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Is an Airport like Any Other Mall? Identification of Passengers' Activities Patterns in an International Airport

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ABSTRACT

With the development and the competition between airports, they share more and more similarities with malls with the presence of international brands, large commercial spaces, many bars and restaurants, but also many services intended to complete or improve passengers' experience. In a typical mall, consumers engage in many activities above and beyond shopping (they can socialize, pass time and so on). But research about passengers in airport generally focuses only on shopping and excludes the other activities. The aim of this research is to investigate the similarities and differences between airports and malls, in terms of activities' patterns as well as passengers' profiles. Our data is derived from a survey administrated in an international mid-size airport during summer 2017. First, using principal component analysis, we identified few differences, but many common points between airports and malls. Secondly, based on passengers' activities and a hierarchical clustering method, we identified 4 clusters of passengers. Our results can have direct implications for airport management, to refine segmenting and targeting, and also to improve passengers' overall airport experience.

Keywords

Airport, Mall, Principal Component Analysis, Hierarchical Clustering, Passenger behavior.

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IS AN AIRPORT LIKE ANY OTHER MALL? IDENTIFICATION OF PASSENGERS' ACTIVITIES PATTERNS IN AN INTERNATIONAL AIRPORT.

INTRODUCTION

Today, international airports generate more turnover from non-aeronautical activities than from aeronautical ones (Fuerst and Gross 2017; Puls and Lentz 2018; Volkova 2009). With the rise of low-cost airlines, increased taxes and fuel prices, airports generate lower revenue with passengers' flow. Thus, they have developed since the late 90's their commercial activities, notably in departure lounges, in order to allow passengers to shop and enjoy their time as much as possible. By doing that, they want to transform themselves from "transit spaces" to "destination spaces" (Huang et al. 2018). This transformation brings to light many similarities between "traditional" shopping centers and airports: services offered (e.g. kid playgrounds, free Wi-Fi access, photo booths, banking services…), retail spaces with major brands in various categories (e.g. alcohol, perfume, luggage, jewelry…) and also the presence of numerous bars and restaurants, from the simplest sandwich store to high-end restaurants owned by famous chefs. Passengers are de facto in an airport to travel from one place to another one, but they have today the opportunity to spend their free time doing various activities and shopping in various retail stores.

Malls share the same characteristics. They offer many services above their "traditional" activities (hairdressers, banking services, cinemas, kids playground and so on) (Bloch et al. 1994). Moreover, they gather heterogeneous people from distinct areas (Michon and Chebat 2004; Roy 1994; Shim and Santos 2014). Malls are not just a place for shopping: consumers can engage in various activities and they go in a mall for distinct reasons. Bloch et al. (1994) were the first to identify distinct behavioral patterns in a mall and also identified 4 consumers' groups depending on their activities inside the mall. While some people go in a mall just to pass time, other people want to socialize with friends, and other engage in many activities as possible, above and beyond simple shopping.

From these similarities between international airports and malls, arise a simple yet unanswered question: from the passenger point of view, are airports like malls? This paper aims at answering this question. After highlighting differences and similarities between malls and airports, we investigate what people do in an airport and identify distinct segments of passengers. By linking these segments to sociodemographic variables, travel behaviors, purchases and cultural differences, we offer a clear vision of passengers' behaviors and profiles within a departure lounge in an international airport. Our results strongly support the view of an airport being a mall, with only few differences being identified. These results offer managerial insights for international airports, notably in terms of segmenting and targeting. After reviewing literature on both airports and malls, we present our methodology, data and results. Finally, we draw some conclusions for airport management.

THEORY

Malls as consumer habitat

A mall can be defined as a place which gathers various stores "under the same roof". Today, almost every mall offers also services, bars, restaurants and entertainment to consumers (Bloch et al.

