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Segmentation of traveller preferences for using digital technologies at airports

Abstract

Airports are increasingly focused on implementing digital technologies that enhance the traveller experience. However, different travellers are expected to have different preferences for using digital technologies at airports. This paper investigates preferences at key stages of the airport journey, and the presence of distinct segments according to demographic and trip characteristics. The findings will be based on a survey of 6000 travellers at eight airports in Norway. Fieldwork ends late December 2019, so while this paper only introduces the study, results will be available for presentation at EMAC 2020. This paper has several contributions to the conference track on tourism marketing. It looks at experiences from the managerial side in terms of what airports should invest in, and the consumer point of view in terms of traveller preferences. The findings can help to inform airport decision making, and allow airports to achieve growth by maximising traveller satisfaction.

Keywords: *Segmentation, Digital technologies, Airport experience.*

Track: *Tourism Marketing.*

1. Introduction

Airports are an important part of the tourism supply chain, forming the first and last impression that air travellers have of a destination (Martín-Cejas, 2006). However, the airport experience is often far from perfect because travellers are bounced from one touch point to another. In addition, touch points are operated by different stakeholders, each of which has their own objectives. On a typical airport journey, travellers may encounter check-in with an airline or handling agent, security with a security company or government agency, shopping with a retail provider, information services and wayfinding with an airport operator, and passport control with a police force or border agency. These interactions occur at touch points that disrupt the traveller journey, and can be a source of great frustration, for instance, due to the presence of long queues, insufficient information or inadequate levels of service quality.

Technological solutions are often viewed as a way of improving the traveller experience, and as a result, many airports are investing huge sums of money on technology. For instance, airports invested US\$10 billion on technology in 2018. This is an increase of US\$3 billion compared to what was invested in 2016 (SITA, 2019a). More telling is that the proportion of total revenue spent by airports on technology has increased from 2.7 per cent in 2008 to 6.1 per cent in 2018 (SITA, 2010; SITA, 2019a). According to Arthur D. Little (2018), the most important reason airports invest in technology is to improve efficiency. This includes operational efficiency (e.g. to make better use of capacity) and cost efficiency (e.g. to reduce capital expenditure requirements and operating expenditure). The next most important reasons are to enhance the traveller experience and generate additional revenue.

It is the traveller experience that is of most interest to this paper. For the last few decades, airports and stakeholders such as airlines, ground handling and security companies, concessionaires and border agencies, have been implementing new digital technologies at key stages of the airport journey. For instance, check-in has traditionally been carried out by staff at a check-in desk but recent investment has been on digital technologies that allow travellers to conduct the process themselves, initially via a self-service kiosk (Castillo-Manzano and López-Valpuesta, 2013; Wittmer, 2011), and more recently via their mobile device (Inversini, 2017). Similar progress has been made with bag tag and drop processes that have traditionally been staff assisted but are increasingly conducted using self-service technologies. More recently, there has been growing interest in digital bag tag options that allow travellers to programme a permanent digital bag tag on their luggage from their mobile device. Digital bag tags allow added services for travellers such as the ability to track their luggage throughout its

journey. In terms of identification, the need to show paper documents such as a boarding pass along with a passport or identity card to staff is increasingly replaced by digital options such as a mobile-based boarding pass to scan at automated gates, while several airports are now experimenting with biometric options, not only with e-gates at passport control (Morosan, 2016), but at several key stages including check-in, security and the departure gate – the idea being that travellers can enjoy a more seamless experience by pre-registering their biometric details and then use their face to pass through each check-point at the airport (del Rio, Moctezuma, Conde, de Diego, and Cabello, 2016). On the retail side, new payment methods mean that in addition to cash, credit or debit card payments, airports may offer mobile payment options. Also, there is a growing availability and range of products and services that can be pre-ordered online via the airport website or mobile application (Florido-Benítez, Alcázar Martínez, and Gonzalez Robles, 2016). These initiatives seek to speed up and simplify key processes at airports, and offer a more seamless traveller experience compared to the traditional way of bouncing travellers from one touch point or stakeholder to another. However, with the range of solutions now available to airports, it is important for them to know what preferences travellers have at key stages of the airport journey. The first research question in this paper (RQ1) therefore asks:

RQ1: What are the digital technology preferences of travellers at key stages of the airport journey?

