice as long among 85% of the respondents.

The difference in the length of choice duration between tourists and business-travelers was explained based on the characteristics of each passenger group. These include price sensitivities and employing choice deferring in an effort to increase utility maximization, the entity which pays for the travelers' itinerary as a factor for choosing quicker or slower, and the available time on the first place to conduct itinerary search.

Focusing on the consumers' choice behavior in a dynamic situation, investigating the ability to defer choice, it provides a novel framework and methodology for similar research efforts. These include various products and services, such as hotel rooms, rented cars and other items which are marketed online while suppliers are using yield management practices to maximize their revenues and profits. In such cases the consumer is faced with uncertainty regarding pricing and availability and is affected by information a-symmetry while trying to maximize his/her utility.

Although this methodology has promising qualities in modeling choice behavior of airline passengers, several limitations were found in this study. First, the use of stated preferences (SP) methodology has its known limitations, which include some possible inconsistencies with the expressed preferences and the real choices made by the same person. In the future it is recommended that a similar study is conducted using revealed preferences technique which eliminates the SP techniques' disadvantage. A second limitation lies with the composition of the study's respondents. We asked a significant number of persons which are students and faculty members from all universities in Israel to participate. In the future it is recommended that the same (or similar) study will be performed among a more balanced respondents group. A third and final limit arises from the choice of the air transportation market in Israel. Although this market expands rapidly in recent years, and such trend is expected to continue in the coming years due to the Israel-EU open skies agreement signed in 2012, it is still a relatively small market with its own constraints and limitations (e.g., income rates, very limited connecting flights in TLV, etc.). It is recommended that in the future similar study is performed on other markets such as EU, the US and Asian countries.

The methodology described in this paper could be regarded a useful approach for investigating similar dynamically changing choice scenarios. In relation to consumers' behavior while using online websites, the ability to defer choice could be regarded as part of a much more sophisticated choice strategy employed to increase utility. Understanding such behavior and its economical implications are important to both academics and practitioners.

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Appendix A: List of Acronyms

AB - Air Berlin
AC - Air Canada
AF - Air France
BA - British Airways
DL - Delta Air Lines
EWR - Newark Liberty International Airport
JFK - John F. Kennedy International Airport
LH - Lufthansa
LHR - London Heathrow Airport
LTN - London Luton Airport
LY - El Al Airlines
SXF - Berlin Schönefeld Airport
TXL - Berlin Tegel Airport
UA - United Airlines
U2 - EasyJet
YYZ - Toronto Pearson International Airport
4U - German Wings

REPRESENTATIONS OF DISTANCE: DIFFERENCES IN UNDERSTANDING DISTANCE ACCORDING TO TRAVEL METHOD

Gunvor Riber Larsen¹

ABSTRACT

This paper explores how Danish tourists represent distance in relation to their holiday mobility and how these representations of distance are a result of being aero-mobile as opposed to being land-mobile. Based on interviews with Danish tourists, whose holiday mobility ranges from the European continent to global destinations, the first part of this qualitative study identifies three categories of representations of distance that show how distance is being 'translated' by the tourists into non-geometric forms: distance as resources, distance as accessibility, and distance as knowledge. The representations of distance articulated by the Danish tourists show that distance is often not viewed in 'just' kilometres. Rather, it is understood in forms that express how transcending the physical distance through holiday mobility is dependent on individual social and economic contexts, and on whether the journey was undertaken by air or land. The analysis also shows that being aeromobile is the holiday transportation mode that removes the tourists the furthest away from physical distance, resulting in the distance travelled by air being represented in ways that have the least correlation, in the tourists' minds, with physical distance measured in kilometres.

Keywords: Distance, Representation, Aeromobility, Tourism.

JEL Classification: R41, Z30, Z39

1. INTRODUCTION

Travelling on holiday is an activity undertaken by increasing numbers of people globally (UNWTO, 2016). Almost everywhere is a potential destination for an increasing variety of niche tourism industries and the holiday mobility routes are becoming ever more complex by the increased connectivity and ease with which tickets and accommodation can be booked. This increasing holiday mobility is becoming part of what constitutes life in contemporary society, where transcending distance is both desired and necessary for social and economic relations (Urry, 2000). Tourists travel to meet up with friends and relatives (Larsen, Urry & Axhausen, 2007), they travel to see interesting places or events (Urry, 2002), they travel on business (Larsen, 2006), they travel on pilgrimages and sports holidays (Urry, 1995), and for a variety of other reasons. According to UNWTO (2016), 54% of international tourism travel is conducted by air, 39% on the road, 5% on water and 2% on rail. Being aeromobile is thus a central element of contemporary tourism. Aeromobility is a broad concept that encompasses the full range of activities, infrastructures, meanings, economics, etc. at the intersection of mobility and aviation (Cwerner, Kesselring & Urry, 2009). The three main categories of air travellers are leisure tourists, business travellers, and people travelling to visit friends and relatives (Cwerner, Kesselring & Urry, 2009). All three of these categories

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can be, and are, understood as tourism in a broader sense (Lassen, 2006; cf. Yousuf & Backer, 2015), justifying the conclusion that being a tourist today is also likely to result in being aeromobile.

All this travelling, whether it be by air or land, obviously involves transcending distance. While the reasons tourists travel have been explored through a number of studies over the years (Cohen, 1979; Crouch, 1999; MacCannell, 1999; Ryan, 2002; Sharpley, 2002; Sheller & Urry, 2004), how tourists think about the distance that is an inevitable part of their mobility has received comparatively little attention. It is recognised within social sciences that distance is not 'just' distance. Watson (1955) argues that geographical exploration needs to view distance also in terms of the cost and time of transcending it, naming this 'cost and time distance', and emphasising that social distance is a more accurate signifier of distance within urban environments than physical distance. Janelle (1968), Harvey (1990) and Giddens (1984) introduced other conceptualisations of distance through time-space convergence, time-space compression, and time-space distance, focussing in different ways on how physical distance appears altered through technological, infrastructural, and societal developments.

Also, within tourism studies distance is recognised as a concept that includes more than just physical distance, although physical distance obviously is a central element due to the necessity of spatial movement. Hall (2005) and Cooper and Hall (2008) discusses how the distribution of tourists' travel behaviour in space and time reflects an ordered adjustment by the tourist to distance. When tourists decide where to go and how, their choices are an attempt at minimizing the friction of distance, but not just distance understood as kilometres. Cooper and Hall (2008) lists eight types of distance that can influence travel behaviour: Euclidean (physical) distance, time distance, economic distance, gravity distance, network distance, cognitive distance, social distance, and cultural distance. The travel behaviour of tourists can be seen in relation to all of these different types of distance. It is not necessarily the physical distance from one place to another that is relevant in assessing travel behaviour; Hall (2005) argues that research into how distance influence tourists' travel behaviour needs to be flexible in how distance is being conceptualised for analytical purposes. Distance is more than just a measure of kilometres from one place to another; rather, distance is relative to the social and economic context of the tourists, where individual circumstances are important for knowing what forms of distance becomes relevant, and how much of an impact a given distance, in a given form, will have on deciding travel behaviour.

The first objective of this paper is to identify the different forms in which distance can become relevant for tourists. In this paper, this 'translation' of distance from Euclidean distance to other ways of understanding distance is referred to as 'representations of distance,' by which is meant the ways in which distance takes on other, non-geometric forms besides kilometres. Further, this paper also has a second objective: exploring how being an *aeromobile* tourist influences the perception of distance, and how this might differ from the perception of distance transcended across land.

2. DISTANCE AND TOURISM²

Tourism is manifest, desired travel and therefore a spatial activity. Any decision to travel for leisure will involve some form of reflection on whether and how to transcend the distance between home and a given destination. The transcendence of distance tempts tourists with promises of something different in another space and place, and sometimes even gives the illusion of the possibility of seeing another time. For tourists, the price of desire for

² This section on Distance and Tourism has previously been published in Larsen (2013)

somewhere else is the overcoming of distance. However, the tourist often does not appear to give much thought to this prerequisite, because (infra)structures are in place. This enables the tourist a reasonably smooth transition from being an everyday-human to being a tourist, where the actual movement across distance is often a routine and mundane activity that is not significantly different from everyday mobility aside from its destination (Edensor, 2007). Corporeal mobility is such an obvious part of tourism that it is often forgotten by researchers (Urry, 2002) or reduced to a practical problem for the tourist rather than regarded as a subject in its own right (Haldrup, 2004). Through the focus of this paper on tourists' representation of the distance they travel, the corporeal mobility of tourism is regarded as more than 'a practical problem', and thus this section explores how distance has been discussed in relation to tourism.

The effect distance can have on the destination choice can be both positive and negative. Nicolau (2008) discusses this conundrum, which is mostly based on a spatial, i.e. physical, understanding of distance, but it nonetheless shows links to relative distances:

One train of argument holds that distance – or geographic position of the tourist origin relative to destinations – is considered a restriction or a dissuasive dimension of destination choice, as the displacement of an individual to the destination entails physical, temporal, and monetary costs (Taylor & Knudson 1973). Alternatively, another line of research proposes that distance can lend positive utility. Baxter (1980) shows that the journey itself, as a component of the tourism product, can give satisfaction in its own right so that, on occasions, longer distances are preferred (Nicolau, 2008).

Nicolau (2008) goes on to explore the factors that might influence whether distance becomes a positive or negative element of a destination choice. He identifies five variables that could explain different individuals' sensitivity to distance in relation to their choice of destination:

- Personal restrictions: income and number of children
- Socio-demographics: size of the city of residence and age
- Trip characteristics: use of intermediaries and transport mode
- Tourist behavior variables: interest in discovering new places and variety seeking
- Motivations: search for relaxation, search for climate, curiosity, and visit friends and relatives (Nicolau, 2008)

Nicolau's exploration is based on an empirical inquiry of individual tourists' destination choices. His conclusion is that a greater willingness to travel further is associated with high income, being a resident in a large city, the use of intermediaries, and the interest to discover new places, variety seeking behavior and the motivations of searching for climate, curiosity, and visiting friends and family. Inclination to not travel far is associated with having children under the age of 16 and when the purpose of a holiday is to simply relax (Nicolau, 2008). Cohen (1972; 1988) offers another view on how distance is important for understanding tourism. In his effort to offer explanations for tourists' motivations to travel, he argues that tourism must be understood as social relations, and that a tourist typology can be based on an individual's desire for familiarity or strangeness as part of their tourism experiences. This leads him to label four categories of tourists: the organized mass tourist, the individual mass tourist, the explorer and the drifter (Cohen, 1972). These represent tourists within a continuum ranging from desired familiarity with the destination/holiday experience to a desire for the unknown.

While the link between physical distance and destinations that offer the tourist familiarity or strangeness is not necessarily linear (physically close destinations can seem strange, and familiarity can be produced far away, in for example holiday resorts), there is a clear link between cultural distance and familiarity/strangeness of holiday experience. The 'environmental bubble' (Cohen, 1988) of familiarity creates a feeling of cultural proximity that appeals to the types of tourists labelled by Cohen (1972) as organized and individual mass tourists, while the explorer and drifter type tourists are more likely to seek out destinations and holiday experiences that are unfamiliar to them and their normal cultural context. Chen, Mak and McKercher (2011) relate Cohen's familiarity-strangeness continuum to physical distance by suggesting a linear link between long haul travel and culturally different destinations versus short haul travel and culturally similar destinations. This is undoubtedly true for many holidays, but Cohen (1972; 1988) emphasizes that distance in relation to tourism is more than the physical distance from home to destinations – it is the tourist's relation to a destination that determines whether it is familiar, and therefore feels closer, or appears strange, potentially resulting in it feeling further away from home. This is an important insight for the research presented in this paper, as it highlights the relativity of distance and firmly establishes distance as a phenomenon within tourism that is more than just physical.

This understanding of distance in relation to how the individual tourist is able to relate to their destination will emerge later as an important element of how tourists represent distance. Hall (2005; 2008) is also concerned with distance in relation to tourism, and he argues that distance is basic to tourism accessibility, and that the 'distribution of travel behavior in space and time reflects an ordered adjustment to the factor of distance' (Hall, 2005). As noted earlier, Hall (2005) presented a list of relative distances that influence tourism: time-distance, economic distance, cognitive/perceived distance, and social distance. These 'relativist notions of space in a non-physical sense' (Chapman, 1983) are elements of a discussion of the distribution of tourists and their destination choice based on spatial interaction models, such as the gravity model and the intervening opportunity model. The gravity model states that the interaction between two locations is a result of the strength (usually the population number) of the two locations and the distance between them (Ravenstein, 1885; 1889; Wrigley, 1980), in a relation whereby interaction becomes inversely related to distance. The longer the distance between the two locations, the less likely an interaction is, a phenomenon termed 'distance decay' by Eldridge and Jones (1991).

The effects of distance decay have long been recognized within social science and geography as a concept that outlines how distance exerts a frictional effect on demand (McKercher & Lew, 2003), but Hall (2005) claims that the influence of distance decay has not been fully explored in relation to what impact it has on the distribution of tourist arrivals. Hall (2005) notes that understanding distance decay and the influence it can have on tourist travel behavior should not regard distance purely in its physical sense, but rather recognize different perceptions of distance, that can inform a destination choice. This emphasizes the possibility of relative distance decay (i.e., where the distance element is not physical distance, but rather a representation of distance) where a tourist's choice of a destination physically further away than other potential destinations could be a manifestation of distance decay in relation to time distance or cost distance. In such a case the chosen destination would be prioritized over other, physically closer destinations based on shorter travel time or lower costs. The introduction of relative distance challenges the normal understanding of distance decay, but does not invalidate the idea behind distance decay in relation to understanding distance's role for destination choices.

Within the context of tourism, the intervening opportunities model, developed by Stouffer (1940), outlines that the choice of destination will be based on which destination,

among a number of destinations offering the same attractions, is closer (Hall, 2005). Hence it is the relative distance to a destination in comparison to distances to other destinations that becomes a determining factor for the destination choice, not the absolute distance. The intervening opportunities model offers, however, a slightly simplistic view on distance in relation to tourism destination choice. The model says that the closest destination will be chosen, but in order to apply this model analytically in an empirical context, awareness needs to be focus on what type of distance is the basis for the judgement of which destination is closer. It might be physical distance, but it could just as well be time distance or cost distance (Prideaux, 2000). The issue of accessibility is also important; how accessible a destination is (perceived to be) has an important role in a tourist's choice, which is linked to the type of distance(s) being applied to a tourist's assessment of the destination and the travel to that destination.

These two (essentially quantitative) models for understanding how tourists make their destination choice both have distance as a central element, but distance must not be understood only as a physical entity, because tourists do not only make their holiday decisions based on distance measured in kilometers. Distance understood in a nonphysical, relative sense is also important, and probably more so than physical distance. That distance is an element of a tourist's destination choice is not surprising, and has been established by a number of theoretical and empirical studies (cf. Kim & Fesenmaier, 1990; Wamsley & Jenkins, 1992; McKercher & Lew, 2003; Hall, 2005; Cooper & Hall, 2008). Also Ankomah, Crompton and Baker (1995) have explored how distance becomes an element in tourists' destination choice. They argue that cognitive distance, i.e., the distance a tourist perceives there to be to a destination, is a primary evaluation criterion for destination choice. The perception of distance is influenced by the apparent mis-estimation of physical distance by the tourists, where the further away a destination is, the more the physical distance will be overestimated, and the distance to closer destinations will be underestimated. The apparent mis-estimations of physical distance by tourists leads to at least two observations about the relation between tourism and distance that are relevant for the research presented in this paper. Firstly, it highlights the fact that physical distance is not necessarily experienced uniformly by tourists in spite of its standardization through uniform measurement units. Second, more important, is the finding that physical distance does not appear to be the measure of distance to destinations most widely used by tourists. This echoes Hall's (2005; 2008) reflections on how distance becomes part of a tourist's destination choice, and outlines that, for the purpose of exploring whether and how distance might be represented by tourists, physical distance should not be regarded as a distance-dimension that has prominence over other distance dimensions, and therefore be understood as not conceptually any different than the other, relative distances discussed above.

3. METHOD AND EMPIRICAL FOCUS

This research into how tourists represent distance in relation to their holiday mobility is based on explorative qualitative interviews conducted within a grounded theory approach, which is appropriate when aiming for development of theoretical reflections based on empirical data in a field where relatively little is known (Corbin & Strauss, 2008). Thirty in-depth interviews were conducted over three periods from November 2010 to May 2011. The interviews lasted between one and two hours.

