The Value of Decision Making to the Airlines: An Analysis of Passenger Preferences on Check-ins

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- Airline
- Check-In

ABSTRACT
The nature of business environment in airports has made speed of operations crucial. From this standpoint, check-in areas in airports have become the most important place for monitoring the speed of operations. Airline companies offer many methods for check-in processes to the passengers and along with that there has been a huge increase in usage of self-check-ins. In this phase, decision making comes into play. This study is an attempt to reveal the value decision making for the airlines by analysing the passenger preferences on check-ins. Based on the quantitative data, correlational analysis method is performed and RStudio is used for all computations. Hence, some decisions are made based on that analysis.

Havayolları İçin Karar Vermenin Değeri: Check-in'lerde Yolcu Tercihlerinin Bir Analizi

Anahtar Sözcükler:
- Karar Verme
- Havayolu
- Check-In

ÖZ
1. Introduction

There is a link between decision makers and business and operational activities in the airport. With the widespread use of computers in business and operations today, many information needs are organized into a management information system (Banerjee, 2005). Today, Management Information Systems (MIS) has many definitions. Research in the past has shown that there is no universally accepted definition of MIS. Although, definitions existing today reflect prejudices of their authors (Adeoti-Adekeye, 1997; Lucey, 2005). MIS supports the planning, control and operation functions of an organization by furnishing uniform information in the proper time frame to assist the “decision makers” (Asemi, Safari, & Zavareh, 2011). Today, many businesses rely on a management information system.

O’Connell (2016) stated that many advancements have occurred in airline industry and some of those advancements are worthy of special consideration; such as check-ins, space allocation and service quality. Technology has always played a major role in the development of the airport industry (Halpern & Graham, 2013). It was around the year 2001 when self-service-check-in kiosks started appearing at airports. Nonetheless, they were installed by airlines for their own use (Halpern & Graham, 2013). This has changed today. Lee, Castellanos, & Chris Choi (2012) spotted that self-service kiosks are increasingly becoming an option for airline passengers. According to Chang & Yang (2008) one of the reasons for that is the airline companies themselves since air passengers spend a great deal of time checking in during peak hours therefore airlines are eager to promote self-service check-in-kiosks to achieve benefits of cost-saving, space-saving and even time-saving.

In this study, the value of decision making to the airlines is examined and an analysis of passenger preferences on check-ins is given. In the analysis, correlation analysis method is used and all computations are computed in RStudio in order to make decisions based on the data.

The rest of this study is organized as follows. In the second section, related literature on check-ins and nature of business in airlines is reviewed. In the third section, method is introduced and findings are presented. Finally, discussion and conclusion part is presented in the fourth section.

2. Literature Review

Airports are important locations for business activities (Schultz, Schulz, & Fricke, 2010). However, in Airline Industry both planning and control is big and complex problem. The value of control lies in relation to planning while planning establishes strategy to achieve goals and develops a framework to integrate and coordinate business activities (Curry, Flett, & Hollingsworth, 2006).

Nowadays, increasing business performance through information technology solutions is a common process (Lipaj & Davidavičienė, 2013). Purnell (2012) relates IT and Business side of the airport to the organizational needs of Airline companies. Lipaj & Davidavičienė (2013) find that the role of IT in airline industry is huge; yet there has been a change in IT’s strategic importance from automation of repetitive process to process management and management control since the main reason of growing
role of IT is the complexity and the volume of creating and distributing passengers’ airfares.

Purnell (2012) states that the business environment in airports are unique and business and financial management systems are needed to be specifically tailored to fit this environment as the administrative staff in airports benefit from these systems since these systems save time, costs and they help with the decision making procedures. Regarding to the uniqueness and complexity of the airline business, Lee-Partridge & Law (2004) claimed that airport management has functions which involves both terminal and airside operations but those operations are actually complex. Authors also claim that numerous parties should be working together (such as airlines and ground handling agencies) if check-in operations to work. When this is the case, improving check-in procedures is needed in order to improve the efficiency of terminal operations. Using self-service systems allows more efficient systems and fast-changing passenger numbers can be managed while it reduces passenger waiting times and save money, lessen activity at the airport (Barich, 2011).