Introducing technology-based alternatives to manual processes makes sense given that travellers have high levels of adoption for digital technologies, and increasingly demand and expect interactions with digital technology at all stages of their journey (IATA, 2018; SITA, 2016). In addition, satisfaction with key airport processes is higher among travellers that use digital technologies versus those that do not (Bogicevic, Bujisic, Bilgihan, Yang, and Cobanoglu, 2017; Brida, Moreno-Izquierdo, and Zapata-Aguirre, 2016; SITA, 2019b). The use of digital technologies at airports can therefore have service quality implications but also financial implications because studies suggest that happy travellers spend more (Jarrell, 2014). However, while there may be benefits of using digital technologies from a traveller perspective, airports also need to consider the needs of travellers who are not familiar with, or interested in using digital technologies. For instance, 17 per cent of travellers at Brazilian airports would not use biometric technologies at check-in if given the choice (Negri and Falcão, 2019). As we move towards a post-digital era where the use of digital technologies for

key airport processes becomes second nature for travellers, the number of people that fit into the category of not being familiar with, or interested in using digital technologies, may be diminishing rapidly. However, it is unlikely that this is the case just yet, so there may be distinct segments of travellers that have different preferences, for instance, according to demographic and trip characteristics. It is important for airports to know and understand the preferences of different segments in order to make the best possible investment decisions for the future, and to enable them to achieve growth by maximising traveller satisfaction. Hence research question two (RQ2) asks:

RQ2: What distinct segments of travellers can be identified regarding preferences for digital technologies at key stages of the airport journey?

The collection of data to address the two research questions in this study is ongoing and will be completed late December 2019. As a result, this paper only introduces the study, including the methodological approach and expected outcomes and implications. It does not present or discuss actual results. However, results will be available for presentation at EMAC 2020. In terms of the structure of this paper. Section two describes the methodological approach taken in terms of key variables, survey design and data collection, and data analysis. Section three describes expected outcomes and implications of the study.

2. Methodological Approach

2.1 Key variables

For this study, the traveller journey is broken down to a few key stages where airports have different options available for service delivery. For instance, there might be manual options where travellers can expect assistance from staff in person, self-service and electronic options where travellers can expect to carry out tasks themselves, and more personalised options such as via the traveller's own mobile device, biometric details linked to the individual, or artificial intelligence that mimics the cognitive functions of humans.

Main options for five key stages in the airport journey are listed in Table 1. Note that several airports are experimenting with more futuristic innovations. However, this study focuses on options that are readily available on the market – the objective being to identify preferences for key stages in the airport journey (RQ1), but also to develop an index that can be used for RQ2 by grouping travellers into distinct segments according to their preferences.

There is also a need to take into consideration traveller and trip characteristics for RQ2 when segmenting travellers into distinct groups, and there are several characteristics included in this study (Tables 2 and 3).

Table 1. Traveller preferences at key stages of their airport journey.

Variable – key stage	Categories – preferences		
Access to boarding pass	Staff-assisted desk	Self-service kiosk	Own mobile
Bag tag (and drop)	Staff-assisted desk	Self-service kiosk	Mobile-linked digital bag tag
Identification	Physical documents	Electronic documents	Biometric details
Customer information	In person	Digital self service	Artificial Intelligence
Payment method	Cash	Credit or debit card	Mobile payment application

Table 2. Traveller characteristics.

Variable	Categories
Nationality	Norwegian; Other
Gender	Female; Male
Age (in years)	18-24; 25-34; 35-44; 45-54; 55-64; 65+
Highest completed education	None; Primary/secondary; Further; Higher – undergraduate; Higher – postgraduate
Flight frequency (return trips in the last 12 months)	1; 2-5; 6-11; 12-23; 24 or more

Table 3. Trip characteristics.

Variable	Categories
Destination	Domestic; International
Travel purpose	Business; Leisure

2.2 Survey design and data collection

A survey of travellers is used to create the variables listed in Tables 1, 2 and 3. The survey begins with questions on trip characteristics. This is followed by questions on traveller preferences at key stages of the airport journey. Respondents were asked to complete the survey as if they were taking the exact same trip as their current one at some point in the next 12 months. The survey ends with questions on traveller characteristics.

The survey was tested extensively including via a pre-test with over 100 participants and a pilot with 100 participants at Oslo Airport Gardermoen. The testing period resulted in several changes being made to the survey including with wording, question order and rules. After changes were made to the survey, it was distributed to departing travellers at eight

airports in Norway. That process is still ongoing at the time of writing this paper but will end late December 2019 with 6000 completed surveys. The airports, region, and passenger traffic for 2018 are listed in Table 4. Soft quotas used for sampling purposes are also listed.