The focus for the interviews was how, and in what form, distance becomes an element of the destination choice and how transportation mode choices are influenced by the distance

between home and the holiday destination. The interview guide had four main themes, under which the role of distance was discussed, based on open-ended questions:

- Holidays undertaken, including the rationales for the destination choices
- Holiday dreams and desires
- Holiday transit and holiday transport modes
- The importance (or lack thereof) of place and distance in relation to holiday destinations and the notion of 'far away'

The interviewees were Danes aged from 26 to 67 years of age, representing a wide range of educational and occupational backgrounds. No criteria were set for the sample other than the interviewees would have to be Danish. This was because the study has aimed at exploring the variety of ways in which distance can be represented, and by excluding groups from the sample the study could have run the risk of missing some representations that might have been relevant for some groups but not others. It has not been an aim for the study to suggest representations of distance that are readily generalizable to other national or cultural contexts, but merely to suggest ways in which distance can be represented. It should be noted, then, that the 'list' of representations of distance discussed later in this paper is by no means exhaustive.

Through theoretical sampling, the data collection was allowed a wide scope, where the data analysis running in parallel with the interviews enabled the inquiry of a variety of reflections and viewpoints, giving the research sufficient width as well as depth. This enabled a qualified suggestion of how tourists do conceptualise and represent distance in relation to their holiday mobility. Theoretical sampling stopped when theoretical saturation was reached. The interviews have been analysed through the identification of themes emerging from the data, and the categorisations of distance representation reported on in the remainder of this paper stems from the empirical analysis, and is as such not based on a priori theoretical classification of potential distance representations.

The remainder of this paper presents the findings of the analysis of representations of distance as seen from the perspective of the tourist, first outlining how distance is generally perceived by the travellers, followed by insights into how the activity of aeromobility influences distance perception.

4. ANALYSIS

The sections below unfold the analysis findings and discusses the content and reflections on distance in relation to holiday mobility as they were expressed in the interviews. Based on the analysis of the conducted interviews with Danish tourists, three categories of representations of distance were identified. The interviews revealed a range of ways in which tourists represent distance, but it is possible to group these as follows:

- Distance as resources: distance becomes relevant for the tourist through the amount of resources that is needed in order to transcend that distance.
- Distance as accessibility: the perception of the distance to a potential holiday destination becomes relative to how accessible the destination is perceived to be via acceptable transport modes.
- Distance as knowledge: the level of knowledge about the destination (culturally or physically) and the level of knowledge of the route and transport mode is a factor in the perception of how far it is to the destination.

These categories have emerged from the data, and have been identified through a coding process. Here the transcribed interviews were coded according to open categories that would identify statements and reflections that in one way or another referred to the transcendence of distance by the interviewee. Following this open coding process, a thematic coding process combined the original distance representation categories, and resulted in a merging of categories on this list into the above mentioned three overall distance representations. As noted in the methodology section, the analysis has been guided, but not structured by the theoretical framework presented earlier in this paper, and therefore the following unfolding of distance representations is an empirical one rather than a theoretical one. As a result, it is not possible to identify a complete overlap between the theoretical distance representations highlighted earlier, and the empirical distance representations emerging from the analysis.

4.1 Distance as resources

Travelling on holiday involves spending money on transport, accommodation, food, activities etc., at least some of which would not have been spent had the tourist stayed at home. It also involves spending time away from home, work, and other daily contexts. Before going away on holiday the tourist will need to make a choice of whether the holiday is 'worth' spending the money and time on. Can they afford it and do they have the time to travel away? Depending on the economic and social context of the individual tourist, money and time are factors that can either enable or hinder travelling on holiday.

Money and time are very tangible price tags of a holiday (albeit not the only ones) and therefore these two appear to become easily associated with the notion of 'getting away' and set a rigid framework within which holidays have to be conducted. If you don't have the time and money to travel, it is unlikely that you will go on holiday, although there will be other reasons for not travelling as well, such as lack of incentive or lack of travel companions. Because of this seemingly simple relationship between holiday means, in the form of economic and temporal resources, and the possibility of going on holiday, these become factors that, to a certain degree, determine within which geographical limits the tourist travels. There has to be enough money to pay for the transit and there must be enough time to travel to a destination and back again and still have time to experience the destination. Because money and time are needed in order to overcome distance, it is not the physical distance involved in holiday travel that is immediately relevant for the tourist, but the resources it will take to get from home to the holiday destination. Money and time, more so than physical distance, determines how far the tourist travels on holiday.

4.1.1 Economy

Cost-distance, or 'the monetary cost incurred in overcoming physical distance between two locations' (Cooper & Hall, 2008), is a recognised representation of distance, not just in tourism studies, but also in mobility and business studies. It costs money to transcend distance, either in paying the fare for travelling on planes, trains, ferries or coaches; buying the fuel for privately owned vehicles; or buying the equipment needed for a cycle or rambling tour. Very few forms of transport are entirely free and, when travelling on holiday, few individuals rely entirely on transport modes that they own, with driving holidays being the obvious exception. But even here the cost of fuelling the car will be significant and often comparable to the ticket price of trains or planes. It is no surprise then, that when asked about what determines how far they travel, price was often mentioned as the most important factor by the interviewees.

Understanding distance in terms of the cost of overcoming it makes distance relative, in spite of physical distance being an absolute entity. Cost distance will be relative to the

overall economic context of the tourist, and it will be relative to the transport mode, where the same physical distance can be overcome by different transport modes, that will have different costs. The economic context, and therefore the economic ability, of a tourist is linked to factors that are not directly related to the tourist's travel behaviour, but it is highly influential on how many economic resources the individual tourist can spend on a holiday, and thereby also to a certain degree how far the tourist is likely to travel. Tickets that are cheap for some might be expensive for others, making a particular journey more or less likely to happen. Cost distance is also relative to the transport mode chosen for a journey, and the chosen transport mode will influence the cost of transcending a given distance. Cycling is cheaper than driving, but that does not necessarily make the two different prices comparable, because cycling to a destination will take longer than driving to it, and other intrinsic or idealistic values might be the cause of a choice of bicycle over car. To compare one cost-distance to another is likely to only be meaningful if the two journeys had been undertaken using the same form of transport. That a journey has cost £1000 does not convey much information about how far the journey might have been, whereas the information that £1000 was spent on travelling by plane does give some indications.

In spite of cost distance not having the same absolute quality as physical distance, the use of cost-distance to represent distance makes distance easily interpreted by other people. Not everybody will be able to pay expensive tickets, but most will understand the measurement unit, and be able to set it in relation to other contexts. It makes sense to talk about how far a tourist has travelled in terms of the cost of the journey. It will not be an exact measure of distance (ticket prices vary according to class and flexibility among other things, the price of fuel is not constant and some stretches of distance are more expensive to transcend than others etc.). Nevertheless, cost-distance is widely understood and therefore widely usable as a measure of distance.

Price, therefore, can determine where tourists can and cannot travel. But the relationship between price and distance is not linear, where the further away means the more expensive. This depends on the transport mode, but also the accumulated price of the holiday. Just because travelling to a closer destination is cheaper, the overall price of the holiday might be more expensive than travelling further to a cheaper destination, as experienced by one interviewee (female, 29). She and a friend had originally planned not to travel 'far away' on their holiday this summer, but found that three weeks spent in Bali and Singapore was cheaper overall than a fortnight in Crete, primarily because of living expenses being significantly different in the two locations. This (lack of) linearity between distance and its representations will be discussed later in this paper.

4.1.2 Time

An oft-heard description of contemporary tourists is that they are money-rich, but time-poor, implying that if only they had the time, they would have the economic power to travel anywhere they like. To be able to take the time out to go on holiday is obviously a prerequisite, but it is clear from the interviews that time is not the predominant reason for people not to travel. The two main issues that have would-be tourists staying at home in the interviews are lack of money and lack of people to travel with. According to the interviewees, time resources are a significant factor in determining where and how far they travel on holiday. Time becomes important for travel behaviour in two different ways: the time spent travelling to the destination and the time spent at the destination.

It is a common description of how far a tourist is going away on holiday to say that the destination is a four-hour drive or a ten-hour flight away. This relays reasonably accurate information about the distance to a given destination, and just like with ticket prices, the time-distance is easily interpreted by others. Time-distance is 'the time taken to travel

between destinations' (Cooper & Hall, 2008), and the relationship between time and physical distance will be near linear if the transport mode is the same. It is reasonable to assume that the longer time of a flight, the further away in kilometres the destination is, and time spent in transit is clearly viewed as a signifier of how far away the tourist is travelling, according to the interviewees. Along with monetary resources, time is mentioned as the prime factor that determines how far they travel.

The time-resource they refer to as determining the distance travelled is not entirely made up of just time spent in transit though. The transit time has to be viewed in relation to the amount of time they are able to spend at the destination. The more time the tourist spends on getting to a destination, the longer they want to spend at the destination, so transit-time and destination-time are linked in a relationship where the one has to be justified by the other. For example, if 15 hours have been spent on a flight to reach a destination, a certain amount of time 'needs' to be spent at the destination. What was interesting in the interviewees' comments was that this also seems to become set in relation to transport mode. Having travelled by air to, say, Thailand, most would agree that the time spend at the destination should be more than a week, whereas if the same length of time, or indeed more, had been spend in a car driving to southern Europe, it is acceptable to not stay for any longer than a week. It would probably be reasonable to assume that the price of transit plays a role in this as well, as it is generally perceived that travelling outside Europe is significantly more expensive than travelling within Europe (which is not necessarily true), therefore adding the notion of 'getting your money's worth' to the reflections of time spend on holidays. This was, however, not expressed explicitly by in the interviews. Spending what was perceived as a long time in transit (travelling outside Europe) had to be justified by spending longer at the destination, while having purchased an expensive holiday did not in the same way require spending a long time away. Adding to this perspective is also the notion expressed by interviewees, of not travelling further 'than you have to,' i.e. there is no reason to travel to Thailand if the purpose of the holiday is a 'sun-holiday,' which can be had somewhere in the Mediterranean. Whether this distinction is a reaction to the longer time it would take to fly to Thailand, the perceived expense of tickets to Thailand, or in relation to the physical distance is unclear. One thing it is unlikely, though, is a reaction to the environmental effects, as only one of 30 interviewees included environment as an issue to be conscientious about in relation to travel behaviour. The other 29 interviewees only considered environment when prompted, often just to say that it is not an issue they give much consideration to.

The time spend at the destination becomes important in other ways besides just in relation to the time spent in transit. There has to be 'enough' time to spend at the destination. What 'enough' time is, will be determined to a certain degree of what the purpose of the holiday is (sun-holiday, sight-seeing-holiday, visiting family and friends etc.), how familiar the destination is, and how likely it is that the given destination will be visited again. Sun-holidays seems to be conceived of as very standardized in time, they are usually seven to fourteen days long, whereas see-holidays within Europe are shorter, and outside of Europe significantly longer. Holidays that are for the purpose of experiencing another place, which is outside of Europe have to be longer in time, because of the resources invested, the unfamiliarity of the place, and the idea that it is unlikely that the tourist returns to the same place. The same restrictions are apparently not applied to destinations within Europe, because that which is European is perceived as more known, and therefore more accessible culturally, and the journey there does not involve the same investment of money and time.

Physical distance is present in the considerations and actual travel behaviour of tourists, but through the economic and temporal resources needed in order to transcend distance. Asked whether they would travel more or longer if they had more money and more time,

a majority of those interviewed commented that they would probably travel both more and longer distances. Because of the reasonably straightforward relation between price and distance as well as time and distance in a holiday context, physical distance easily becomes translated into these concepts, rather than being used itself, when the tourists talk about their travel behaviour. The resources needed for a holiday are the factors that facilitate the holiday in the first place, and determine the radius within which the holiday destination will be. Resources are at the forefront of the interviewees' minds when talking about locations of destinations, because they are very tangible ways of expressing physical distance in a relevant form.

4.2 Distance as accessibility

After the resources required for transit, accessibility to a given location is mentioned in the interviews as a significant factor in differentiating perceptions of distance from physical distances. Places that are easier to get to are perceived as closer than places that are more difficult to get to, even if the physical distance is shorter to the more inaccessible places. Accessibility is a complex concept; questions of accessibility for whom, by what means, and in relation to what context are important questions. Places that are accessible for some are not so for others, and over time accessibility can change, both as a result of changes in individual circumstances of the person traveling and in circumstances regarding the place, e.g. the opening of a new flight route or similar. Accessibility has been expressed by the interviewees as relating to three issues in particular: infrastructure, i.e., how two places are linked in a network facilitated by the provision of various transport modes and institutions; resources, mainly time and money, which links into the above discussion of physical distance often being quantified through the resources needed in order to transcend distance; and the ease with which it would be possible to interact and navigate at a given location. This latter issue will be discussed in more detail in the following section. This section will focus on how infrastructural accessibility becomes a factor in the perception of distance.

The ease with which the tourists can arrive at the chosen destination appears an important factor in travel behaviour, more so than physical distance. Depending on the purpose of the holiday, the ease with which it is possible to get to a destination is viewed as an asset. The more routine the holiday is, e.g. if it is just the yearly sun holiday to the Mediterranean, the less time is allocated to the holiday and the more accessible the destination has to be; but if the holiday is regarded as an extraordinary holiday, accessibility to the destination becomes less of a factor in destination choice. On extraordinary holidays it is almost expected that all aspects of the holiday are magnified, both in terms of resources invested and places visited, and where the transit then becomes more than pure transport from home to destination. The more inaccessible the place and the more complex the journey, the more experience-value is added and the extra hassle is justified by the expected better rewards at the end of the journey as well as the experience of an extraordinary journey. That which for some would be a long haul flight, for others might be a more complex transit consisting of more transport modes and reliance on local guides and infrastructures.

Direct flight routes make places very accessible, to the degree that it determined where some of the interviewees decided to go on holiday. The destination was chosen based on where possible destinations when departing from the local airport. Having said that, perceptions of what is accessible is obviously an individual matter, depending on personal attitude, monetary resources and what modes of transport the individual has available. One interviewee commented that because she does not own a car, two of the three closest airports would never be chosen as departure airports because they are not connected with the rail

system, and it would be easier for her to travel across the country by train to the main international airport (female, 60).

Accessibility is obviously linked to transport modes and the connectivity of infrastructure. For some interviewees, accessibility is a matter of how well they are connected to a wide range of transport infrastructure, while for other interviewees it is a matter of having access to transport modes that give them a high level of control, primarily exemplified by the car, but also by some by the bicycle. Using these transport modes gives the highest level of control over route and times, which for some is more important than quick or cheap transit. The flexibility of the car, and to a lesser degree of the bicycle, makes more places accessible, and therefore in some interviewees' understanding, closer, because it requires less effort to get there. One interviewee commented that when you go on holiday using the car, it is easier to get to where you want to go, rather than having to adjust your schedule to using public transport (female, 34). Using public transport ties the tourist in space and time decided and controlled by others, which for some represents a lack of control and thereby accessibility.

To represent distance through accessibility is thus to place more emphasis on how it is possible to get to a place rather than how far it is in metric terms. Places then become nodes in an accessibility-network, which distorts physical distances and where the important feature of a place is whether it is connected or not. The tourists that have represented distance through accessibility are, to a certain degree at least, aware that accessibility is not a reflection of actual distances, but accessibility to a place becomes a more important factor than physical distance, because accessibility is what is relevant when contemplating how to get to a place.

4.3 Distance as knowledge

Tobler (1970; 2004) argues that the first law of geography is that everything is related to everything else, but near things are more related than distant things (Cooper & Hall, 2008). Undoubtedly true, this statement becomes nuanced in the light of a discussion of how knowledge and information about other places makes those places feel closer than they are, and closer than other, more alien places that might be physically closer. Knowledge can obviously be many things, but through the interviews, two categories that can be summarised under the heading knowledge have been identified as having an impact on how the interviewee perceives distance: knowledge of the culture at the destination, including the notion of feeling secure; and familiarity with the destination and/or the journey, including transport modes.

There are probably few places left where it is likely that a normal tourist will be travelling to and not have any knowledge of. Most places will be more or less known, maybe not through previous personal experience, but through knowledge from other people's experiences or various media coverage. Knowledge will possibly also be derived from an assessment of how similar the destination is culturally, so very few tourist-destination encounters will happen without prior knowledge of the destination. Indeed, part of going on holiday is to 'read up' on the destination; what activities and sights are available, some local history, etc. Some use the time spent in transit to brush up on their knowledge of the destination while others have it is a part of their decision-making process. The more unfamiliar a place is, the more, and the further in advance it seems the tourists are likely to familiarize themselves with the destination. On the other hand, places that are perceived as familiar, or that fall within a category of familiar destinations, the less practical and mental preparation is needed. One interviewee commented that the further away one is going, the further in advance you prepare and that this preparation can become a motivational factor in itself, where a place becomes more interesting the more knowledge is being accumulated (male, 30).

