

EVALUATING IT-BASED OPERATIONS IN THE AIRLINE INDUSTRY: A CASE FOR ELECTRONIC TICKETING

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ABSTRACT

During the late 1990s, the airline industry, led by the U.S. airlines, began to emphasize selling air tickets directly to customers in the form of “Electronic Ticket” (E-Ticket) without passing through travel agents. Airline companies realized that the implementation of “Electronic Ticketing” (E-Ticketing) could lead to significant savings in ticket distribution costs, and increased net revenues. This research was a formal study that tested the hypothesis: “Airlines can increase their net income and reduce their operating costs by implementing e-ticketing”. The researcher collected data from both primary and secondary sources. The primary data was gathered by conducting a survey of 100 managers and professionals, using questionnaires, from 20 airlines offering the e-ticketing service. The secondary data was collected from various journals internationally recognized. The research was descriptive, and its time dimension was cross-sectional. The t-test was used for testing the hypothesis and significant investigative questions on the questionnaires. The researcher employed a non-probability sampling technique, which utilized a quota sample of managers and professionals from those airlines. Based on the findings from review of the literature and the survey, the researcher was able to prove that airline companies can increase their net income and reduce their operating costs by implementing e-ticketing.

Key Words: Electronic ticketing, ticketless travel, non-probability sampling

INTRODUCTION

Today, people are demanding more conveniences regarding air travel. In the late 1990s, the airline industry, led by the U.S. airlines, realized that elimination of the traditional paper ticket had potential for significant savings in ticket distribution costs. By the year 2002, several U.S. airlines, such as Continental Airlines, Delta Air Lines, Northwest Airlines, Southwest Airlines, and United Airlines, introduced what is called “Electronic Ticketing” (E-Ticketing), which is also sometimes called “Ticketless Travel”. At present, a number of non U.S. airlines, such as Air Canada, Air France, Air New Zealand, British Airways, Cathay Pacific Airways, China Airlines, Japan Airlines, KLM Royal Dutch Airlines, Korean Air, Lufthansa Airlines, Qantas Airlines, Scandinavian Airlines, Singapore Airlines, Swiss International Airlines, and Thai Airways International, are also offering the e-ticketing service.

E-ticketing can be described as an alternative method of ticketing offered by many airlines in which an electronic reservation record is created containing all of the information normally printed on a paper ticket. When a passenger checks in at the airport, he or she presents a photo identification and the confirmation number to be able to receive a boarding pass. E-ticketing eliminates the need to keep track of or deliver tickets and allows prepaid ticketing from other destinations without fees. It allows the above-mentioned airlines to take advantage of Internet bookings, smart cards and self-service kiosk capabilities, as well as to increase their profitability (Hawaleshka, 1998). The purpose of the research was to evaluate the e-ticketing operations in terms of advantages and disadvantages in order to prove that airline companies can increase their net income and reduce their operating costs by implementing e-ticketing.

ADVANTAGES

E-ticketing offers a number of key advantages to airlines. First, Mr. David McEwen, Ticketing Services Manager based in International Air Transport Association (IATA)'s office, Geneva, Switzerland, stated that it costs an airline between US\$7 and US\$9 to produce a paper ticket, but approximately US\$2 for an e-ticket (McEwen, 2003). With e-ticketing, airlines are able to save operating costs needed for producing paper tickets. Second, since there is no need for airlines offering the e-ticketing service to produce paper tickets, fixed overhead costs associated with paper ticket production can be reduced. Third, the implementation of e-ticketing results in reduction in costs for distributing paper tickets to customers. According to Galileo International, a global leader in e-ticketing deployment, e-ticketing helps save airlines an estimated US\$8 - US\$10 per ticket and up to US\$369 million annually for airlines worldwide. It estimates that by implementing e-ticketing, the average U.S. Galileo travel agency can save up to \$398,000 per year in personnel, time, ticket delivery, and shipping and handling costs. According to analyses by IATA, "As much as 20 percent of an airline's expenses go toward ticket distribution" (McKenna, 1998).