1994). With the multiplicity of activities to do, malls aren't just "shopping centers" and people can enter a mall for distinct reasons. Bloch et al. (1994) were the first to propose a classification of activities and consumers' behaviors in a mall. They first identified 4 groups of activities: "consumption of the mall" (walking, looking at exhibits or show, talking, socializing), "consumption of services" (going to a movie, playing video game, visiting a medical office, going for a haircut), "passing time" (browsing in a mall, buying a snack, having a lunch or dinner) and "consumption of products" (shopping, making an impulse purchase). Then, they linked these 4 groups to 4 clusters of consumers: the "Mall enthusiasts" who use the mall for every activity possible, the "Traditionalists" who consider the mall for its main function (i.e. shopping), the "Grazers" who go to a mall essentially for passing time, and the "Minimalists" who don't like the mall and engage in very few activities. What is interesting is that their work reveal that except the traditionalists, many people go in a mall for more than just shopping.

Another characteristic of malls is that they reunite people from various socioeconomic background in the same place. Roy (1994) identify that shoppers in a mall vary according their age, revenue, household size and also according their shopping values. People in a mall can also be heterogeneous according to their origin: Shim and Santos (2014) show that in South Korea, malls are visited by locals but also by foreigners and tourists and Michon and Chebat (2004) show that in Montreal, malls are visited by French and English Canadians.

Airports = malls

Today, international airports generate billions of dollars with shopping expenditures and act to increase their non-aeronautical turnover (Castillo-Manzano 2010; Fuerst and Gross 2017; Volkova 2009). They share many similarities with malls (Geuens et al. 2004; Rowley and Slack 1999). First, their commercial space includes many types of goods such food and beverages, clothing or jewelry, with international brands being present (e.g. Swarovski, Salvatore Ferragamo, Hermès…) (Freathy and O'Connell 2012; Solca 2015). As malls, airports are "globalized" and have the same retail structure (same brands, same products) throughout the world, in line with malls having the same characteristics all over the world (Huang et al. 2018; Rowley and Slack 1999; Shim and Santos 2014). Secondly, as malls, international airports offer many activities to passengers in departure lounges, above and beyond shopping opportunities, in order to improve passenger's experience. They typically offer free internet, kid playgrounds, and some airports offer many more, such a swimming pool, casinos or bathing rooms (Geuens et al. 2004). Finally, any passenger can find many bars and restaurants, which contribute to its overall experience within the airport (Del Chiappa et al. 2016).

Airports ≠ malls

Concerning the differences between malls and airports, we can first note that airports are a "transit" place, while malls are a "destination" place, even if airports aim at becoming more and more a "micro-destination" (Huang et al. 2018). Indeed, passengers, even if they can shop, consume or do anything else, are in a departure lounge for the specific objective of traveling. Thus this could lead to differences in passengers' behaviors compared to consumers in a mall. For example Torres et al. (2005) show the motive of travel (business vs. leisure) explain more differences in expenditures than time spent in a departure lounge. Secondly, airports may be more stressful and frightening than a typical mall (Bohl 2013). Indeed, passengers have a limited time, have to pass several

controls (check-in, immigration, security…) and may not be used to deal with such environment (Omar and Kent 2001). Finally, one potential important difference between malls and airports is their scope of "customers". While a mall can only attract people from a geographically delimitated space (i.e. a city, a region), an international airport attracts people from all over the world. Thus, the latter is a more cross-cultural space than the former.

Cultural differences in airports context

If consumers from different cultures or origins behave differently in a mall-like environment, we could expect these differences to appear even more in an airport departure lounge environment. For example, a comparative study of shopping style between Chinese and American found significant cultural differences between the two groups (Ackerman and Tellis 2001). A cross-national study about tourist activities (Pizam et al. 2004) shows that individual differences explain differences in activities done by tourists and that cultural differences moderate the propensity to engage in certain activities. According to this view, cultures and or nationalities could explain differences in behaviors in an airport context. For the airport, this could lead to cultural segmentation schemes, with distinct geographic zones being targeted specifically (Tkaczynski et al. 2009).