It is not a surprise that cultural similarities evoke a feeling of closeness in spite of physical distance. It is easier to relate to places that have similar cultural structures and institutions, and according to some interviewees they would have more reason to travel to places that are within some 'cultural boundary' within which certain degrees of familiarity and feeling of security would rest, but obviously for some, the destinations can't get alien enough. This is, however highly dependent on the purpose of the holiday, and there seems to be some relation between the degree of accepted cultural dissimilarity and resources invested, especially time. The level on acceptable cultural dissimilarity is obviously an individual matter, but if the holiday goes to a place that is perceived as very different, then more time is required at the destination, because it will take longer to get to know the place. Maybe this is part of the reason why the interviewees seem to associate cultural dissimilarity with distance.

Knowing how to get to a place can make the journey less daunting and strenuous. Pre-journey apprehension is often linked to the uncertainties the tourists imagine they might encounter en route. Questions of how to navigate various transport modes, whether there is enough time to transfer at transport hubs, how to get to the hotel at the other end of the journey and so on appears significant elements of a journey. But, the more familiar the tourist is with both the transport mode and the route, the less significant these factors get. Knowing how to 'operate' a certain transport mode gives a feeling of security, even though the route might be unfamiliar. Flying from Copenhagen to London more or less involves the same capabilities as flying from Copenhagen to Singapore, but if there are unknown stops along the route, the journey can become a cause for concern. As one interviewee explained, the first time she flew to the United States from Denmark, catching the connection in Frankfurt was an uncomfortable experience. But after she learned where to go and how long she had (or, in this case, didn't have) it was not a problem, because she knew what to do (female, 29). Familiarity with the institutions and processes where the individual is expected to act in accordance with regulations beyond the individual's control makes this activity seem easier, and therefore, arguably has an impact on how accessible a place might be for the individual tourist.

During the interviews, a number of the tourists commented that familiarity with a route made it feel shorter, but others commented that knowing the route didn't necessarily make it feel shorter, just easier. Knowing what to do and what to expect helped relax the anxiety of a journey, which most tourists related that they had experienced.

Knowledge as distance is a concept that involves what Cooper and Hall (2008) termed cognitive, social, and cultural distances. This is when perceptions of distance are influenced by the general knowledge held by the tourists, be it spatial, socio-economic or cultural, and where the link to physical distance might be weaker, or of a different character than for the two previously discussed categories of representations of distance. Where distance as understood through the lens of resources or accessibility had strong (linear) and logical links to physical distance, the distance that is perceived on the basis of knowledge is far less causally linked to physical distances.

It is not surprising that the level of knowledge about a place influences the perception of the location of a place in relation to home. Places thus become nodes in a mental network, where knowledge and connectivity are more important than actual distance and time-distance. The way in which knowledge appears to influence the perception of distance seems to be in a 'negative' way, where knowledge about other places and their cultures does not necessarily make them feel closer, but lack of knowledge about a place can make it feel further away. As one interviewee commented, if some place is home to an alien culture, it then feels even further away than it would have otherwise (female, 60).

5. DISCUSSION

Distance measured in kilometres becomes increasingly abstract and meaningless the further the distances are. Within a local area, distances given in metric units makes sense and relay useful and interpretative information that in an everyday context that is relevant for an individual. But when the distances become greater and relate to places that are unfamiliar to the individual, a distance represented in metric units will not yield the same quality of information. Physical distance is then being supplemented by other understandings of distance, ways in which physical distance is being translated into other forms, which are more meaningful and therefore relevant. In this paper, this understanding of distance being more than 'just' physical distance was explored through 30 tourists' reflections on how distance plays a role for their travel behaviour. Moored in previous discussions of distance, running back some 60 odd years and beginning with Watson (1955), this paper had two objectives: to identify different forms in which distance was represented by the interviewed Danish tourists, and to explore how being aeromobile might influence the perception of distance travelled, compared to how distance is represented using a land-based transport mode. This paper has explored how distance is being translated from physical, absolute units, to forms that are relative to economic and social contexts and more 'real' for individuals. When travelling on holiday, tourists relate to distance both physically by transcending distance and mentally by representing distance in forms other than kilometres. Three categories of representations of distance were identified: distance as resources, distance as accessibility and distance as knowledge. This section uses these findings to give suggestions on how aeromobility influences distance perception and representation.

5.1 Distance representations and aero mobility

Distance can be understood in terms of the amount of resources it will take to transcend a given distance; most tangibly as the time it takes to get from one place to another, and as the price of that given transit. In the interviews, there exists a perception that, generally, the longer the distance, the more resources are needed, i.e. the longer the transit in physical distance, the longer it will take and the more expensive it will be. This perception will be nuanced by the transport mode used, where a linearity generally is likely to exist if the transport mode is the same, whereas it obviously will take longer to travel a shorter distance by car than by plane. When distance is understood in terms of accessibility to a place, the relationship between actual physical distance and perceived distance becomes more distorted. Accessibility is defined by how easy it is possible to get from one place to another and how places are connected, not how close they are in the physical sense. Places that are easier to get to will seem closer than places that might actually be closer, but are harder to reach. It might be the case that places that are 'connected' are not being perceived as closer, but rather that places that are not viewed as accessible through that becomes further away, in some form of negative projection of distances outside a network. The category of distance representations that sees the weakest link between physical distance and perceived distance is knowledge. This can be knowledge of the specific destination, knowledge of the route and/or the transport mode, or knowledge of the cultural and social settings at the destination. Knowing a place and how to get there makes it 'feel' closer.

In the analysis of how the interviewed tourists represent distance, it was obvious, and maybe not that surprising, that the transport mode has a significant impact on how distance is perceived, and that being aeromobile is the travel practice that removes the tourist the furthest from the physical distance they travel. According to the interviews, travelling by air holds a range of positive elements, but engaging with the territory they travel across is not one of them, and neither is having an intrinsic travel experience. These two factors are central

for how distance is perceived as more than just time and money resources. Overwhelmingly, the distance travelled across in an airplane is perceived as time and as cost, i.e. distance as resource. None of the interviewees referred to flying distances in relation to their holiday travel in terms of physical distance, but only in terms of time, whereas journeys undertaken across land often would also have either a physical distance marker attached to it, or distance in one of the other representations mentioned above. This appears to be caused by the actual, physical detachment from the distance that you travel across in an airplane. If you are lucky enough to have a window seat, clear skies, and are flying at lower altitudes over land masses, you might be able to trace your progress and get some feeling of the physical distance, but often even the visual connection to distance is lost while in the air. This means that other forms of reference points are needed, and in the case of the interviews, this was most likely to be time, and in some cases, the cost of the tickets.

The interviewees expressed an awareness of the lack of intrinsically, i.e. value in its own right, of travelling by air, the air journey not in itself representing a journey value, as it is seen when the interviewees use other modes of transport across land. But this trade-off is happily made, because the air journey can offer rapid transit at a competitive price compared to land travel. On holidays with destinations further away (in metric terms), flying is often the only viable option. Travelling by air, however, is not an exclusively instrumental experience, as some interviewees mention that being aeromobile also holds some value and extra-everyday life experiences (such as travelling to, and being at, the airport, and the bodily experience of flight), that have come to symbolise holiday for them. But these experiences do not seem to translate into transforming the air-distance representation away from being mainly a resource representation, without any intrinsic distance experience as it can be seen in the other two distance representations discussed above, distance as accessibility and distance as knowledge. Those two are almost exclusively related to land based travel. When it comes to travelling on holiday across land, distance becomes a much more complex factor, that is constituted by a much more prominent awareness of the physical distance, combined with the three types of distance representations discussed above. But also, there is differentiation evident with car journeys and high speed train journeys offering a more instrumental transit service than the more intrinsic experiences had when the interviewees use slower transport modes such as bicycles, ferries, and walking. The pattern that emerges is that the slower the pace, the more distance perception becomes a phenomenon that is linked to a range of different values, such as knowledge and cultural difference or similarity. This is probably due to the interaction with the places travelled allowed by land based modes, and the slower the passing-through is, the more time there is to allow other factors than just time and money to become attached to the understanding of distance.

Therefore, a significant attribute of representations of distance is that they will presumably often be in relation to transport mode, or maybe more precisely, speed. The three categories of representations of distance stand in varying relationships to physical distance, where distance understood in terms of resources will have a stronger association with physical distance than with accessibility, which again is more strongly linked than knowledge-distance. The linearity between the physical distance and the distance representation signifies how longer physical distance is likely to influence the perception of distance derived from the representation of distance. Thus, it is common to assume that the more money or time spent travelling equals further distance, which shows a strong association, whereas high levels of knowledge of a place is not in a linear relation to physical distance to that place, not representing a 'true' reflection on distance in the physical sense. The correlation between money, time, and physical distance is not a linear one though, and an important element of this relationship is the mode by which the distance is overcome. Knowles (2006) discusses how a differential collapse in time/space is a result of successive transport innovations, an

argument that in this present context can be used to illustrate that the resources needed to overcome a given distance will be a result of what transport technology the tourists, for economic, social, or idealistic reasons choose for their holiday transit. From any given departure location, there will be places that are cheap to travel to, but further away than other places, which will be more expensive, and it might take longer to travel to places that are closer than to places which are further away. Therefore, it would be a flawed assumption to suggest that the more money the tourist spends on the holiday or the longer they spend on the transit to the destination, the further away the destination is. Nevertheless, the interviewees expressed a strong association between distance and money and time.

Another interesting perspective on the relationship between physical distance and its representations is the fact that some journeys are more than just transit from one place to another. Some journeys are intrinsic, and undertaken for the enjoyment of the journey itself. The previous discussions of representations of distance primarily relate to instrumental holiday travel, where the transit was undertaken by the tourist in order to get to a place, although some of the interviewees have engaged in intrinsic journeys, and have reflected on distance also based on these. But what is the significance of this juxtaposition of journey purposes for understanding representations of distance? Foremost is that instrumental travel is played out within a sphere of absolute space. The furthest possible instrumental travel would be to the other side of the globe, so to speak, travelling further than that on the same journey would suggest some other purpose than 'just' getting from point A to point B. Intrinsic travel, however, does not happen in an absolute space, because the purpose is not to get to a specific place, but rather to engage in the journey. Is distance being represented in different ways according to journey purpose? And is the distinction between instrumental and intrinsic so clear that this would be identifiable? A number of the interviewees comment on making instrumental journeys more enjoyable by adding elements to them that could be viewed as intrinsic (making the most of it, now that we are here). One thing seems to be sure though, and that is that the air journeys are much more instrumental than the land journeys, as travelling across land offers much more opportunities for giving the journeys intrinsic elements through the physical closeness to the 'content' of the distance travelled en route to the holiday destination.

The various representations of distance, of which arguably only some have been discussed here, together with physical distance, create an individual's knowledge of distance to specific places. Distances to some places might rely more on a representation through resources, while distance to other places will be a result of individual experience and knowledge. Through distance representations, the concept becomes relative because it is comprised of contexts that are themselves forever dynamic. Perceptions of distance change over time, because individual experiences over time alter the context within which distance is being represented by the individual. It is altogether possible, too, that distance to a given place will be represented in different ways, determined by the purpose of the relation at hand. One day it might be relevant to know that it will cost £500 to get to a place, another day it might be relevant to perceive that same distance in terms of cultural similarities. No representation of distance is likely to stand alone.

6. CONCLUSION

This paper has argued that distance is more relevant and more easily understood by tourists when it is being represented by other concepts such as resources, accessibility, and knowledge than when it is represented in mere kilometres. In relation to holiday travel behaviour,

distance is rarely referred to in its physical form, but rather as a translation into a form that relays more information about the stretch of space than 'just' the distance.

This paper has also discussed how being aeromobile has an influence on tourists' representations of distance in a different way than being mobile across land, with the flying tourist being further removed from both the physical distance of their journey as well as other contextualising factors framing distance. More than half of international tourists arrive at their destination by air, so this reduced perception and representation of distance as primarily time and cost could have magnitude impacts in a case where such an understanding of distance might lead to undesirable tourism travel behaviour. In an attempt to make tourism more environmentally sustainable, calls have been made for a reduction in air travel, both in terms of physical distance and frequency (Peters, 2007), but if the practice of leisure aeromobility conducted by tourists is linked to a distorted and un-reflected awareness of the distances actually involved in travel behaviour, it might be difficult to achieve the desired behavioural change (Hares, Dickinson & Wilkes, 2010). On a brighter note, with this insensitivity towards physical distance brought on by tourism aeromobility, few destinations are 'too far away' in metric terms, as the distance to them is assessed using other criteria. This has expanded the range of potential destinations as a result of air travel, benefitting both tourists and destinations.

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MEASURING AIR AND TERRESTRIAL TRANSPORT COMPANY REPUTATION: TOURISM INTANGIBLES EXPRESSED IN THE DIGITAL ENVIRONMENT

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ABSTRACT

The reputation of companies within the transport industry is influenced by competitive dynamics within the sector: low-cost flights, the attractiveness of destinations, online user-generated content about users' experiences, and more. At the same time, social media provides a means for companies to manage issues of tourism intangibles. Thus, it is relevant to analyse transport reputation in the digital environment, taking into consideration the resources for managing these intangibles. This paper presents a method for measuring transport reputation based on an analysis of tourism consumers' digital opinions and passengers' comments about their experiences with these firms. The use of social media, such as TripAdvisor and Facebook, conjugated with business intelligence tools and complemented by data mining techniques, can contribute to the development of metrics that consider intangibles like emotions and experiences, with the aim of measuring, analysing, and visualizing the complex relationships between these intangibles and transport companies' reputations. The results present the impacts of these intangibles through clusters and positioning maps focusing on these issues. This investigation contributes to our knowledge about airlines and terrestrial transport companies that seek to differentiate their positioning in tourism markets through their reputations.

Keywords: Air and Terrestrial Transport Reputation, Business Intelligence, Online Reputation, Social Media.

JEL Classification: E22, M15, M31, Z33, Z32

1. INTRODUCTION

In today's world, the Internet has made it difficult for companies to control the flow of data about their products, services, and brands, given the sheer number of user-generated comments that are produced daily in social networks. The tourism sector and its associated services depend on the opinions of consumers, which are increasingly expressed in the digital environment. These types of commentaries contribute to the process of decision making by other tourists as they plan their own travel. For companies involved in tourism transport, like other activities within the sector, competitive advantage requires analysis of their reputation, expressed through social networks, in relation to other companies. Transport markets are interconnected and involve hierarchical control by firms that are in the business

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of both terrestrial and air transport (Sezgin, 2016; Sigala, 2017). As consumers have gained more power and influence over brands, companies have come to operate in a more and more unstable environment (Schau & Gilly, 2003). Stakeholders wish to determine what is behind the services offered by transport companies, and they demand a greater level of transparency in these companies' activities.

However, this dialogue allows transport companies to adjust their strategy and to take decisions at high velocity, correcting inaccuracies or mistakes in their communication and actions before dissatisfaction grows and the noise in social media increases (Gurtner, 2016). The participative behaviour, ensuring that transport companies listen to their customers, is now a priority for companies as they define their strategies in the short, medium, and long term—at least for any companies that want to survive and compete at the local level and around the globe. Due to these considerations, companies have a vested interest in understanding stakeholders' perceptions of their reputations within the digital world (Liu & Shi, 2017).

Corporate reputation is the perception that stakeholders have of the behaviour of the company over time (Casado & Peláez, 2014). This perception is related to the capacity of the organization to achieve stakeholders' expectations and how the firm compares with other companies (Riel & Fombrun, 2007; Roberts & Dowling, 2002).

Although analysing corporate reputation is important for all activities, it is even more relevant in the tourist transport industry because there it helps to contribute to the image of a destination, and thus the definition of the excellence of an entire region or country (Tang, Weaver & Lawton, 2017). The integration of air and terrestrial transport information, in connection with market globalization and new ICT (Information and Communication Technologies) scenarios, is needed to generate sustainable and trusting relationships with companies' stakeholders in markets where operate or wish to operate. For these reasons, they have incorporated into their strategy the treatment of relational intangibles as a differential value, which gives them economic and social sustainability. Focusing on these relational intangibles is necessary for improving tourism transport companies' reputations (Min, 2015).

Many research studies have confirmed that management of corporate reputation is an intangible that brings a competitive advantage and provides multiple benefits, such as, reducing costs, raising prices and creating a barrier to competition. (Dolphin, 2004) multiplies trademark value (Black, Carnes & Richardson, 2000; Fan, 2005); products and services and constitutes a shield against crisis (Bartikowski & Walsh, 2011); transmits quality commitment to consumers (Berens, Riel & Bruggen, 2005); gives access to new markets (Fombrun & Riel, 2004); improves financial performance (Fombrun, 2001; De Quevedo, De la Fuente & Delgado, 2005); inactivates threats and attacks to the trademark (Interactive, 2002); attracts a quality workforce (Greening & Turban, 2000); and diminishes the impact of a crisis and promotes recovery from it (Eccles, Newquist & Scharzt, 2007; Obloj & Capron, 2011). For these reasons, the analysis of the reputations of tourist transport companies as displayed in the digital environment is increasingly relevant, yet it lacks appropriate definition of methods and measures.