Table 4. Sample of airports.

Airport	Region	Total passengers 2018	% domestic passengers 2018	Soft quota*
Oslo Gardermoen	Eastern	8,055,422	59.0	23%
Bergen Flesland	Western	6,232,049	94.5	14%
Trondheim Værnes	Central	3,070,713	77.0	14%
Stavanger Sola	Western	2,389,958	61.0	14%
Bodø	Northern	1,699,285	94.5	9%
Tromsø Langnes	Northern	1,634,562	89.8	9%
Kristiansand Kjevik	Southern	1,059,882	71.8	9%
Molde Årø	Western	401,539	93.6	9%

* Proportion of the 6000 interviews.

Data source: Avinor (2019).

Collectively, the airports listed in Table 3 served almost 50 per cent of total passengers in Norway in 2018. The airports were selected in line with those that are used for national air travel surveys and quality service monitoring surveys in Norway. One exception is that Molde was selected instead of a larger airport called Ålesund. This was so that a smaller airport is included in the sample. The selected airports represent a good geographical spread of the country with at least one airport from each of the main regions, and two to three each from the larger regions of western and northern Norway.

Data is collected via a computer-assisted self-interviewing survey method whereby travellers complete the survey themselves on an electronic device. The survey is administered by market research experts Epinion. The company has a trained workforce for conducting survey work, that already has airside access to the airports listed in Table 4. They also have extensive experience in conducting survey work at airports in Norway.

All departing travellers were eligible to take part in the survey. Random sampling was used based on the counting principle to make sure that all target groups (e.g. based on age or other traveller characteristics) are included. This was done by approaching every third or fifth traveller sitting in the gate, depending on the size of the gate. Gates serving a range of domestic and international destinations were included to capture a range of trip characteristics. The survey was available in two languages; Norwegian and English.

2.3 Data analysis

To answer the research questions, this study will apply two-step cluster analysis whereby travellers are grouped according to the focal variables in the survey, namely traveller preferences at key stages of their airport journey, traveller characteristics, and trip characteristics. This method is used due to its ability to handle both categorical and continuous variables and its ability to determine clusters automatically (Ballestar, Grau-Carles, and Sainz, 2018). In the first step, the raw data will be pre-clustered by using the log-likelihood distance as the similarity criterion. Next, standardised data records will be combined in a sequential process using an existing pre-cluster or a new pre-cluster that generates the largest log-likelihood. In the second step, the pre-clusters will be merged using agglomerative hierarchical clustering under the Schwarz criterion (BIC). Automatic determination of clusters is useful because it can reveal natural segments within a dataset that would otherwise not be apparent. The consistency of the revealed segments will be validated by using silhouette criterion (Rousseeuw, 1987). Eventually, a one-way ANOVA test will be conducted to confirm the significance of the differences between the segments.

3. Expected Outcomes and Implications

In terms of expected outcomes, we intend to reveal homogeneous segments of travellers that eventually can be used for enhancing the traveller experience. With data from 6000 travellers, the relevance of the established segments is expected to be quite robust. Through segmentation-based categorisation, the study will identify major differences in expectations and preferences among travellers with respect to digital solutions deployed across the airport value chain. By exploring traveller experiences during key stages of the airport journey, this study will reveal preferences of each segment at each service encounter. This way, the study will partly respond to Voorhees et al. (2017) who called for future research to consider simultaneously different stages of service experience. Ultimately, insights from the findings of this study are expected to serve as a basis for creating relevant personas for the airport value chain. This is crucial because it will determine relative amounts of resources that airports and other stakeholders should invest in each stage of the chain.

In terms of implications, we expect our results to provide insights that can help airports and other stakeholders in the value chain to develop effective strategies for increasing traveller satisfaction. A better understanding of travellers and insights into the various segments will allow airports and other stakeholders in the airport value chain to serve them

accordingly rather than treating them as a monolithic group. By identifying travellers expectations and preferences at each key stage of the airport journey, services can be personalised according to the traveller segments. This will allow for a more effective management of resources across the entire airport journey while optimising service quality. Based on the findings of this study, actionable managerial recommendations will be offered for each of the revealed segments. Given the ongoing digital transformation of airports (Halpern et al., 2019), digital solutions are increasingly becoming an integral part of traveller journey at airports. Therefore, the digital preference categorisation that this study expects to reveal can potentially become a useful predictor or moderator variable in future studies related to airport experience.

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