On the other hand, airports are more and more globalized and normalized throughout the world (Rowley and Slack 1999; Shim and Santos 2014). Thus, as for malls, we could expect that culture or origin will matter less, and that other consumers' variables, such as sociodemographic or behavioral, will lead to more differences between consumers (Steenkamp and Ter Hofstede 2002). In such a context, people from different cultural background will "acculturate" and behave similarly, despite distinct origin (Manrai and Manrai 1995). For example, Michon and Chebat (2004) compare activities of French-speaking and English-speaking Canadians consumers in mall. If they observe differences in attitudes, authors didn't find significant differences in the propensity to engage in various activities between groups. Another research has demonstrated the existence of "marketing universals" such as price, brand and physical appearance, which are consistent all over the world (Dawar and Parker 1994; Erdem et al. 2006). These universals can also appear in an airport context, with people reacting to stores, brands and products, whatever their origin. Thus, if culture is generally considered to be an important element of differences between people (de Mooij 2015, 2017; Heine et al. 2002; Steenkamp and Ter Hofstede 2002), it is difficult here to draw a specific hypothesis on the impact of culture for passengers' behaviors in an international airport context.

Contribution of this study

Many studies focused on shopping behavior in airports (Freathy and O'Connell 2012; Geuens et al. 2004; Lin and Chen 2013; Lu 2014; Omar and Kent 2001). Others have included consumption in bars and restaurants (Castillo-Manzano 2010; Del Chiappa et al. 2016, 2017) and other have considered expenditure (Torres et al. 2005). But no study to date has investigated all the activities' patterns passengers can do, above just shopping and consumption. Based on all the existing similarities and differences between airports and malls, we (1) compare passengers' behaviors between an airport and a mall and (2) investigates differences in passengers' profiles.

DATA AND ANALYSIS

Data presentation

The data used in this study comes from secondary data given by a Western European International mid-size Airport (above 10 million of passengers yearly)[2]. After a major transformation of its commercial space (duty free extension, new stores…), the airport managed a "consumers survey" to better understand why people shop and why they don't. The survey was administered in summer 2017 to 909 passengers by a specialized firm in survey in transportation sector[3]. To ensure a certain level of generalizability, the survey use quota based on passengers' origin. The survey asks several questions like the number of stores visited (if any), the number of products purchased (if any), the expenditure in various categories, with information about the travel (stay duration, motive of travel…). Also, some yes / no questions were asked about activities respondents engaged in (Table 1). These questions are used in the subsequent analysis.

Step 1. Principal component analysis

To identify different patterns of consumption and activities in airports, we followed the same methodology as in Bloch et al. (1994). First, we use the activities done by passengers to identify specific dimensions. In addition to the main list of dichotomous questions (yes / no), the survey asked passengers if they used specific services, such a photo booth, Wi-Fi, bureau de change and so on. Due to low number of services used, we classified them to be either "traveling services" (safebag, fast-track, …) or "waiting services" (photo booth, manicure…). This results in 12 activities with yes / no answers, as shown on table 1. We ran a principal component analysis based on Phi correlation matrix of different activities[4]. The PCA procedure with varimax rotation (proc principal in R package Psych, (Revelle 2017)), generates 6 dimensions, based on Kaiser criteria, with a cumulative variance of 67 %. The 6 dimension loadings are presented in Table 1.

The first dimension (RC1) has high loadings on purchases which are opposed to listening, reading, playing and using traveling and waiting time services. We call this dimension "Living" as it refers to a dynamic use of the free time in the airport. The second dimension (RC2) opposes purchases to consumption. Traveling services are also associated to this dimension. We can call this dimension "Consuming" and refers to passengers who either purchase or consume in the airport (with a predominance of consumption). The third dimension (RC3) is called "Socializing". Indeed, the two activities which load more strongly with this dimension are "talking" and "walking". Making purchasing is to a lesser extent associated with this dimension and both are opposed to playing on a computer or a mobile phone. The fourth dimension (RC4) strongly opposes reading a book to playing on a computer or a mobile phone. We call this dimension "Passing time". It refers to passengers waiting without moving (e.g. seated in the departure lounge). The fifth dimension (RC5) is strongly and only associated with working, and to a lesser extent to travel services, and both are

[2] The name of the airport is not disclosed due to non-disclosure agreement.

[3] The survey was initially administered to 1006 passengers. As we'll compare distinct nationalities in the analysis, we exclude national non-resident passengers and non-national resident passengers, leading to a final 909 observations.