This study aims to achieve several objectives: (a) identify whether all users' experiences have the same influence on the relationship with tourism transport companies; (b) study whether the experiences and emotions of air transport users are the same as those for terrestrial transport users; (c) identify the characteristics of the transport reputation associated with good brand performance; and (d) determine whether the positioning of brands, in regard to intangibles, is characterized by heterogeneous performance in the experiences and emotions of transport users.

This paper presents an analysis of how air and terrestrial transport companies that operate in the Spanish market are perceived, taking into consideration the opinions of tourists and passengers within the digital realm about their experiences with these companies. First, it presents the concepts associated with the relational intangibles of users' experiences and emotions and examines evidence from the literature about these intangibles and their impacts. Second, we present the methodology based on business intelligence techniques and the sample of the field work. Third, we highlight the results and answer our hypotheses. Finally, we offer conclusions and recommendations for improving company reputation within the tourism transport sector.

2. INTANGIBLES AND THEIR RELATIONSHIPS WITHIN THE TOURISM TRANSPORT INDUSTRY

Air and terrestrial transport companies need to hear and know about public perceptions of their services (Casado, Méndiz & Peláez, 2013) in order to adjust their strategies in the short and long term (Zink, 2005). These companies are interested in controlling their reputations, but doing so has become extremely difficult. Due to rapid advances in digital technology, the reputations of transport brands are known worldwide, and tourism consumers' opinions about organizational strategies are expressed on social networks (Schwarz, 2012) as the consumers interact with other online users (Bernoff & Li, 2008), share their experiences (Shapiro, 1983), voice their opinions, and exert their influence quickly and forcefully on a wider audience.

This public perception about a brand and reputation is one of the most relevant intangibles with regard to relational capital. This intangible is determinant to corporate success and should be understood as a market asset (Daum, 2003; Kuhle, Smedley & Schmitt, 2009; Casado, Méndiz & Peláez, 2013).

Within the relational intangibles about brand perceptions, the most important are lived experiences (Mahon & Wartick, 2012) and emotions (Scherer, 2005). These intangibles are applicable to any portion of the public that has a relationship with the company.

2.1. Experiences

Multi-stakeholder experiences are understood as the experiences generated by stakeholders who are affected by business relationships with enterprises or their brands (MacMillan *et al.*, 2005; Mahon & Wartick, 2012). Depending on the familiarity and interest of stakeholders resulting from their experience, there will be greater or lesser impact or social reaction to the company, and thus a more or less favourable predisposition toward it (Tennie, Frith & Frith, 2010; Yao *et al.*, 2014; Ijzerman, Janssen & Coan, 2015). Multi-stakeholder experiences can include material or immaterial benefits received by the brands (McDonald, Chernatony & Harris, 2001); communication between the brand and stakeholders (Duncan & Moriarty, 1997); trust behaviours of the brand in the past; and a company's commitment to its stakeholders (Conway & Briner, 2002).

Stakeholder perceptions, especially when stakeholders perceive a disconnect between a company's brand and its promises (Roberson & Park, 2007), get moved swiftly to digital conversational environments where they are shared and viralized (Kozinets *et al.*, 2010; Van Laer & De Ruyter, 2010).

With respect to the dimensions of multi-stakeholder experiences, a great many authors (Highhouse, Brooks & Gregarus, 2009; Ponzi, Fombrun & Gardberg, 2011; Casado & Peláez, 2014) have studied which are the main variables explaining public evaluation of a first or ongoing experience with the enterprise. There has been general agreement about these

variables; those with the most multi-stakeholder application are defined by Fombrun and Gardberg (2000) and Ponzi, Fombrun and Gardberg (2011) as the following: innovation, work, integrity, citizenship, leadership, and finances. These dimensions are in turn broken down into 23 attributes.

2.2. Emotions

For Scherer (2005), emotions are expressed through feelings and arise as a reaction to any situation or thing. Feelings summarize whatever is experienced and can convey the meaning of that experience as a direct reaction to the individual's perception. Emotions are complex judgements of multiple dimensions and reflect a great deal of information about one's reaction with social and physical environments, as well as the inner thoughts regarding those relationships (Jalonen, 2014; Schweidel & Moe, 2014). However, as shown in Table 1, the literature includes a large number of definitions about the concept of emotion.

Scherer (2005) developed the first instrument on the dimensions of emotions, the Geneva Emotion Wheel (Figure 1), as well as a method to deal with the lexical aspect of emotions with granularity, called the GALC lexicon program (Scherer, 2005).

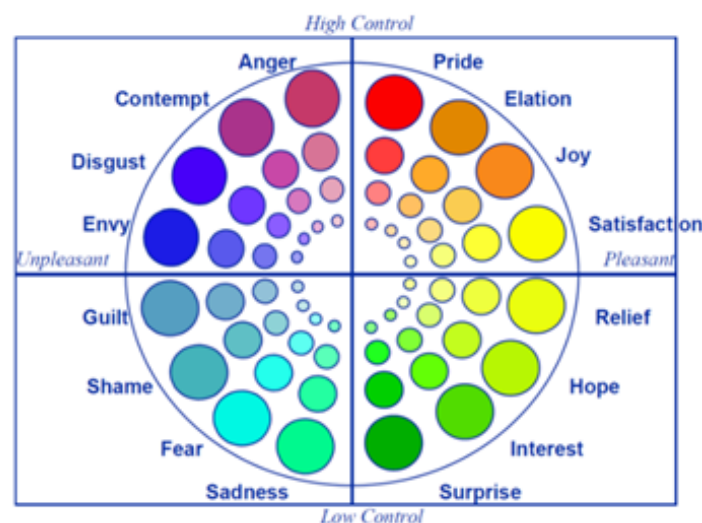
The emotions and the experience are intangible assets that have a relationship and contribute to defining the reputation associated with a product, service, or involvement.

Table 1. Definitions of Emotions

Discipline	Perspective of Emotion	Authors
Marketing	Positive and Negative emotions being fruit of some causes and they generate consequences Emotions in social Media	Coombs & Holladay (2005); Izard (2010); Morales, Wu & Fitzsimons (2012); Schweidel & Moe (2014); Thomson, MacInnis & Park (2005).
Psychology	Concepts of emotions: emotional attachment, passion (intensity) and affect. Characteristics of emotions: Extension, Duration and Feature; pleasantness dimension (polarity or valence: positive or negative); agitation dimension (intensity); and tension of that excitement (control when facing the event).	Ekman & Cordaro (2011); Goleman (2007); Thomson, MacInnis & Park (2005). Gabay (2015); Kahn <i>et al.</i> (2007); Scherer (2005).

Source: Own Elaboration

Figure 1. Geneva Emotion Wheel



Source: Sacharin, Schlegel & Scherer (2012)

2.3. Relationships among Intangibles

Research provides evidence for not only the relationships among intangible relational capital assets (experiences and emotions) but also the relationships of those intangible assets with tangible business assets (Table 2). Many authors consider the importance of working with appropriate tools, which allow modelling precedents and effects of these activities on a dynamic, holistic, and transversal multidimensional construct (Lange, Lee & Dai, 2011).

Table 2. Types of Intangible Relational Assets

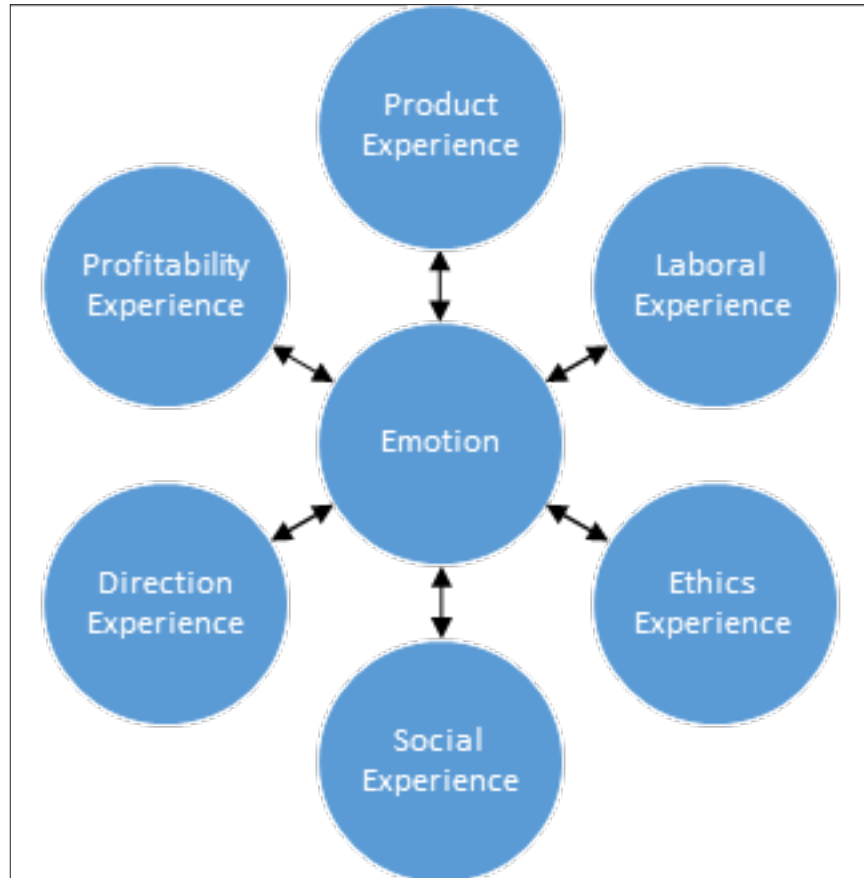
Type of Research	Relationships	Authors
Intangible Relational Assets	Experiences and Emotions	Bagozzi, Gopinath & Nyer (1999); Bigné, Ros & Andreu (2004); Pandey, Kumar & Soodan (2012); Park & Lee (2007).
Intangible Relational Assets with Tangible Assets	Emotions and Management	Bandelj (2014); Han, Duhachek & Agrawal (2014); Kuhle, Smedley & Schmitt (2009); Lord & Kanfer (2002); Lynch & De Chernatony (2004).
	Experiences and Business	Meyer & Schwager (2007); Thomson, MacInnis & Park (2005); Waddock (2008).
	Experiences and Emotion with Business	Black, Carnes & Richardson (2000); Boyd, Bergh & Ketchen Jr. (2010); Money & Hillenbrand (2006); Roberson & Park (2007); Scherer (2005); Wang, Smith & Taken (2010).

Source: Own Elaboration

Nevertheless, as illustrated in Table 2, no evidence has been found of a business intelligence methodology that allows establishing in a transversal way relationships between intangible relational capital assets (experiences and emotions) that the public has about transport enterprises within the tourism sector (Figure 2). However, it is important to investigate whether all users' experiences similarly influence their relationships with tourism transport companies. At the same time, it is also relevant to understand whether the experiences and emotions of air transport users are the same as terrestrial transport users.

For tourist transport organizations to survive and compete in today's world, considering all the technological applications that have emerged within society, they should have access to knowledge discovery as a way of gaining insight into the perceptions that transport users have about their brand and their competitors. Therefore, there is a need to develop a reputational model that can analyse, measure, and monitor the brand management of tourism transport, in the context of users' interactions and opinions, as a way to identify the perceptions about the company's stakeholders (Iglesias, Ind & Alfaro, 2013), and their relationships globally and transversally (by business areas).

Figure 2. Relationships between Experiences and Emotions



Source: Own Elaboration

A reputational model that considers knowledge extraction in regard to intangible resources around strategic company management can be a way to differentiate their operating mode in society and in the markets. Adoption of such a process can help companies to control their performance, solve problems, (Deng, Wang & Galliers, 2015), and position themselves in the reputation economy. The reputation model also should include business intelligence tools to find intelligence and insights in the data as a way to identify and develop new ideas and strategies to potentiate the reputational performance of these transport brands and their positioning in the intangible economy. In this study, this is also called a reputational intelligent model, which will be applied to the tourism transport sector.

3. METHODOLOGY APPLIED TO THE TOURISM TRANSPORT SECTOR

The methodology applied to measure the relationships among users' experiences and emotions to build up transport reputations and to define the reputational positioning of transport firms is defined by the application of business intelligence tools. Such tools can extract knowledge and insights from data warehouses (Olszak, 2016; Peters *et al.*, 2016; Santos & Ramos, 2009), complemented with data mining techniques, such as clusters using the naïve Bayes algorithm (Han, Pei & Kamber, 2011; Kelner & Lerner, 2012; Tsai *et al.*, 2016). The most relevant advantages of business intelligence tools are their potential to: (1) show reputational benchmarking of firms; (2) demonstrate the existing relationships and influences among the different variables (intangibles and tangibles) of the model; (3) delimit

the different clusters of reputational performance in the sector; and (4) classify and position the transport brands within the reputational performance clusters in this sector.

To develop a reputational intelligent model associated with tourism transport, it is necessary to follow an appropriate methodology, comprising three phases: (i) data gathering, divided among the three steps of location, capture, and semantic analysis; (ii) data warehousing, and (iii) data analysis.

For the location step within data gathering, it is necessary to search online for useful data, using the domain knowledge of the study as well as intuition and automatic mechanisms. Data capture involves known APIs (Application Programming Interface), which will provide data in different formats (e.g., Excel, XML, JSON, etc.) from external and internal sources, or through standard query languages. In addition, in the capture and storage step it will be necessary to guarantee the quality of the data (Kim, Huang & Emery, 2016). In the last step of data gathering, a semantic analysis process must be carried out for those data that need it. This process uses probabilistic techniques based on Kelner and Lerner (2012), naïve Bayes analysis, pattern-based techniques, or expression analysis. It can also be done through two types of supervised and unsupervised approaches (Neri & Raffaelli, 2005).

After the semantic analysis, the collected data are transformed by numeric values that can define performance metrics, followed by storage in a database created to support the decision-making process. Data warehousing (Wrembel & Koncilia, 2007) is characterized as a collection of integrated, non-volatile, and subject-oriented data, recorded over time, for the purpose of supporting the reputation analysis and measuring and managing the performance indicators.

In the data analysis phase, it is necessary to transform and select the data necessary to measure the indicators that contribute to reputation. The numeric data need to be converted and normalized into a scale that permits comparison of the different indicators or variables. Online analytical processing and data mining techniques are used to analyse the information according to different perspectives (dimensions) and to look for relationships, patterns, or models that are implicit in the data. This phase involves five steps: i) data validation; ii) normalization, to make possible the comparisons among different variables; iii) conversion to a scale that represents “digital emotion”; iv) application of the business intelligence tools to extract intelligence about the data, and v) data visualization through the development of tables and graphics that show the results of the key performance indicators associated with the activity.

Digital emotion, based on the work of Miller (1956), considers a 0–10 scale of values to express emotions: values between 0 and less than 2 express an emotion of hatred, values greater than or equal to 2 and less than 4 express an emotion of rejection, values greater or equal to 4 and less than 6 express an emotion of indifference, values greater than or equal to 6 and less than 8 express an emotion of acceptance, and values greater than or equal to 8 express an emotion of admiration.

3.1 Sample of the Sector

The model is applied to the digital opinions regarding intangible assets — experiences and emotions — that stakeholders, mainly tourist passengers, express about the most relevant firms in the air and terrestrial transport sector. The firms are the three most relevant corporations in the Spanish transport sector, and those that have the most passengers. The data sources from which digital opinions are extracted comprise the most important digital ecosystems of the Spanish market: Twitter, Facebook, and YouTube, forums, websites, and social platforms. The study period is from January 1 to December 31, 2016. It has been

extracted 159,409 commentaries and the information data analysed for transports sector is a total of 85,758 observations from digital ecosystems.

3.2 Hypotheses

Based on the concepts associated with relational intangibles assets in tourism transport (users' experiences and emotions), and the methodology based on business intelligence techniques, the hypotheses that we consider through data analysis are these:

H1. All user experiences have the same influence on the relationship with user emotion in the tourism transport industry.

H2. In the tourism economy, user experiences and emotions with regard to air transport are different from those with regard to terrestrial transport.

H3: The reputational performance of corporate brands differentiates the clusters within a business sector.

H4: The positioning of brands in the intangible economy is characterized by a very heterogeneous performance among user experiences and emotions.