A proper MIS in airlines industry can help to build a passenger profile (Jawadekar, 2013). By doing that, meeting the expectations of maximum passengers can be possible since the decisions can be made based on the passenger profile. Which would require a a well-designed information systems as a well-designed Management Information System allows fast access to relevant data (Kisielnicki & Gwiazda, 2007).

2.1. Decision Making in Airlines

In travel industry, many organizations use decision support systems to improve decision making. In Airline Industry, companies even calculate the value of passengers who will miss a connection because of a flight delay and they determine the impact of booking the passenger on the next flight (Stair & Reynolds, 2013). In aviation area, there are studies that has examined the aspects of decision making processes such as airline profitability, revenue management, airline service quality performance and so on (Bruce, 2016; Wu & Cheng, 2013; Hung & Chen, 2013). A good example would be “the decision making based on passenger self-tagging.” Self-Service kiosks, web-based check in and mobile boarding passes are actually a part of a larger term which is known as the passenger self-tagging. Compared to past, today airline companies offer more through web check-in and self-service kiosk check-in. In addition to that, depending on the airline and/or flight passengers can even enter their meal preferences by choosing one of the options or they can simply pay for improvements in the service they will experience during the flight.

Check-ins are crucial since at check-in, the customer comes contact with the airline for the first time on the journey. “It is here that perceptions of quality can be communicated” (Edwards, 2005). A simplified passenger check-in procedures help airline companies by saving time therefore reducing the costs and in the meantime customers getting charged with extra fees depending on their luggage, therefore reducing the number of baggage subject to handling (Gross & Schröder, 2007). Additionally, the airline self-service technologies are also very effective at minimising company labour costs, occupancy of space, time and queues. On the contrary, the studies have shown that customers often accept the use of self-service technologies
but they make customers anxious when the kiosks malfunction (Lee et al., 2012; Lin & Hsieh, 2006).

2.2. Passenger Behaviour

Passenger behaviour needs to be predicted before all else. Because if passengers do not want to use self-service, there will be a problem. According to Ueda & Kurahashi (2014) attaining higher cognition of self-service is a necessity because reducing hesitation of passengers is possible by using lobby service agents as they can urge passenger to use self-service kiosks.

Technology readiness is an important factor when it comes to prediction of customer behaviour (Parasuraman, 2000). In their research, Lin & Hsieh (2006) confirmed that the more satisfaction customers experience while using self-service technologies, the more likely they are going to use it again and going to recommend others. Therefore, firms need to understand the customer readiness to use self-service technology services. Additionally, the role between customer and self-service check-in kiosks must be assessed frequently so the effectiveness of IT investment strategies can be calculated by the airline (Lee et al., 2012).

3. Methods, Findings and Results

The main purpose of this study is to show the relationship between check-in types and passenger preferences according to the data set obtained, and to present the effects that decision-making has on airlines based on this relationship. The data set that has been used for this research is mentioned in Table 1 and the data was collected from a commercial airline company’s Information Technology (IT) department’s database logs which based in Turkey and the data includes the check-in numbers and check-in types between the years 2013-2015. There are 5 check-in types and descriptions of check-in types are mentioned in Table 2. The strength and direction of relationship between check-in types and total number of passengers are measured by using correlation coefficients. Additionally, evaluation is performed in RStudio (RStudio Team, 2015).