[4] Contrarily to Bloch et al. (1994), we use PCA instead of Factor Analysis. The PCA had a higher proportion of variance explained with fewer dimensions.

opposed to consumption in bars. Here, this dimension "Working" clearly refers to a specific purpose of traveling. Finally, the sixth dimension (RC6) is "Purchasing" and is associated to strolling which opposes to making purchase. Indeed, this dimension is clearly associated to the shopping activity.

Activities	% people engaging in activity	RC1	RC2	RC3	RC4	RC5	RC6	Com.
Making purchases on stores	37%	**-0.55**	**-0.27**	**0.23**	0.18	-0.09	**-0.33**	0.57
Listening to music	10%	**0.63**	-0.11	0.16	0.05	-0.01	0.07	0.45
Talking with people you are with	27%	0.03	-0.02	**0.66**	-0.06	-0.26	-0.08	0.51
Walking through the airport	10%	0.03	-0.06	**0.73**	0.09	0.08	0.15	0.58
Working (phone, computer)	6%	-0.04	-0.11	-0.14	-0.04	**0.91**	0.02	0.86
Reading a book, a magazine	19%	**0.28**	**-0.21**	-0.14	**-0.80**	-0.02	-0.09	0.79
Consume in a bar or in a restaurant	42%	-0.12	**0.85**	-0.18	0.06	**-0.21**	0.04	0.82
Strolling in the stores	16%	-0.01	-0.02	0.09	0.06	0.00	**0.91**	0.85
Playing on your computer or mobile phone	26%	**0.39**	**-0.42**	**-0.31**	**0.60**	-0.12	-0.09	0.80
Travel services	69%	**0.40**	**0.52**	**0.27**	0.17	**0.35**	-0.19	0.68
Waiting time services	17%	**0.66**	-0.03	-0.02	-0.12	-0.05	-0.15	0.47
Eigen values		1.59	1.31	1.29	1.10	1.09	1.05	

Table 1. 6 PCA dimensions of airports activities (loadings above than |0.20| in bold)

By comparing our dimensions with dimensions found in Bloch et al. (1994) (Table 2), we observe major similarities as well as few differences between a mall and an airport. On one hand, we find the same patterns of behaviors for 3 of the 4 dimensions of Bloch et al. (1994). For example, RC1 and RC3 refer to the first dimension of Bloch et al. (1994) "Consuming the mall". Similarly, the third dimension of Bloch et al. (1994) "Passing time" is linked with two dimensions of our analysis: "Consuming" (RC2) and "Passing time" (RC4). Passing time is "free" while consuming involves spending in the airport, specifically in bars or restaurants. Finally, the 4th dimension of Bloch et al. (1994) "consumption of products" is linked with our 6th dimension "Purchasing". Two dimensions emerge as specific to malls or airports. The second dimension of Bloch et al. (1994) "Consuming services" appear to be absent in the airport context. This specific dimension refers to the use of the mall's services, such dental services or watching a movie. First, airports do not offer such services (at least not in the airport studied). Second, as an airport is not mainly a destination place, people may not go to an airport looking for such services. For example, it is hard to imagine a passenger searching for a hairdresser one hour before traveling. At the opposite, a specific dimension appears

only in an airport context. “Working” appears to be a specific dimension and it is also logical not to observe it in a mall context.

	Bloch et al. (1994): Malls		**Our study: Airports**
Dimension	Activities	**Dimension**	Activities
Consumption of the mall	walk in the mall for the exercise looked at mall exhibits or shows Talked with other shoppers met today in the mall Socialized with friends or family in the mall	**Living (RC1)**	Making purchases on stores Listening to music Reading a book, a magazine Playing on your computer or mobile phone Travel services Waiting time services
		Socializing (RC3)	Making purchases on stores Talking with people you are with Walking through the airport Playing on your computer or mobile phone Travel services
Consumption of services	Went to a movie playing in the mall Played a video game in a mall arcade Visited a medical / dental / vision care office in the mall Had a haircut or styling in the mall	**X**	**X**
Passing time	Browsed in a mall store without planning to buy Bought a snack in the mall Had a lunch or dinner in the mall	**Passing time (RC4)**	Reading a book, a magazine Playing on your computer or mobile phone
		Consuming (RC2)	Making purchases on stores Reading a book, a magazine Consume in a bar or in a restaurant Playing on your computer or mobile phone Travel services
Consumption of products	Shopped in a mall store to buy something Made an unplanned purchase	**Purchasing (RC6)**	Making purchases on stores Strolling in the stores
X	**X**	**Working (RC5)**	Working (phone, computer) Travel services

Table 2. Comparison between Bloch et al. (1994) dimensions and our dimensions.