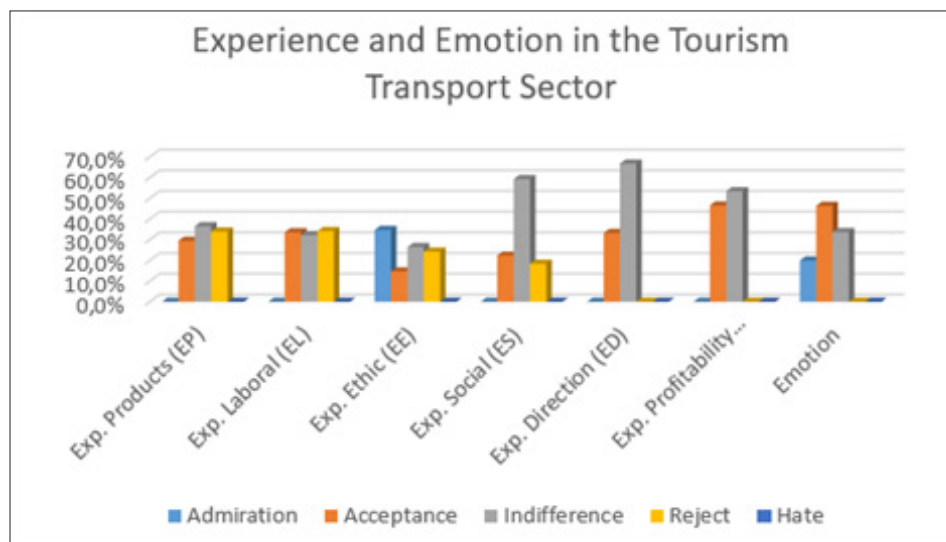
Taking into consideration the Spanish economic sector of tourism transport and the methodology presented above, the data were processed and structured in a way to extract intelligence about transport reputation.

The relationships among the intangible assets of user experience and emotions, as presented in Figure 2, take into consideration the work developed by Fombrun and Gardberg (2000) and Ponzi, Fombrun and Gardberg (2011). User experience was subdivided into product, labour, direction, ethics, profitability, and social dimensions, comprising the variables to be analysed by the business tools and data mining techniques.

4. RESULTS ANALYSIS

Descriptive analysis shows that: (1) user emotions about the air and terrestrial transport sector are concentrated around two feelings: acceptance and indifference; (2) with regard to profitability and direction, opinions are more positive than negative (Figure 3).

Figure 3. Reputational Behaviour of Tourism Transport



Source: Own Elaboration

Figure 4 shows that there is homogeneity in the sector with regard to negative experiences around products, labour, and ethical issues. Entity 4, an air transport firm, has more negative user experiences around products and labour. Entity 2, a terrestrial transport firm, has more negative user experiences around ethics.

Transport Tourism have more than 65% positive emotions with admiration and acceptance situations (see figure 5). There are not negative emotions for air and terrestrial transports expressed through social opinions on the digital environment. Only the emotions of the entity 2 are indifference in all the situations.

Figure 4. Reputational Behaviour of Tourism Transport by Types of Experiences

Exp. Products (EP)	Transport Sector	Entity #1	Entity #2	Entity #3	Exp. Laboral (EL)	Transport Sector	Entity #1	Entity #2	Entity #3
Admiration	0,0%	0,0%	0,0%	0,0%	Admiration	0,0%	0,0%	0,0%	0,0%
Acceptance	29,5%	0,0%	87,4%	1,1%	Acceptance	33,6%	22,7%	77,0%	1,1%
Indifference	36,5%	97,0%	12,6%	0,0%	Indifference	32,2%	73,8%	23,0%	0,0%
Reject	34,0%	3,0%	0,0%	98,9%	Reject	34,2%	3,6%	0,0%	98,9%
Hate	0,0%	0,0%	0,0%	0,0%	Hate	0,0%	0,0%	0,0%	0,0%
Exp. Ethic (EE)	Transport Sector	Entity #1	Entity #2	Entity #3	Exp. Social (ES)	Transport Sector	Entity #1	Entity #2	Entity #3
Admiration	34,7%	5,2%	0,0%	98,9%	Admiration	0,0%	0,0%	0,0%	0,0%
Acceptance	14,7%	44,0%	0,0%	0,0%	Acceptance	22,3%	66,9%	0,0%	0,0%
Indifference	26,4%	50,8%	28,4%	0,0%	Indifference	59,3%	33,1%	44,8%	100,0%
Reject	24,2%	0,0%	71,6%	1,1%	Reject	18,4%	0,0%	55,2%	0,0%
Hate	0,0%	0,0%	0,0%	0,0%	Hate	0,0%	0,0%	0,0%	0,0%
Exp. Direction (ED)	Transport Sector	Entity #1	Entity #2	Entity #3	Exp. Profitability	Transport Sector	Entity #1	Entity #2	Entity #3
Admiration	0,0%	0,0%	0,0%	0,0%	Admiration	0,0%	0,0%	0,0%	0,0%
Acceptance	33,2%	57,1%	41,5%	1,1%	Acceptance	46,5%	60,4%	78,1%	1,1%
Indifference	66,8%	42,9%	58,5%	98,9%	Indifference	53,5%	39,6%	21,9%	98,9%
Reject	0,0%	0,0%	0,0%	0,0%	Reject	0,0%	0,0%	0,0%	0,0%
Hate	0,0%	0,0%	0,0%	0,0%	Hate	0,0%	0,0%	0,0%	0,0%

Source: Own Elaboration

Figure 5. User Emotions for Tourism Transport

Emotion	Transport Sector	Entity #1	Entity #2	Entity #3
Admiration	19,9%	59,8%	0,0%	0,0%
Acceptance	46,4%	40,2%	0,0%	98,9%
Indifference	33,7%	0,0%	100,0%	1,1%
Reject	0,0%	0,0%	0,0%	0,0%
Hate	0,0%	0,0%	0,0%	0,0%

Source: Own Elaboration

4.1. Influences between the Intangibles of Tourism Transport

On the existing influences among user experiences and emotions, all of the experience variables influence each other transversally, with their impact value translating from experiences into emotions (Figure 6). Data mining has been used to analyse the key influences.

Figure 6 shows how the different values of experience variables exhibit different valence and intensity on customer emotions. The most important influences are these: (1) acceptable experiences produce an emotion of admiration in 100% of the situations; (2) An indifference profitability influences, an ethic experience of admiration and a laboral experience of rejection favours an acceptance emotion in more than 75% of the situations; (3) A products experience of acceptance and ethics experiences of rejection influences an indifference emotion in more than 70% of the situations. Therefore the results confirm that

user experiences regarding products and ethics have the most influence on the valence and intensity of user emotions.

Figure 6. Holistic Influence of Experience Variables on User Emotions

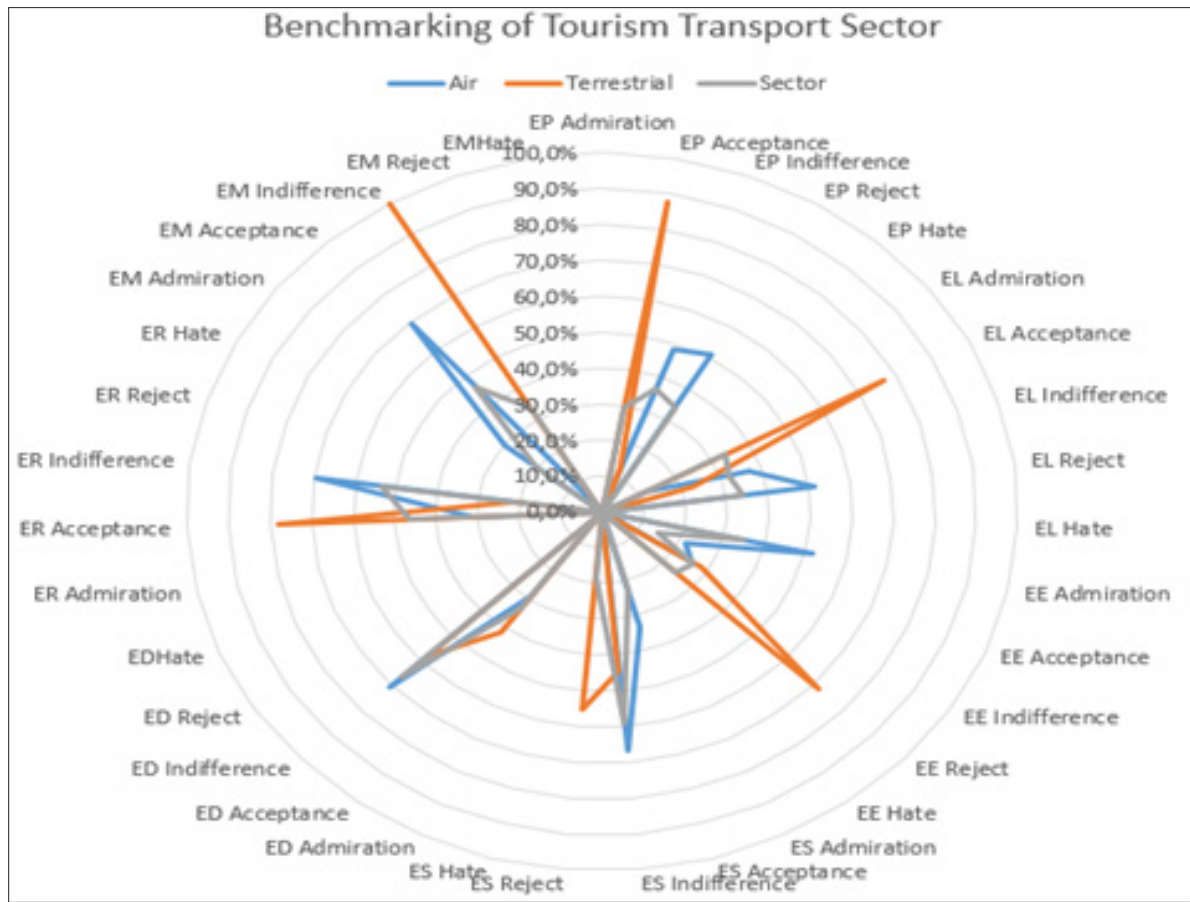
Experiences Variables	Value	% Impact	Favors an emotion of:
Social	Acceptation	100%	Admiration
Products	Indifference	58%	Admiration
Direction	Acceptation	53%	Admiration
Profitability	Indifference	100%	Acceptation
Ethics	Admiration	82%	Acceptation
Laboral	Rejection	80%	Acceptation
Products	Rejection	79%	Acceptation
Direction	Indifference	59%	Acceptation
Social	Indifference	56%	Acceptation
Products	Aceptation	100%	Indifference
Ethics	Rejection	73%	Indifference
Social	Rejection	51%	Indifference

Source: Own Elaboration

4.2. Behaviour of Intangibles in Air and Terrestrial Transport

Analysing the reputational benchmarking of tourism transport firms, we can observe differences dependent on user experiences (Figure 7). User experiences and emotions regarding air transport are different from those regarding terrestrial transport. There is a heterogeneous emotion with acceptance value between air transports; terrestrial and the entire sector, which have more than 70% with acceptance situations.

Figure 7. Reputational Behaviour of Tourism Transport



Source: Own Elaboration

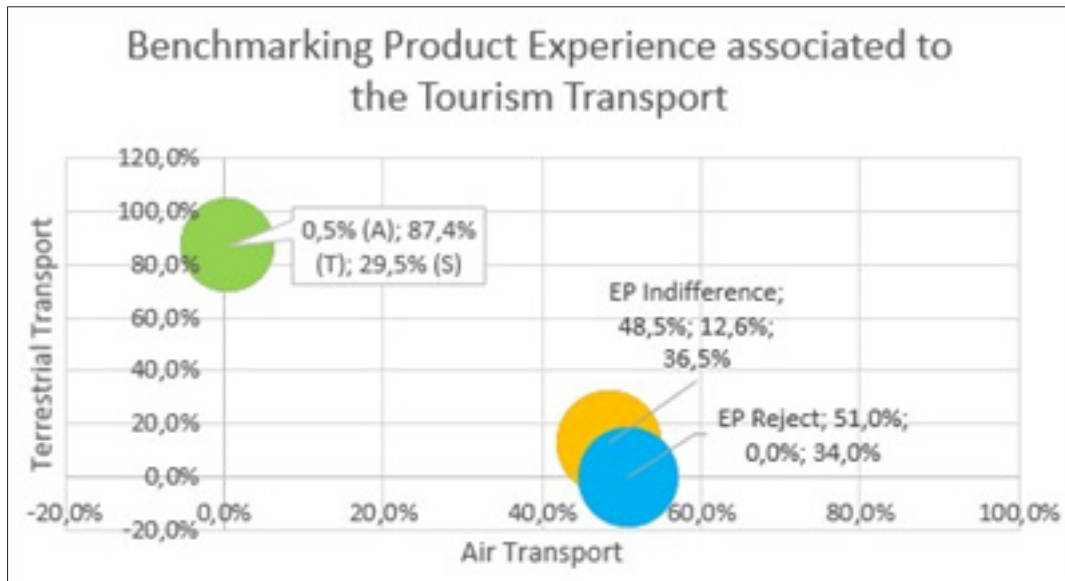
The society has a 100% of indifference emotions about Terrestrial transports (Figure 7). Otherwise, air and terrestrial transport brands are more homogenous with regard to two experiences: (1) social responsibility experiences have around 60% of situations with the indifference value; (2) Direction experiences have more than 60% of situations with reject value. With respect to ethics, behaviours are less homogenous. In air transports, ethical experiences have less than 50% of situations with admiration value and in terrestrial transports more than 70% of situations with reject value. Labour Experiences are also a heterogeneous behaviour.

4.3. Positioning of Transport Brands in the Intangible Economy

The reputational benchmarking of the tourism transport sector is visualized through a mapping technique that shows the positioning of air and terrestrial transport (Figure 8 and 9).

Figure 8. Map of Reputational Positioning Associated with Tourism Transport. Experience associated with the product with value of acceptance is higher in the terrestrial transport; with rejection value is higher in air transport.

(Product Experiences for Air and Terrestrial Firms)



Source: Own Elaboration

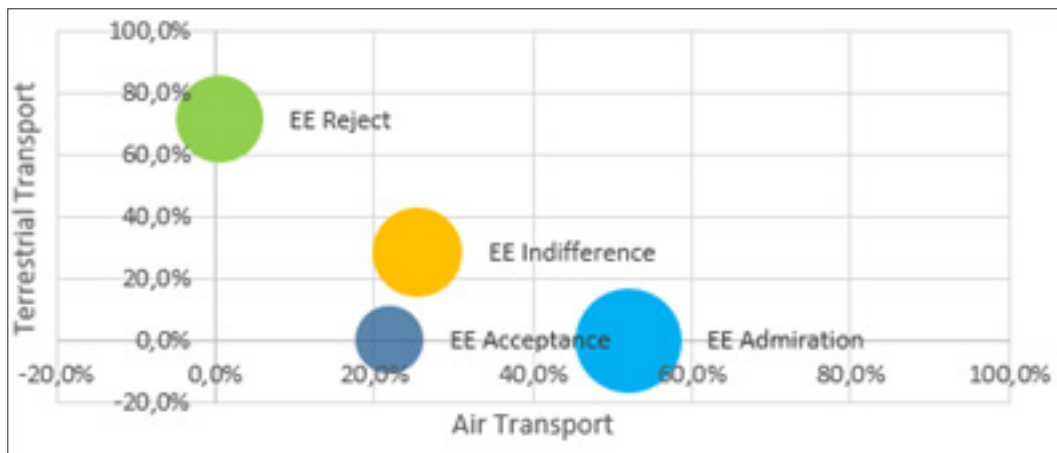
For product experiences: (1) terrestrial transports position has more situations of acceptances (87%) than air transports. In Ethical Experiences; (2) There are some similar product experiences between terrestrial transports and some synergies between companies of air transports.

For ethical experiences: (1) There are not homogeneous performance between air and terrestrial transports brands; (2) Experiences of air transports are more positive, two of them has admiration and acceptances situations; (3) Terrestrial transports only have reject situations of ethical experiences. Figure 8 and 9 shows that the experiences around product and ethics have a heterogeneous performance.

The positioning of brands in the intangible economy is characterized by very heterogeneous performance with regard to emotions. Figure 10 shows that user emotions for air transport are more positive than for terrestrial transport. More than 60% of air transport emotions display acceptance.

Figure 9. Map of Reputational Positioning Associated with Tourism Transport. Experience associated with the ethics with value of admiration is higher in the air transport; with rejection value is higher in terrestrial transport.