Table 1. Check-in numbers

<table>
<thead>
<tr>
<th>Flight (Months)</th>
<th>Mobile</th>
<th>Mobile App</th>
<th>Internet</th>
<th>Kiosks</th>
<th>Counter</th>
<th>Total Pax</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-01</td>
<td>20098</td>
<td>0</td>
<td>165850</td>
<td>43827</td>
<td>758293</td>
<td>1064050</td>
</tr>
<tr>
<td>2013-02</td>
<td>22200</td>
<td>0</td>
<td>164656</td>
<td>42918</td>
<td>722413</td>
<td>1035910</td>
</tr>
<tr>
<td>2013-03</td>
<td>25056</td>
<td>0</td>
<td>194446</td>
<td>49449</td>
<td>788139</td>
<td>1166327</td>
</tr>
<tr>
<td>2013-04</td>
<td>27236</td>
<td>0</td>
<td>211814</td>
<td>59710</td>
<td>861071</td>
<td>1258146</td>
</tr>
<tr>
<td>2013-05</td>
<td>29973</td>
<td>0</td>
<td>243049</td>
<td>58961</td>
<td>948173</td>
<td>1400737</td>
</tr>
<tr>
<td>2013-06</td>
<td>30875</td>
<td>0</td>
<td>233762</td>
<td>56774</td>
<td>996908</td>
<td>1445741</td>
</tr>
<tr>
<td>2013-07</td>
<td>34379</td>
<td>0</td>
<td>243502</td>
<td>49183</td>
<td>1037381</td>
<td>1517561</td>
</tr>
<tr>
<td>2013-08</td>
<td>53672</td>
<td>0</td>
<td>243170</td>
<td>55310</td>
<td>1154630</td>
<td>1645664</td>
</tr>
<tr>
<td>2013-09</td>
<td>54636</td>
<td>0</td>
<td>214933</td>
<td>57400</td>
<td>1103513</td>
<td>1557758</td>
</tr>
<tr>
<td>2013-10</td>
<td>56546</td>
<td>0</td>
<td>227211</td>
<td>53295</td>
<td>1082947</td>
<td>1553314</td>
</tr>
<tr>
<td>2013-11</td>
<td>32058</td>
<td>0</td>
<td>221583</td>
<td>52126</td>
<td>938519</td>
<td>1351030</td>
</tr>
<tr>
<td>2013-12</td>
<td>25534</td>
<td>0</td>
<td>217711</td>
<td>50222</td>
<td>881638</td>
<td>1305194</td>
</tr>
</tbody>
</table>
### 3.1. Correlation and Scatter Plots

Correlation is a technique for exploring the relationship between two quantitative variables and measuring the strength of the relationship between them. Additionally, graphical visualization of the data on a scatter plot is the first step for exploring a relationship between two variables (Bewick, Cheek, & Ball, 2003). Pearson correlation coefficient is used for linear relationships and Spearman’s rho is used for nonlinear relationships to measure the strength and assess the shape and direction of the relationship (Holmes & Rinaman, 2014). Firstly, scatter plots are shown based on check-in types and total passengers data for whether relationship exists by using plot() function.

![Figure 1. Scatter plot of mobile check-in and total pax](image-url)
Weisburd & Britt (2007) claimed that to see whether relationship is linear, a simple way is to look at scatter plots, or scatter diagrams, representing different types of relationships. In Figure 4 and 5, the scatter plots show positive linear trend between check-in types and total pax. In Figure 1, 2 and 3, the scatter plots show some positive linear trend but the trend is not as clear as that of other figures.
3.2. Performing Correlation Coefficients

Correlation coefficients can be calculated to measure the strength of the relationship (Bewick et al., 2003). Pearson’s product moment correlation coefficient and Spearman’s rank correlation coefficient are the two main types of correlation coefficients and the correct usage of correlation coefficient type depends on the types of variables being studied (Mukaka, 2012).

Hauke & Kossowski (2011) argued that Spearman’s rank correlation coefficient which suggested by Charles Spearman to measure the relationship between two variables is a nonparametric (distribution-free) rank statistic and Spearman’s rank correlation coefficient isn’t a measure of the linear association between to variables for some statisticians. Pearson’s product moment correlation coefficient assumes that the data follow a bivariate normal distribution (Helsel & Hirsch, 1992). Furthermore, Spearman’s rank correlation coefficient is a non-parametric equivalent to Pearson’s correlation coefficient (Sedgwick, 2012).