Step 2. Hierarchical clustering

Following Bloch et al. (1994), the second step of analysis is to identify passengers' profiles, based on the results of the 6 activities dimensions. We run a Hierarchical Clustering on Principal Components, using Ward's Method (proc HCPC on R package FactoMineR, (Lê et al. 2008)). Based on the dendogram, a four cluster solution appears optimal. Table 3 gives the average factor scores for each dimension for each cluster.

	Cluster Size	RC1 : Living	RC2 : Consuming	RC3: Socializing	RC4: Passing time	RC5: Working	RC6: Purchasing
C1: Socials	56 %	-0,27	**0,19**	**0,33**	-0,42	-0,19	-0,40
C2: Workers	6 %	-0,17	-0,52	-0,42	-0,15	**3,49**	0,05
C3: Waiters	24 %	**0,74**	-0,48	-0,68	**0,96**	-0,37	-0,36
C4: Buyers	14 %	-0,10	**0,28**	0,03	0,11	-0,19	**2,15**

Table 3. Factor score means for each cluster and each dimension.

The first cluster has higher averages for dimensions "Consuming" and "Socializing". We call this cluster "Socials" as people in this cluster are in an "active" waiting time, they tend to consume in bars or restaurants, talk with other people and so on. The second cluster, "Workers" is only linked to the working dimension. The third cluster is called the "Waiters" in the sense they use the airport for "free" activities and wait in the departure lounge. They load high for dimensions "Living" and "Passing time". The last cluster represents the "Buyers". They load more in two dimensions associated with shopping ("consuming" and "purchasing").

We observe the same cluster as in Bloch et al. (1994). What they called the "Traditionalists" (28 % of the passengers), consumers who mainly used the mall for its main function (selling products and offering services) correspond to our "Waiters" (24 %) classification. Indeed, such people use the airport for its main function, a staging area. As they have to wait, they kill time as they can, by reading a book, playing on a mobile phone, or using specific services offered by the airport. The "Grazers" (20 %) in Bloch et al. (1994) correspond to the "Buyers" (14 %) in our study. Here, passengers consume and purchase, but don't socialize too much when using the airport. On the contrary, the "Mall Enthusiasts" (24 %) in Bloch et al. (1994) correspond to the "Socials" (56 %) as they consume but also socialize more than the other clusters. Finally, the "Minimalists" (28 %), that is to say, the lower users of the mall can be linked with the "Workers" (6 %). They didn't use the place as they could do it. To conclude, we confirm the similarities between mall and airport in terms of people activities.

Step 3. Comparisons of clusters

To further investigate differences between passengers, we ran ANOVA with cluster membership being the independent variable. We divide our analysis in 4 blocks: (1) sociodemographic (8 variables), (2) travel behaviors (10 variables), (3) purchasing (17 variables) and (4) culture (23

variables). Before describing each cluster, we can note that if almost all sociodemographic (7 on 8 variables) and travel behaviors (9 on 10) are significantly different between clusters, 10 on 17 purchasing variables are different between clusters, and even few are significant for cultural variables (8 on 23). Thus, it seems that culture doesn't differentiate between clusters. On the contrary individual variables are important to explain these differences in behaviors.

Cluster 1. Socials
This cluster is similar to the average passenger. But, it is the second oldest cluster, with the highest proportion of retired passengers. Passengers in this cluster have the longest stay duration (10 days), and are slightly more frequent flyers than the average passenger. They don't visit stores too often, but when they do it, they have the highest conversion rate (80 %). In terms of culture, there is no significant difference with the average passenger.