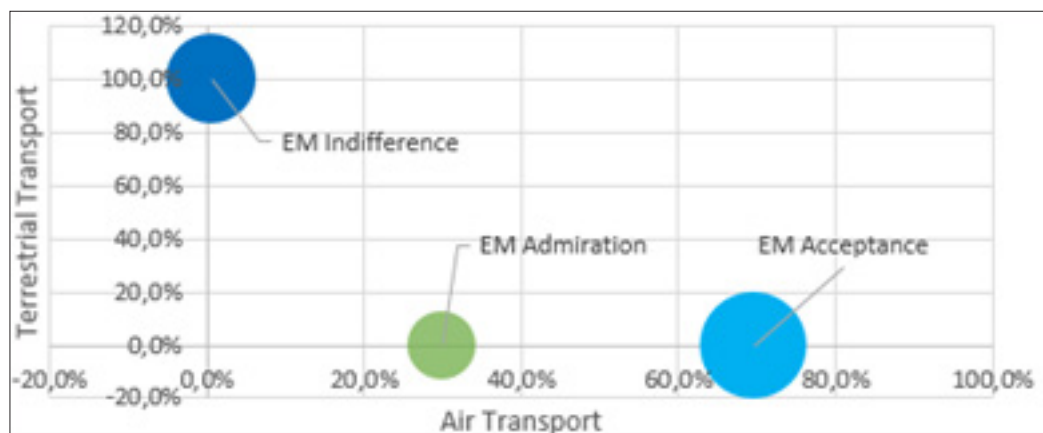
(Ethics Experiences for Air and Terrestrial Firms)



Source: Own Elaboration

Figure 10. Map of Reputational Positioning Associated with Tourism Transport. Emotion with a value of acceptance and admiration is higher in the air transport; with indifference value is higher in terrestrial transport.

(Emotions)

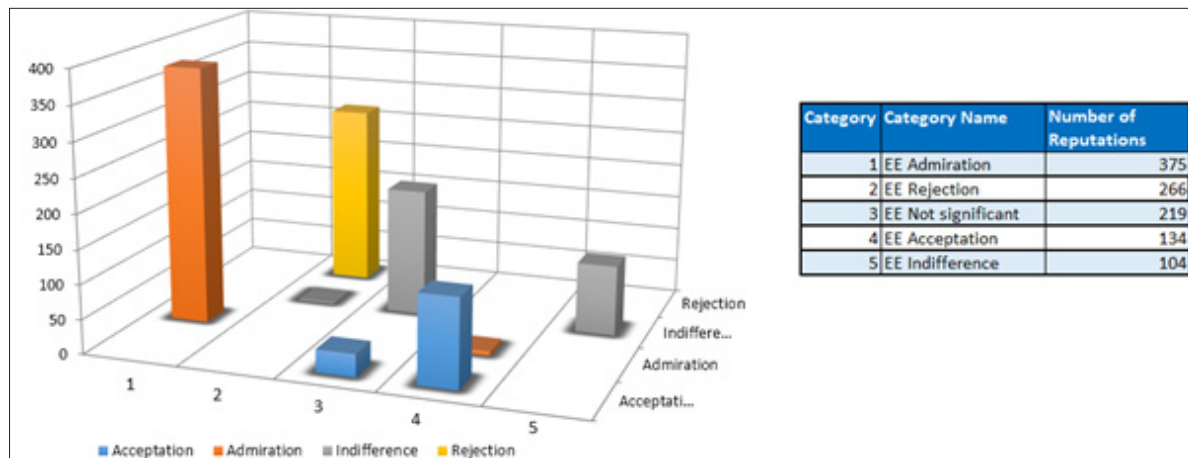


Source: Own Elaboration

4.4. Clusters through Reputational Performance of Tourism Transport

To delimit the different clusters for reputational performance in the tourism transport sector, clustering techniques are applied to find situations with homogeneous relationships between intangible and tangible variables and to define heterogeneous groups. In Figure 11, five different transport reputation clusters can be distinguished.

Figure 11. Transport Reputation Clusters of Tourism Transport (Ethical Experiences). The reputation associated with ethics was enlightening in the transport sector that was used to create categories. (Clusters)



Source: Own Elaboration

As can be seen in Figure 11, ethical experiences in every cluster are distinguished by their valence and intensity compared to other variables.

Tourism transports were analysed according to the percentage of different situations for ethical experiences, the main category to make clusters in the transport sector (see figure 12). In cluster 1, ethical admiration, air transport entity #3 received a rating of admiration for 98.91% of situations over 362 days. In cluster 2, terrestrial transport entity #2 has 71.58% of rejection situations in 262 days and this entity 2 has 28.24% of indifference situations in cluster 5. The air transport entity 1 is relevant in two types of clusters: During 219 days, in cluster 3 this entity 1 has 59.84% of not significant situations; and during 134 days, it has 36.61% of acceptance situations in cluster 4.

Figure 12. Transport Reputation Clusters of Tourism Transport (Ethics)

Entity	EE Acceptation Category		EE Admiration Category		EE Indifference Category		EE Not significant Category		EE Rejection Category	
	% Category	Days Number:	% Category	Days Number:	% Category	Days Number:	% Category	Days Number:	% Category	Days Number:
Entity #1	36,61%	134	3,55%	13	0,00%		59,84%	219	0,00%	
Entity #2	0,00%		0,00%		28,42%	104	0,00%		71,58%	262
Entity #3	0,00%		98,91%	362	0,00%		0,00%		1,09%	4

Source: Own Elaboration

Faced with these ethical experience situations, the reputational performance of corporate brands differentiates the tourism transport clusters. Entity #3 is the company with the most homogenous behaviour of ethical with admiration value, associated to the reputational performance.

5. DISCUSSION

Sustainable relations between transport companies and consumers are only possible if the companies: (1) align the interests of the company with the perceptions of the company held by stakeholders; and (2) integrate ethical and professional corporate values into the company's behaviour with consumers, which in time can generate an atmosphere of trust and credibility.

In the particular case of air and terrestrial transport companies, trust and reputation can't be bought. Stakeholder perceptions are composed of multiple factors, which are not always under the companies' control. The success or failure of tourism transport companies depends not only on themselves, but also on the trust relations generated with the public. Stakeholders see inconsistency between the messages that they receive and their own experiences, which affects their level of trust in the company and generates negative feelings about reputation.

Analysing the reputational benchmarking of tourism transport companies, we find that tourists' opinions about ethical experiences with air transport companies are positive. However, their opinions about ethical experiences with terrestrial transport companies are negative; the transports firms have more than 70% of situations with reject value. In both types of tourism transports, tourists evaluated direction experiences with more than 60% of reject situations.

When we applied a reputational map to tourists' digital experiences, the main differences between air and terrestrial transport companies' positioning in the intangibles economy are the performance of these firms in products and ethics. Terrestrial transports has a better positioning in product experiences than airlines companies. Otherwise, air transports has a better positioning in ethical experiences than terrestrial transports. The entity #3 airline has the best positioning in the intangible tourism economy with 362 days of the year an ethic experiences with a value of admiration expressed by their passengers and users.

Clustering techniques were used to extract knowledge about the five groups of tourism transport with the best and worst performance around intangibles. The most influential factor when defining the differences in the five clusters of tourism transports reputations is the valence and the intensity of the ethical experiences. In the tourism transport sector, we discovered the following brand position strategies in the tourism intangible economy of the sector: airline – entity #3 - is the transport firm with the biggest value associated to the ethic experiences (see cluster 1) and positive emotions; the positioning of terrestrial transport – entity #2 - in the tourism intangibles is distinguished by ethical experiences (cluster 2) with reject value. And finally airline – entity #1, the ethic experiences are not relevant experiences in their tourists' opinions (more than 50% (see cluster 3)).

Faced with this situation, we specifically recommend that terrestrial transport companies improve their reputational performance around ethics, aiming to change the valence and intensity of emotions from indifference to acceptance and admiration. In the case of airlines, they must continue to retain their ethics positioning and improve their product experiences with customers.

Our results confirm the acceptance of two hypotheses: **H3**: The reputational performance of corporate brands differentiates the clusters within a business sector. **H4**: The positioning of brands in the intangible economy is characterized by a very heterogeneous performance among user experiences and emotions. The other two hypotheses are rejected: **H1**. All user experiences have the same influence on the relationship with user emotion in the tourism transport industry (Figure 2); **H2**. In the tourism economy, user experiences and emotions with regard to air transport are different from those with regard to terrestrial transport.

In summary, the present investigation can contribute to analyse the tourism intangibles expressed in the digital environment, offering to the air and terrestrial transports companies: (1) an exhaustive measurement of relational intangibles; (2) identify types of behaviour of these relationships between brands and users or customers; (3) extract knowledge about the intangibles of the tourism companies, to difference their brands, in the tourism economy, versus their competitors; and (4) define its brand positioning in its sector through its tourism intangible relational assets.

6. CONCLUSION

This investigation has analysed the relationships among aspects of intangible relational capital: user experiences and emotions. This study has revealed challenges associated with new digital channels that affect companies' ability to manage these intangibles. (1) Great complexity is associated with the automatic collection and analysis of large volumes of data extracted from user opinions expressed in the digital environment. (2) No evidence has been found for a business intelligence method that can be applied to the relationships and influences among the intangible relational capital assets of user experiences and emotions. (3) Classify and positioning Tourism Transports companies within clusters of performance based on intangible relationships.

We proposed a business intelligence method to apply to user experiences with air and terrestrial transport companies within the tourism sector. In applying data mining techniques and Business intelligence tools for information treatment and analysis, it is observed that: (1) not all user experiences have the same influence on user emotions; (2) experiences and emotions around air transport are different from those for terrestrial transport; (3) reputational performance for corporate brands differentiates the clusters in this sector; and (4) tourism transport brand positioning is characterized by very heterogeneous performance regarding user experiences and emotions.

This research is a starting point to understand whether transport companies generate contradictory perceptions among stakeholders, resulting in a lack of consumer trust. The same stakeholders have experiences with different areas of the company: points of sale, customer relations, etc. All major air and terrestrial transport companies currently have large communications departments that position the company's products and manage its brand and global communication strategies. However, the development of the ICT has changed the rules of the game, and now the stakeholders can recommend or reject company behaviour through expressing opinions about their experiences and emotions in the digital environment. For this reason, tourism transport companies need to measure their reputation with business intelligence methods and techniques. The application of these techniques will simplify the collection of social data so that the companies can best position their brands and make decisions to guarantee their economic sustainability.

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INVESTIGATING EFFECTS OF PERCEIVED SERVICE QUALITY ON OVERALL SERVICE QUALITY AND CUSTOMER SATISFACTION: CASE OF SAUDI AIRLINES

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ABSTRACT

An increase in information readiness and intense competition between service organizations leads to more challenges in the business environment. On top of these service characteristics and need for a human touch are additional challenges for airline companies, not only to be successful but also to survive. Thus, knowing what airline customers think about an airline and gauging their satisfaction levels are of utmost importance. The aim of this study is to analyse the perceptions of service quality and levels of satisfaction among customers of the national airline of Saudi Arabia. To do so, it adopts the Airline Quality (AIRQUAL) scale. This scale comprises 44 items on seven distinct dimensions, namely; airline tangibles, terminal tangibles, personnel, empathy, image, perceived service quality, and customer satisfaction. Results of extensive data analysis support significant relationships with these study dimensions. Most notably, 'Airline Tangibles' are found to be the most influential factor creating a pool of satisfied airline customers. The text discusses the findings and implications of the survey.

Keywords: Perceptions, Overall Service Quality, Customer Satisfaction, AIRQUAL.

JEL Classification: M10, M31, L83

1. INTRODUCTION AND BACKGROUND

At a time of intense competition, all service organizations are desperate to survive, not just to be successful. This is vital in-service organizations in general but especially the airline industry (Nadiri *et al.*, 2008; Alotaibi, 2015; Nwaogbe *et al.*, 2017). One sure way of doing this is to provide a high quality of overall service, which increases customers' satisfaction, makes them more likely to return, and promotes recommendations to other potential customers (Bogicevic *et al.*, 2017). Keeping customers satisfied increases profits, market share, and return on investment (Sultan & Simpson, 2000). Thus, aviation managers must devise ways to distinguish their services from others (Al-Refaie, Fouad & Eteiwi, 2013; Hussain, Al-Nasser & Hussain, 2015; Wanke, Barros & Nwaogbe, 2016). To do so, they first need to understand what their customers' need, before they can attempt to meet and preferably surpass them. To improve the quality of service and customer satisfaction, managers need a way to reliably assess and measure these factors. Several researchers have attempted to define and evaluate the concept of service quality (Parasuraman, Zeithamal & Berry, 1988; 1991).

A synthesis of the related literature reveals that the SERVQUAL model (Parasuraman, Zeithamal & Berry, 1988) has been one of the most influential models in service quality literature for more than three decades (Jiang *et al.*, 2017; Subramanian, Suresh

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& Balachandaran, 2017; Ceylan & Ozcelik, 2016). According to Parasuraman and his colleagues, service quality has five key dimensions (Parasuraman, Zeithamal & Berry, 1988; 1991):

- *Tangibles* - the physical surroundings in terms of objects (for example, interior design) and subjects (for example, employees' appearance);
 - *Reliability* - the service provider's ability to provide appropriate and consistent services;
 - *Responsiveness* - a company's readiness to help its customers by performing its services quickly and efficiently.
 - *Assurance* - various features that give customers confidence (such as the firm's service knowledge, or polite and trust-worthy behaviour from employees);
 - *Empathy* - the service provider's willingness to give personal service to each customer.
- The authors called on other researchers to replicate SERVQUAL in different industries and settings. Since then, hundreds of replication studies have been conducted (Asubonteng, McCleary & Swan, 1996) with varying degrees of success. In addition, SERVQUAL has been adapted as a basis for several other scales, for instance, AIRQUAL (Ekiz, Bavik & Arasli, 2009), E-S-QUAL (Rafiq, Lu & Fulford, 2012), HiEduQual (Annamdevula & Bellamkonda, 2016), RENTQUAL (Ekiz, Hussain & Bavik, 2006; Ekiz, Bavik & Arasli, 2009), etc.

Churchill and Surprenant (1982) assert that satisfaction is determined by overall quality perception, which in turn is affected by several factors. In the case of the present study, these factors are; airline tangibles (ATANG), terminal tangibles (TTANG), personnel (PER), empathy (EMP), and an image (IMG). There is overwhelming support in the literature to back these relationships. For instance, Parasuraman, Zeithamal and Berry (1988; 1991) stressed the importance of tangible factors in creating a strong perception of quality, which leads to customer satisfaction. Westbrook and Oliver (1991) investigated the interrelationships among empathy, perceived quality and satisfaction and concluded that empathy displayed by the staff of the service provider created satisfaction. Bowen (2001) conducted research to consider the antecedents of customer satisfaction and found a substantial relationship between positive perceptions of the firm's employees and customers' overall satisfaction and impressions of quality. Finally, Annamdevula and Bellamkonda (2016) stressed the importance of image on the quality perception that leads to pre-decided satisfaction (where the customers make up their minds to be happy with the product/service even before they purchase it).

This is a much-needed study, because of a) it targets the perceived service quality of the national airline of Saudi Arabia, which has been little studied previously, except for Alotaibi (2015); and b) most tourists coming to Saudi Arabia use air transportation, predominantly Saudi Airlines. Thus, knowing how Saudi Airlines services are perceived and whether their customers are satisfied is of the utmost importance. Moreover, measuring airline service quality is vital to increase competitiveness in the Middle East market and in international tourism (Šebjan, Tominc & Širec, 2017).

1.1 Tested Hypotheses and Model

Considering the above-mentioned literature review as well as the research models of Ekiz, Bavik and Arasli (2009) and Nadiri *et al.* (2008), the following hypotheses were developed to assess the interaction between perceived quality factors/dimensions and overall quality perception and customer satisfaction with Saudi Airlines:

- H₁: A high level of perceived personnel-related quality will have a significant positive effect on overall service quality.
- H₂: A high level of perceived airline tangibles related quality will have a significant positive effect on overall service quality.
- H₃: A high level of perceived empathy related quality will have a significant positive effect on overall service quality.
- H₄: A high level of perceived terminal tangibles related quality will have a significant positive effect on overall service quality.
- H₅: A high level of perceived image related quality will have a significant positive effect on overall service quality.
- H₆: A high level of overall service quality will have a significant positive effect on customer satisfaction.