Before performing the correlation coefficients, data is tested if normally distributed or not. Royston said that Shapiro and Wilk’s W test is a powerful procedure for detecting departures from univariate normality (Royston, 1983). Therefore, normality is tested by using shapiro.test() function.

### Table 3. Results of Shapiro-Wilk’s W test

<table>
<thead>
<tr>
<th>Data</th>
<th>W</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile</td>
<td>0.93299</td>
<td>0.03087</td>
</tr>
<tr>
<td>Mobile App</td>
<td>0.85259</td>
<td>0.0002184</td>
</tr>
<tr>
<td>Internet</td>
<td>0.94885</td>
<td>0.09619</td>
</tr>
<tr>
<td>Kiosk</td>
<td>0.82035</td>
<td>4.241e-05</td>
</tr>
<tr>
<td>Counter</td>
<td>0.9852</td>
<td>0.9015</td>
</tr>
</tbody>
</table>

In Table 3, p-value for Internet and Counter check-in are greater than 0.05. According to Shapiro-Wilk normality test, they are normally distributed and Pearson’s product-moment correlation coefficients are obtained using cor() function.

### Table 4. Pearson’s Product-Moment correlation coefficients

<table>
<thead>
<tr>
<th>Relationship between</th>
<th>Pearson’s Product-Moment Correlation Coefficient</th>
<th>Strength of Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet check-in and total passenger</td>
<td>0.9067661</td>
<td>Strong</td>
</tr>
<tr>
<td>Counter check-in and total passenger</td>
<td>0.9777209</td>
<td>Strong</td>
</tr>
</tbody>
</table>

According to Table 4, there are strong positive relationships between Internet check-in and total passenger and between Counter check-in and total passenger.

In Table 3, p-value for Mobile, Mobile App, and Kiosks is smaller than 0.05. According to Shapiro-Wilk normality test, they are not normally distributed and Spearman’s correlation coefficients are obtained using cor() function.
Table 5. Spearman’s correlation coefficients

<table>
<thead>
<tr>
<th>Relationship between</th>
<th>Spearman’s Correlation Coefficient</th>
<th>Strength of Relationship</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile check-in and total passenger</td>
<td>0.6368082</td>
<td>Moderate</td>
</tr>
<tr>
<td>Mobile App check-in and total passenger</td>
<td>0.7796128</td>
<td>Moderate</td>
</tr>
<tr>
<td>Kiosk check-in and total passenger</td>
<td>0.839897</td>
<td>Strong</td>
</tr>
</tbody>
</table>

According to Table 5, there are moderate positive relationships between Mobile check-in and total passenger and between Mobile App check-in and total passenger. In addition to that, there is a strong positive relationship between Kiosk and total passenger.

4. Discussion and Conclusion

Results show that when passenger number has an increase trend; internet, mobile, mobile app, kiosk check-in and counter check-in numbers will increase. When the counter check-in numbers increase, it may cause queues in check-in areas in airports and airlines will need to employ more check-in agents. In this case, labour costs will increase. However, by opening more self-service kiosks and promoting mobile check-in, mobile app check-in and internet check-in, against the counter check-in will reduce the need of check-in agents therefore, labour costs will be minimized. Minimising labour costs is a potent source of competitive advantage and many leading organizations have found it more effective to achieve competitive advantage through customer service improvements (Wright, 2004). Since faster service and/or less queue is a customer service improvement, this will help the airline to achieve competitive advantage.

Due to the uniqueness of the business environment in airports a proper management of information systems is needed for a proper decision making. Since this study highlights the value of decision making to the airlines giving an example by analysing the passenger preferences on check-ins, the gravity of understanding this relationship is crucial for information systems area and it might be the key in this sector.

There are many airline companies in business, but this study only focuses on the data from one specific company. Therefore, this is the limitation of this study. Additionally, passenger behaviour may change time to time. In the future depending on the circumstances there may be changes about passengers’ check-in preferences. This means that a constant research is needed in order to get accurate results for a proper decision making.
REFERENCES