Cluster 2. Workers
This cluster is quite specific compared to the average passenger. First, it is the oldest cluster, with the highest proportion of passengers being in the upper class. This cluster has also the lower proportion of women. Logically, 2 passengers on 3 in this cluster travel for a work motive, and the stay duration is the shortest, almost half the duration of the other groups. Passengers mainly travel alone, and are the most frequent flyers. Moreover, they spent less time in the departure lounge. They are more used to purchase in airports. Concerning purchase behavior, this cluster is more prone to purchase in the fashion category and has the lowest propensity to purchase souvenirs. It has the lowest rate of planed purchases, and it is the second cluster in terms of spending. Purchasing less products than other clusters, it spends in average the most by product purchased. It has a higher proportion of national residents. It is overrepresented for Middle East destinations and on the contrary, it is underrepresented in Easter Europe destinations. Finally, it has the highest proportion of national passengers, and the lowest proportion of Americans. Two cultural variables are higher in this cluster: power distance and uncertainty avoidance.

Cluster 3. Waiters
Cluster 3 has the youngest passengers, and the lowest proportion of upper class. It is represented mainly by students and employees. In this cluster, passengers are the least frequent flyers, and travel alone or in small groups. They spent few time in the departure lounge. Cluster 3 has the lowest propensity to purchase clothing, and moreover, it enters less in stores, and purchases less. Culturally, Cluster 3 is similar to Cluster 2. It has the highest proportion of national residents and the lowest proportion of Americans. It ranks higher on the same cultural variables than Cluster 2. Specifically, Cluster 3 has a higher than average proportion of passengers traveling to Southern Europe.

Cluster 4. Buyers
Cluster 4 and Cluster 1 are similar in terms of socio-professional categories, with minor differences for upper class and students. The main difference between them is the proportion of women which is higher in Cluster 4. They have also the same number of persons traveling with the passenger. Cluster 4 is specific by the longest time spent in departure lounge and a low traveling frequency. Cluster 4 is more prone to purchase a clothing product, and spends more in souvenirs than other clusters. What is interesting is that almost all passengers pertaining to this cluster entered a store, but only half purchased something. This cluster is paradoxical: it has the lowest conversion rate, a low rate of planed purchases, but the highest spending, almost twice than other clusters. Thus, this

cluster considers more "browsing" as a constituent activity of the airport experience. In terms of culture, Cluster 4 is not really different than the average passenger. Its only difference is it has a lower proportion of Eastern Europe destination and a higher proportion of Southern Europe destination.

CONCLUSIONS

This paper aimed at answering this simple question: is an airport like any other mall? Indeed, with the prominence of commercial revenues, airports tend to look like malls, with many stores, bars and restaurants, but also with services, such as photo booth, manicure, banking services and so on. So, above shopping propensity and expenditure, we investigated the similarities and differences between airports and malls.

Based on the seminal paper of Bloch et al. (1994), we identified 6 activities dimensions as well as 4 clusters of passengers. First, we confirm 3 dimensions on the 4 identified by Bloch et al. (1994): many activities appear in both contexts, such as socialization, passing time or even using the services offered. Moreover, the 4 clusters are really similar in both context, despite the fact that the size of each cluster is distinct. Concerning the differences, we identified specific dimensions in malls (consumption of services) and airports (working). Finally, as airports being international by nature and hypothetically more cross-cultural than malls, we investigated whether cultural differences can emerge in this context. If some differences appear between clusters, these differences seem less important than "classic" segmentation variables such as sociodemographic or travel behaviors.

From airport management point of view, this paper can help in improving passengers' segmentation and experience within the airport. Identifying who do what in an airport can help to understand what services and products to offer to which passenger, but also to understand which passenger is more profitable for the airport. Identifying passengers' characteristics in each cluster can improve targeting, which can be helpful to increase airport revenues.

Some limits are worth noting. First, we only investigate clusters' differences based on summary statistics. Secondly, we do not control for other effects when identifying differences between clusters. If, for example, passenger's age and nationality are correlated, we cannot know here if nationality is different between clusters when controlling for age and vice-versa. Third, using secondary data, our analysis is subject to potential bias (survey structure, questions asked and so on). Fourth, as our study focused in a single mid-size airport, we cannot ensure results' generalizability for all airports. For a further understanding of differences between clusters, one will need more robust methodology, such regressions or discrete methods (e.g. a multinomial logit with cluster membership as a dependent variable). With the huge development of international airports, we hope this paper will be completed by other research in the same field.

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