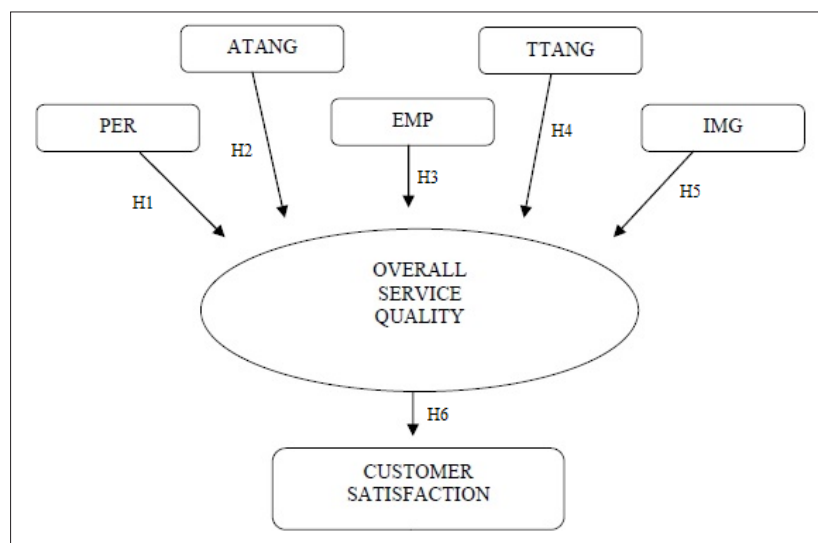
2. METHODOLOGY

2.1 Research Approach in Brief

The study sample comprised customers of the national airline of Saudi Arabia between February and May 2016, using a non-probability convenient sampling method. 800 questionnaires were distributed to airline passengers, both in Arabic and English language, after using the back-translation method for translation. 740 questionnaires were returned, of which 712 were suitable for analysis, representing 89% response rate. The adopted survey instrument was first developed by Ekiz, Hussain and Bavik (2006) and Ekiz, Bavik and Arasli (2009), then tested and confirmed by Nadiri *et al.* (2008).

There were 42 items measuring the perceived service quality of airline services. The instrument can be broken down as follows: Airline tangibles (ATANG): 6-items, Terminal tangibles (TTANG): 12-items, Personnel (PER): 8-items, Empathy (EMP): 7-items, Image (IMG): 3-items, Overall service quality (OSQ): 3-items, Customer satisfaction (CSAT): 3 items.

Figure 1. Tested Hypotheses and Model



Source: Ekiz, Hussain & Bavik (2006)

Data collection was by means of a five-point Likert scale (Likert, 1932); with '1' being 'strongly disagree' and '5' being 'strongly agree'. The analysis was carried out with SPSS 20.0 and Lisrel 8.70 software for Windows. Descriptive analyses including means, standard deviation and frequencies were calculated. Reliability issues were tested. The hypotheses of the study were tested by Path Analysis and Exploratory and Confirmatory Factor Analyses were carried out.

3. FINDINGS

3.1 Demographic Breakdown of the Sample

Descriptive analyses results show that many of the respondents (596 respondents, 87.3%) were men. Over sixty-four percent were between the ages of 18 and 37 (457 respondents, 64.2%). More than half of the respondents had higher education, either undergraduate or graduate level (371 respondents, 52.1%). On income, more than seventy-two percent of the respondents reported an income range between 10.000 and 20.000 SAR (516 respondents, 72.5%). Many of the respondents (495 respondents, 69.5%) identified their reason for visiting Saudi Arabia as fulfilling their religious responsibilities and performing Umrah.

3.2 Psychometric Properties of the Instrument

To evaluate the psychometric properties of the survey instrument, issues of reliability, dimensionality, convergent and discriminant validity were examined. In order assess convergent validity, corrected item-total correlations were calculated. Inter-item correlations were equal to or exceeding 0.32, supporting the convergent validity of the scale.

After establishing corrected item-total correlations, reliability coefficients were computed for each study variable individually and in aggregate. The alpha coefficient was determined to be 0.89 at the aggregate level and individual reliability coefficients were all established to be within the acceptable range, falling between 0.70 and 0.91. Each coefficient exceeded the cut-off value of 0.70 and all t-values were significant (>2.00) as recommended by Nunnally (1978), as was the case in studies by Ekiz, Bavik and Arasli (2009) and Nadiri *et al.* (2008).

Convergent and discriminant validity and dimensionality were rigorously tested. Composite scores for each study variable were calculated by averaging scores across items representing that dimension. Results indicate significant correlations at the 0.01 level for all the study variables. These correlations range from 0.34 (image and terminal tangibles) to 0.54 (perceived service quality and customer satisfaction). Moreover, the confirmatory factor analysis demonstrated a reasonable fit of the data to the seven-factor measurement model on several criteria ($\chi^2 = 821.33$, $df = 210$, $GFI = 0.94$, $AGFI = 0.95$, $NFI = 0.92$, $NNFI = 0.94$, $CFI = 0.91$, $RMR = 0.027$) as recommended by Nunnally (1978). Overall, these results were consistent with those of Ekiz, Bavik and Arasli (2009) and Nadiri *et al.* (2008), providing further support for the reliability and validity of the scale.

3.3 Tests of Research Hypotheses

The six hypothesized relationships were tested using LISREL 8.54 through path analysis (Jöreskog & Sörbom, 1996). The first group of hypotheses refer to the effects of service quality dimensions on overall perceptions of quality. Specifically, the first group hypotheses refer to the effects of *airline tangibles*, *terminal tangibles*, *personnel*, *empathy*, and *image* on overall service quality level. The second group of hypotheses related to the effect of overall quality perceptions on customer satisfaction.

Table 1 shows that all the hypothesized relationships were supported. A careful examination reveals that *airline tangibles* have the most significant positive effect on overall service quality ($\beta = 0.43$, $T = 7.28$). Thus, hypothesis 2 is supported. Table 1 also shows that *personnel* factors exert a significant positive effect on perceived service quality ($\beta = 0.31$, $T = 5.63$). Thus, hypothesis 1 is accepted. As for the remaining hypotheses (3, 4 and 5), they were all statistically significant and had the following values respectively: H3 ($\beta = 0.24$, $T = 3.54$), H4 ($\beta = 0.36$, $T = 6.21$), and H5 ($\beta = 0.19$, $T = 3.17$). These findings suggest that *terminal tangibles*, *empathy* and *image* have a significant positive impact on overall service quality. The first five dimensions jointly explain 89% of the variance in overall service quality. Finally, overall service quality has a very strong positive impact on customer satisfaction ($\beta = 0.47$, $T = 8.93$). Thus, hypothesis 6 is accepted. Overall service quality explained 61% of the variance in customer satisfaction.

Table 1. Path Analysis Results

	Standard Parameter Estimates (ML)	T-values	Significance
Impact on Overall Service Quality			
H ₁ : Personnel (PER)	0.36	6.21	0.0001
H ₂ : Airline Tangibles (ATANG)	0.43	7.28	0.0001
H ₃ : Empathy (EMP)	0.24	3.54	0.0001
H ₄ : Terminal Tangibles (TTANG)	0.31	5.86	0.0001
H ₅ : Image (IMG)	0.19	3.17	0.0001
<i>Explained Variance R²=0.89</i>			
Impact on Customer Satisfaction			
H ₆ : Overall Service Quality (OSQ)	0.47	8.93	0.0001
<i>Explained Variance R²=0.61</i>			

Note: Results obtained in July 2017
Source: Own Elaboration

4. CONCLUSION

The airline is one of the most important parts of every tourist trip and, hence, affects their view of the destination, regardless of the type of tourism. As more and more customers seek better, if not the best, quality for the money they pay, airlines should provide the best possible service to satisfy their customers. To achieve success, it is essential to create and maintain service quality. However, to do so, they need to know what customers think, how they perceive the airline's service quality: are they satisfied with it? The present study aimed to shed light on these questions in the case of Saudia, the national airline of Saudi Arabia.

The presented results of a survey of 712 respondents reflect a positive picture of Saudi Airlines. More precisely, mean scores show that all the perceived quality dimensions - *airline tangibles*, *terminal tangibles*, *personnel*, *empathy*, *image* - are positive and tend towards 'satisfied and/or delighted'. This means customers who used Saudi Airlines were happy with these factors. Moreover, all the hypothesized relationships were found to be statistically significant and had the expected effects on the overall service quality dimension, with varying strength. For instance, consistent with Ekiz, Hussain and Bavik (2006), Ekiz, Bavik and Arasli (2009) and Nadiri *et al.* (2008) *airline tangibles* had the most significant relationship with overall service quality. This means airlines should pay extra attention to keeping their

aircraft updated and well looked-after. Given that most of the service - transportation from one point to the other - takes place inside the aircraft, this result is expected. The *airline tangibles* dimension is followed by the *personnel* dimension. This is a unique finding since the *terminal tangibles* dimension is usually the next significant one (see Ekiz, Bavik & Arasli, 2009). The importance given to personnel can be linked to Saudi Arabia's culture, which is characterized by being friendly and hospitable. Given this cultural context, one may expect the same level of satisfactory personal service, friendliness and positive attitude towards guests. Thus, airline managers should focus on selecting crew with the right interpersonal skills, and continuously monitor and train their interactions with customers.

The *terminal tangibles* and *empathy* dimensions also had statistically significant relationships with perceptions of overall quality. As such, airlines should invest not only in the improvement of their aircraft but also the facilities at the terminal. Passengers spend considerable time waiting to board their planes, which is part of the overall travel experience. For this reason, airline companies should consider providing clean, well air-conditioned and comfortable terminal facilities. Although the measured impact of the *image* was the lowest among the other dimensions, it was still positive. This might be because low airline ticket prices are not so important to many Saudis. Earnings from a strong oil-based economy are shared among the citizens; thus, many Saudis have an income well above the world average. Finally, overall service quality perception has a strong and positive impact on customer satisfaction. This is consistent with previous research findings (Parasuraman, Zeithamal & Berry, 1988; Ekiz, Hussain & Bavik, 2006; Ceylan & Ozcelik, 2016). Airline companies should consider spending more resources on the overall quality of their offerings. Failure to do so may lead to a fall in customer satisfaction levels, which in turn will result in financial losses. Nowadays, the line between success and failure in the airline industry is thinner than ever. Paying attention to what airline customers think and feel, therefore, can tip the scales towards success.

4.1 Limitations of the Study

This study has several limitations. First, the study used a non-probability sampling technique (convenience). Although it used a large sample, future studies should consider using a probabilistic sampling technique. Secondly, most of the respondents were educated young males. The difficulty of reaching out to female respondents is a limitation in Saudi Arabia. Future studies may consider using a market research company that can provide an evenly distributed pool of respondents. In addition, this study focused only on Saudia Airlines, but there are more and more carriers, both public and private, entering the market. Thus, future studies may consider comparing public and private airlines. Moreover, this study utilized only five independent variables, as dimensions of perceived service quality. Future studies should consider adding more dimensions to increase representation and coverage. Finally, there are only a handful of studies focusing on perceived service quality and customer/tourist dis/satisfaction in Saudi Arabia. Such studies, based on service industries in general and tourism and hospitality, are needed to assess and improve the current situation.

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WELFARE GAIN FROM CARBON TAX APPLIED TO LEISURE AIR TRAFFIC

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ABSTRACT

The rapid growth in the air transport required satisfying the increased demand for tourism become a factor of unsustainability due to the substantial environmental impact that supports such a development. There is the need to establish an alternative to the traditional air transport pricing structure that reflects the true cost that air market operators impose on others. This paper analyses one application of a Carbon tax by considering the CO₂ emission costs as a valuable input. A tentative tax on CO₂ emissions from air transport is calculated considering its applications in leisure air transport market. Finally, one of the main conclusions of the analysis performed is that the available evidence suggests that international aviation emissions should be restricted. In this case, a Ramsey pricing structure, which involved aviation users bearing the environmental costs, would work reasonably well at restricting inefficient demand and produce a reasonable welfare gain respect to the do-nothing scenery will be pointed out.

Keywords: Welfare, Carbon Dioxide Emissions, Environmental Costs, Environmental Taxation.

JEL Classification: Q01, Q05, Q53

1. INTRODUCTION

Some years ago, the European Union air market suffered great commotion because of the irruption of a new management model termed “low-cost carrier”. This phenomenon obliged traditional air companies to modify their business strategies and, at the same time, it brought about a “price war” in air transport market. Thus, air companies had to focus their attention on cost-cutting plans that consisted mainly in suppressing some on-board services and in improving their cost efficiency. The emerging price structure gave place to new air demands and, in consequence, stimulated tourism and business traffic all around the world. Since then, airlines have been asking for additional airport capacity as a means to carry out their business more competitively.

The unconstrained mobility model emerging from the availability of cheap air transport has opened new tourism markets, which frequently in addition requires additional air transport expansion to accommodate it. The economic benefits of this model are evident: it not only allows local governments to stimulate regional economies through tourism activities but also helps air companies to promote their own business. However, this mobility model is far from being sustainable. The environmental impact at local and global levels increases steadily and, in a sustainable context, the above-mentioned external effects must be evaluated in order to achieve their internalization.

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In the short run, the most relevant environmental problems related to air transport are aircraft noise, which is also the main reason for community opposition to airport growth, and congestion in and around airports. In the long run, by contrast, air quality will be a fundamental concern although it is rarely perceived as an acute environmental problem. Air transport anthropogenic carbon emissions seem very small (3% to 5% of the total worldwide emissions) if compared with other sources. However, the panorama is now changing because some researchers have attributed great economic importance to the phenomenon of climate change (Tol, 2007). This study try to estimate a carbon tax for Gran Canaria airport based on the Ramsey pricing model. Those who use airport infrastructures impose high environmental costs, in terms of pollution upon others, and they should be charged accordingly. An alternative price structure such as the Ramsey approach allows for the inclusion of external emission costs on the basis of airport users' willingness to pay (Oum & Tretheway, 1988).

The main objective of this study is evaluate, through the application of an Ramsey pricing struncture to Gran Canaria airport, if actual landing fee model (weight-based fee) mispriced flights in presence of external costs. Section 2 describes the background of international aviation related to tourism development as one of the main factor contributing to climate change. Section 3, implement a carbon tax for leisure air traffic and last section pointed out the conclusions.

2. THE BACKGROUND

International aviation is becoming an increasingly important source of CO₂. Previsions indicate that aviation might by 2050 account for over 15% of all emissions of this greenhouse gas (Olsthoorn, 2001). This means that tourism related air transport may, in the future, contribute substantially to global warming. Almost 80% of tourism's contribution to global warming is associated with leisure travel (Gössling, 2002). In the near future tourism will grow fast, and it seems necessary to introduce mechanisms to internalize leisure travel related CO₂ emission costs, if climate change is to be managed. Drastic reductions in leisure air travel would be needed to mitigate emissions worldwide, and might be achieved by applying an airport price structure that shifts holiday leisure travel to more local destinations (Moriarty & Honnery, 2008).

There are several policies regarding international aviation emissions. The main methods could be emission charges, emission trading, rationing demand in air travel and offsetting. In recent years more research into the impact of an emission tax on international aviation has been carried out. The main finding is that a very high kerosene tax has to be applied, if a substantial reduction in emissions is to be achieved (Olsthoorn, 2001). However, an international aviation fuel tax is almost impossible to implement, due to the international bilateral aviation agreement on reciprocal tax exemption for foreign aircraft, the ICAO post-1944 recommendation (ICAO, 1944). In addition, even if an international agreement could be reached, it is not clear how the responsibility for emissions might be allocated among the countries. Is the destination or source country ethically responsible for the greenhouse gas emissions?

Air transport related to tourism account for the most part of the gross ecological footprint associated to tourism activity (Hunter & Shaw 2007; Gössling *et al.*, 2002). The current growth of aviation related to tourism requires strategies trying to reduce CO₂ emissions. A technological solution now is feasible. An initial test has been successfully carried out using a fuel made from biomass (30% vegetable oil methyl ester blended with 70% conventional Jet-A1 fuel) without making any technical changes to the engine. In a few years, the target is a net reduction of 20% in CO₂ emissions compared with current fuels (Gössling *et al.*, 2002).

Nevertheless, technological solutions are expensive and represent a long-term solution. In the short term, however, environmental regulation and taxation can be a suitable way to promote either a shift to less polluting transport mode or reducing emissions in air transport sector because of the leisure-air transport related market is price-sensitive. Moreover, it is crucial to keep in mind that aviation sector is a complementary input to the tourism, the world's biggest industry and any economic intervention must be appraised from a cost benefit analysis. Despite all a tentative simulation of carbon dioxide tax would be implemented (Macintosh & Wallace, 2009).

Economist says that either a tax on kerosene (jet fuel) or per tonne of CO₂ equivalent emitted can be a suitable instrument to control emissions from aviation industry. However, Olsthoorn (2001) point out that only a very high tax could limit the future emissions to 1990 level (reference year of international negotiations). This author concludes that a tax not greater than the marginal external cost of CO₂ emissions (€ 1.1 to € 25.7 per tonne CO₂) only would produce a minor to negligible reduction in CO₂ emissions. A very high tax would be required to stabilising carbon dioxide emissions at International negotiation reference level. Despite the later, an emission tax would be a way to generate environmental corresponsability between tourists, air carrier and governments in the aim of sustainability strategy. Corresponsability criteria must be understood according to willingness to pay for carbon offsetting schemes. Further, governments could use tax earnings for climate change mitigation.

An alternative way to tax emissions could be levied on the amount of actual pollution caused by the flights using airports. The Ramsey pricing structure is a quasi-optimal solution, since it permits the costs to be covered, but without forgetting the principle of the efficient allocation of an airport's available capacity. It also permits the costs generated by externalities such as congestion, noise and pollution to be included in the tariff structure (Rendeiro Martín-Cejas, 2010). Next, a Ramsey pricing model for uncongested tourist airports is implemented, to include air emission costs into the airport pricing structure. A tourist airport was chosen to implement this price structure because of leisure traffic is very sensitive to price changing and thus taxing this kind of traffic could produce a substantial impact in terms of reducing demand. This study estimates the structure of Ramsey pricing for landing at Gran Canaria airport considering two aircraft types.

3. CARBON TAX APPLIED TO LEISURE AIR TRAFFIC

3.1. Ramsey pricing rule in presence of external cost

The basic pricing structure for landing in airports in different continents is a weight-based landing fee. The similarity in landing structures around the world has occurred because most countries have adopted the recommendations made by ICAO and IATA to standardize airport charges. However, current weight-related charge may lead to poor utilization of resources, and airport users gaining at the expense of the rest of society. Oum and Tretheway (1988) derived the normal inverse elasticity mark-up rule for the Ramsey prices when marginal social costs and marginal private costs differ. Ramsey approach allows for the inclusion of external emission costs on the basis of airport users' willingness to pay. That model indicates that the landing right depends on the resulting marginal private cost (MPC_{*i*}) and a fraction of the marginal external cost (MEC_{*i*}) for the *i*th flight. It also depends on the price-elasticity of passenger demand, which is the absolute value for η_i , and on the total cost of the flight (TC_{*i*}). The total cost of a flight depends on the size of the aircraft, as well as the flight

distance; this is the key to reflect the true value of the service lies in the size of the aircraft and distance³:

$$P_i = [(MPC_i + (k/\lambda) \cdot MEC_i) + k/\eta_i \cdot TC_i]/(1 - k/\eta_i) \quad k = \lambda/(1 + \lambda)$$

This is a valuable result, because external costs such as air emission depend on the flight distance and the type of aircraft. So, this price formulation allows us to understand the dimensions of aircraft emission problem. The welfare gain from the imposition of Ramsey prices will be due to include in landing price structure all cost that international aviation imposes on the rest of the society. The adjustments of the flights which are mispriced under current weight-based system without considering marginal external cost of emission would be higher. Thus, if a reasonable price for the tonnes of CO₂ is achieved and at the landing fee level is enough to restrict inefficient air travel demand then the welfare gains for society will be substantial.

Next, we will estimate a Ramsey pricing model including emission costs. For do that we need to estimate some of the parameters related to the activity of air travel; they are the marginal private cost of landing at the airport, the total cost of the flight, the external cost, the airfare elasticity and the constant K.

3.2. The carbon tax design

This section provides an example of a Ramsey pricing model including emission costs for Gran Canaria airport. The above formula shows that we need to estimate some of the parameters related to the activity of air travel; they are the marginal private cost of landing at the airport, the total cost of the flight, the external cost, the airfare elasticity and the constant K. First, the value of K in Ramsey formula depends on the extent to which the revenue constraint is binding, and in the following analysis we used a value of 0.045. This value was chosen because the fees generated were the same order of magnitude as the weight based fees that are currently charged at Spanish airports. A variety of values of K were used, but the general pattern of results remained the same.

The price-elasticity for air travel requires more detailed consideration. It must be said that the values used were estimated by taking several considerations into account. From an economic point of view, the price sensitivity of air travel depends on several factors, such as mode-substitution possibilities, level of income and the distance of the trip⁴. Those factors are correlated, while bearing in mind that a long-distance flight will generally show a smaller number of substitute modes than a short-distance one; this implies an inverse relationship between distance and price sensitivity. Nonetheless, a long-distance flight is more expensive than a short-distance flight, so any cost increase will require a larger share of a passenger's budget. The relationship between flight distance and price elasticity of demand for air travel appears to depend on several forces that counteract one another (Brons *et al.*, 2002).

The point here is whether the substitution effect prevails over the income effect, or vice versa. As leisure travel is generally considered to be a discretionary expenditure, and as airfares for long-distance flights form a substantial part of the total travel costs, it seems that the income effect prevails and leisure travellers show higher absolute price elasticity with respect to the flight distance. The value used in this study was, in absolute terms, 1.17 (Pearce & Pearce, 2000; Tol, 2005)⁵.

³ The users' willingness to pay depends on the flight distance.

⁴ We can assume two hypotheses for η_i . The first is that it is a weighted average of the price-elasticity of passenger demand for different flight distances aboard the same aircraft. Secondly, the flight distance for all the passengers is identical to the flight distance of the aircraft.

⁵ According to Brons *et al.* (2002), the overall mean price elasticity found for a set of case studies analysed was equal to 1.146, in absolute terms.

The total cost of the flight for a given type of aircraft and distance can be estimated by multiplying the total operating cost per block hour for that type of aircraft by the number of block hours for the flight:

$$\text{Total Cost} = (\text{cost per block hour}) \times (\text{number of block hours per flight})$$

The number of block hours per flight was modelled as a function of the flight distance in the following way. The number of block hours per flight is equal to the average taxiing time plus cruising time. Using as reference BAA (2002) study regarding the average taxiing time for British airports we estimate it by multiplying 0.141 by the runway length, and cruising time was calculated by dividing the flight distance by the aeroplane's average cruising speed.

The cost of delay is often used as a proxy for the marginal cost of an air carrier landing at any airport. It also is frequently used in the cost benefit analysis of air traffic management projects, which are expected to increase capacity and therefore reduce the levels of delay in the system (Eurocontrol, 2008). According to the AENA⁶ engineers, the recommended value for marginal private cost to be used in this study was € 72. Although the analysis was carried out for different values of marginal costs, there were no significant changes in the pattern of results. The operating cost per block hour in 2014 for two different types of aircraft that usually fly to Spain (A320 and B737-800), and other information subsequently used are presented in table 1.

Table 1. Aircraft Characteristics

Aircraft characteristics ¹	Aircraft type	
	A320	B737-800
€/block hour	4,032	3,740
Seats	150	162/189
Maximum range (km)	4,800	5,765
Maximum fuel capacity (litres)	23,860	26,020

¹The representative aircrafts selected were the Airbus A320 and Boeing B737-800.

Source: Own elaboration using data from Airbus and Boeing website

The marginal CO₂ emission cost was modelled as a function of the flight distance plus the emissions in the landing and takeoff cycle (LTO). First, the tonnes of CO₂ emission were estimated multiplying by a conversion factor, 0.00251 tonnes of CO₂ per litres of fuel, to convert the aircraft efficiency in litres of fuel/km into the number of tonnes of CO₂ per km. By multiplying this figure by the flight distance, we get the total tonnes of CO₂ per flight:

$$\text{Tonnes of CO}_2 = \text{LTO cycle} + [(\text{Fuel efficiency}) \times (\text{Conversion factor}) \times (\text{Flight distance})]$$

The emissions for the landing and takeoff cycle (LTO cycle) were considered equal to 6.5 kg per passenger or alternatively to the available seats (Pearce & Pearce, 2000). To obtain the marginal CO₂ emission cost, the tonnes of CO₂ were converted into euros by

⁶ Aeropuertos Españoles y Navegación Española.

multiplying the marginal external cost of the CO₂. This marginal external cost ranges from € 1.10 to € 25.70 per tonne of CO₂ (Olsthoorn, 2001). To implement a sensitive analysis three monetary values per tonnes of CO₂ were used to estimate Ramsey price for tourist the Spanish airport; they were € 25.70, € 51.40 and € 257.00.

All the papers on the cost of the damage caused by carbon dioxide emissions conclude that climate change is too uncertain to draw conclusions; nonetheless, the average marginal external cost of carbon dioxide emissions that emerges from all the studies is about € 80 per tonne of CO₂. However, for practical purposes seems unlikely that the marginal external cost of carbon dioxide emissions exceeded 50% of this value (Tol, 2005). One way to complement this low marginal damage cost of carbon dioxide is to include other pollutants such as nitrogen oxides (NO_x), sulphur oxides (SO_x), volatile organic compounds (VOCs), hydrocarbons (NMHC) and carbon monoxide (CO) in the emission costs.

Table 2 shows the relative importance of the Ramsey price, with respect to the total cost of the flight. The Ramsey price, the total flight cost and the external cost for Gran Canaria airport are shown in the context of three values for the marginal external cost of CO₂ emissions; they are 25.70, 51.40 and 257.00 €/tonnes of CO₂. The Ramsey price accounts for 10.5% to 16.8% of the total flight cost. For instance, the current weight-based fee for an Airbus 320 landing at any Spanish airport irrespective of the flight distance is about € 654 per landing, which is only 4.3% of the total cost of flying from Gatwick to Gran Canaria airport. However, according to the values in table 2, the Ramsey price assumes a price penalization of more than 150% for all airports of origin.

Table 2. Ramsey price for the flying to Gran Canaria airport

Airbus 320								
Origin	Distance (km)	Total Cost (€) [†]	External Cost (€)*			Ramsey Price (€)*		
Gatwick	2,880	15,158	916	1,846	9,161	1,591	2,541	9,806
Heathrow	2,900	15,254	922	1,859	9,224	1,601	2,558	9,873
Dublin	2,930	15,398	932	1,878	9,319	1,616	2,583	9,973
Frankfurt	3,190	16,646	1,015	2,045	10,147	1,748	2,798	10,845
Munich	3,261	16,987	1,037	2,091	10,373	1,784	2,857	11,082
Boeing 737-800								
Gatwick	2,880	13,848	848	1,709	8,479	1,471	2,351	9,075
Heathrow	2,900	13,936	854	1,721	8,538	1,480	2,366	9,137
Dublin	2,930	14,067	863	1,739	8,626	1,494	2,389	9,230
Frankfurt	3,190	15,207	939	1,893	9,391	1,616	2,588	10,036
Munich	3,261	15,519	960	1,935	9,600	1,649	2,642	10,256

[†]Total cost of the flight in Euro excluding the airport landing fee.

*The Ramsey price and associated external costs for 25.7 are 51.40 and 257.00 € per tonne of CO₂ respectively.

Source: Own Elaboration

If the airlines passed on all the price penalization to passengers, then the ticket prices for an Airbus-320 with 150 seats and 100% load factor flying from Gatwick to Gran Canaria airport would increase by about € 6.20 per passenger for 25.70 €/tonnes of CO₂ and € 12.60 per passengers for 51.40 €/ tonnes of CO₂. This impact on airfares and emission volumes is negligible. However, for 257.00 €/tonnes of CO₂ the Ramsey price would rise steeply. Ticket prices would increase by approximately € 61.00, if all extra emission costs

were passed on to passengers. Moreover, a landing fee that represents about 65% of the total flight cost is simply unviable. A compromise to justly internalize the emission costs from air travel is required, without negatively affecting the aviation business. Finally, in terms of aircraft type, B737 performed a cheaper Ramsey tariff because of its better fuel efficiency (see table 1). It is to say that aircraft type play an important role in mitigating emissions. In this sense, it is mandatory that Air Carrier must to choose its aircraft fleet for each route to minimize emissions. However, actually those two variables are chosen only thinking in terms of economics benefits rather than environmental cost.

3.3. The welfare gain

Any efficient allocation of airport resources requires that the price paid by any user reflects the costs they impose on others. If the prices reflect the cost, then the level of demand will represent the true demand. However, if the established price is below this cost, it may stimulate extra demand and to induce investment in facilities that do not cover their full costs; and at the same time the external cost generated would not be optimal. A key issue in assessing the suitability of airport pricing structures is the degree to which they reflect all the costs. Therefore, any price structure that includes all the costs generated by aviation industry would produce welfare gain for the society. In this sense, Ramsey price structure allows this with reasonable costs.

The normalized ratio of Ramsey prices to weight-based fees for each aircraft type and distance, which is shown in table 3, will be used to analyse the relative structure of the Ramsey prices. The fee based on take-off weight was used, because the difference between the take-off and landing weights is fuel; hence the take-off weight based fees incorporate the relevant dimensions of Ramsey prices, which are size and range. It is necessary to choose a normalisation criterion, which is a weight-based fee, as the basis for making a comparison. The normalisation criterion was chosen so that the ratio of fees for the Airbus 320 at its first airport of origin equals one. The weight of the A320 means a weight-based fee of € 21.64 per tonne of take-off weight for Gran Canaria airport.

Table 3. Ramsey prices with respect to price based on take-off weight

Airport of Origin	Dist. (km)	A320	B737-800
Gatwick	2,880	1.00	0.96
Heathrow	2,900	1.00	0.97
Dublin	2,930	1.01	0.98
Frankfurt	3,190	1.09	1.06
Munich	3,261	1.12	1.09

Source: Own Elaboration

According the results shown in table 3, the imposition of Ramsey pricing would result in slightly increased fees for the A320 aeroplanes for all the airports and all distances. For the B737-800 aeroplanes, the take-off weight based fees increased faster than the Ramsey pricing for short distances, but the converse is true for longer distances. Overall, the weight-based fee slightly mispriced the flights. However, according to our results the difference in the Ramsey prices with respect to the take-off weight based fees is negligible. In that sense, the Ramsey pricing does not excessively distort the current weighted based landing fees structure. At the same time, Ramsey price structure permits the introduction of the external costs generated by air travel, and especially those related to greenhouse gas emissions.

The welfare gains from the imposition of Ramsey prices include all the costs that international aviation imposes on the rest of the society, and these are incorporated into the landing price structure. The flight adjustments are underpriced using the current weight-based system, because they don't consider the marginal external cost of the emissions. If a fee, which restricts the inefficient demand, is set for the tonnes of CO₂ at the landing level, then the welfare gains for society will be substantial. An extension of this study would be to include estimations of the impact of pollutants other than CO₂; for example, nitrogen oxides (NO_x), sulphur oxides (SO_x), volatile organic compounds (VOCs), hydrocarbons (NMHC) and carbon monoxide (CO) (Pearce & Pearce, 2000).

On the other hand, if administration cost related to this price structure is considered high, any alternative options would be possible. A simple way to simulate how air carrier capacity for a specific route would fit into the Ramsey price structure is by making an approximation based on the available seat kilometres (ASK). This variable combines size and distance, the two dimensions of the Ramsey price. ASK is the product of available seats and flight distance. By using ordinary least squares, the Ramsey prices for the available seat kilometres on an Airbus-320 flying to Gran Canaria airport, as given in table 2, were regressed as natural logarithms. The results were as follows:

$$\ln(\text{ASK}) = 5 + 1.08 \ln(\text{Ramsey price}) \quad R^2 = 0.99$$

(246.6) (394.8)

Note: The t-statistics are in brackets.

This estimated price structure incorporates the two key factors of the Ramsey price, aircraft size and flight distance; and at the same time, it allows the elasticity of available seat kilometres offered by an air carrier with respect to the airport landing fees to be estimated simply. So, on a specific route, an air carrier could simulate the total landing fee levied for a given frequency of flight. According to the values estimated by the regression, the elasticity of available seat kilometres (ASK) with respect to the Ramsey price is around 1.08; this means that a 1% increase in landing fees would raise the available seat kilometres by about 1.08%, or that the available seat kilometres and Ramsey prices grow at almost the same rate. Hence, an air carrier can simulate the total landing fee to be levied, if the demand for air travel requires their aircraft, in this case the Airbus-320, to be used on a specific route.

4. CONCLUSION

Carbon emissions from aviation are an international issue that requires an international solution. An internationally accepted airport landing fee, such as Ramsey pricing structure, has been shown to be a reasonable approach to internalizing the aviation industry's carbon emission costs. On the one hand, it is an unambiguous way to overcome the problem of allocating the responsibility for greenhouse gas emissions between the source and destination countries. On the other hand, it must be borne in mind that this is a progressive taxation system, because the air transport users who choose air transport to get a distant destination are more willing to pay the cost they impose upon the rest of the society. Finally, a Ramsey price structure must be applied globally rather than regionally, as this would avoid a situation whereby a taxed tourism market loses out to a non-taxed region.

The introduction of mandatory measures to address aviation emissions have met with resistance from the industry, which has relied on the improvements in emission intensity by

improving the engine emission factor; however, the tendency is for growth in demand for air travel to outstrip emission intensity gains. The available evidence suggests that international aviation emissions are unlikely to be established, unless there is a radical shift in technology, which is a long run objective. The alternative is that demand for air travel should be restricted. In this case, a Ramsey pricing structure, which involved aviation users bearing the environmental costs, would work reasonably well at restricting inefficient demand and produce a reasonable welfare gain in respect to the do-nothing scenery. Conversely, if a landing fee is not established at the environmentally efficient level or has little effect on restricting air leisure demand, then all that will happen is that the government or the airports get the extra revenue.

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