Forth, the e-ticketing system allows customers to purchase air tickets directly from airlines without having to go through travel agents. As a result, airlines will be able to cut down travel-agent commission. Fifth, with e-tickets, airlines' passengers are able to travel without having to worry about forgotten, lost, or stolen tickets because paper tickets no longer exist in the e-ticketing system. Sixth, the e-ticketing system allows the processes and procedures associated with managing paper tickets to be reduced considerably. Seventh, e-ticketing helps airlines speed up the accounting and billing processes, and reduce potential streamlining of airport procedures. The only reason for this fact is that there is no paper ticket involved in the entire process. Eighth, one of the long-term benefits is that the IRS (Internal Revenue Service) in the U.S. and similar organizations in other countries are expected to eventually come up with some kinds of electronic receipt formats, solving the documentation problem. The savings are then passed on to customers in the form of lower airfares (Ticketless/Electronic, 1999). Finally, e-ticketing enables airlines to eliminate the need to keep track of or deliver tickets and allows prepaid ticketing from other destinations without fees. E-ticketing seems to promise tremendous advantages for the airline industry in the near future.

DISADVANTAGES

The implementation of e-ticketing also gives numerous disadvantages to airlines. First, many codeshare itineraries involving two or more airlines from different alliance groups cannot be ticketed electronically. Several airlines still prohibit their ticketless passengers from switching to a non-alliance carrier at the airport without stopping by a ticket counter to have another ticket issued (Ticketless/Electronic, 1999). Second, depending on each airline, it may be difficult for an airline to issue paper receipts to its customers. Third, streamlining the delivery process might build critical mass for airlines. Forth, airlines are unable to issue boarding passes to passengers in advance. They are usually issued on the day of departure at the airport. Fifth, airlines tend to have problems in quickly and positively identifying the passenger, and verifying that the person presenting himself or herself for travel is the correct one. Sixth, there is a higher margin for error since airline personnel are not yet thoroughly familiar with the e-ticketing system.

Seventh, online information security is one of the major problems. People are reluctant to purchase e-tickets by using a credit card via the Internet because it is possible for hackers to steal information on their credit cards. Most airlines deal with this problem by setting up firewalls. For example, Southwest chose Harris Computer Systems' CyberGuard Firewall to protect its network from hackers. However, people still have uncertainty about how effective this product can protect Southwest's network from hackers (Thompson, 1999). Finally,

another main problem, particularly for the U.S., is that Federal Aviation Administration (FAA) rules require that passengers need paper tickets for checking in their baggage in order to prevent terrorist attacks. Ticketless passengers have to go to the ticket counter and get baggage tickets in order to check in their baggage (Maxon, 1998). Because of the regulation, airlines are unable to completely eliminate paper tickets and operating costs in the area of baggage check-in. Passengers may also have to stay in a long line waiting for their baggage tickets at the airport. Many airlines solved this problem by using palmtop computers to check in their ticketless passengers at the curb. By this way, travelers are able to bypass a long line at the ticket counter.

TRENDS

E-ticketing, one of the latest revolutions in the airline industry, was invented with the advancement of technology. It changes the way airlines process and distribute tickets, and technologically takes the airline ticketing process to the next level. In today's world of the Internet, e-ticketing is just a matter of time. The only question is: "How long will it take to catch on?". E-ticketing seems to be growing at a rapid pace.

A recent survey by Air Travel Card in the U.S. indicates that about 75 percent of corporate travelers prefer e-ticketing. Satisfaction among the ticketless travelers is also on the rise (Sansoni, 1997). In 2003, Northwest Airlines established a new company record when approximately 90 percent of its domestic customers used e-tickets (Maxon, 1998). However, most experts predicted that this new form of travel will find a niche only in the low-fare market in the near future. According to the statement by Tom Murphy, IATA's senior director of customer and distribution services, "By the year 2000, you'll begin to see more airlines offering the e-ticketing service in Europe and Asia" (McKenna, 1998).

METHODOLOGY

Data Required

Research Questions Investigated

1. What are the advantages and disadvantages of implementing e-ticketing in the airline industry?
2. What is the value of implementing e-ticketing in airline companies?

The above research questions were broken down into the following investigative questions:

1. How long has your company used the e-ticketing system?
2. What kind of computer hardware does your company use to support the e-ticketing system?
3. What kind of operating system does your company use to run the e-ticketing system?
4. Can the implementation of e-ticketing help increase your company's net income?
5. Can the implementation of e-ticketing help reduce your company's operating costs?
6. What kinds of security policies are used in your company's e-ticketing system?
7. Is your company's online data encrypted?
8. Are you satisfied with the way your airline manages the ticketless passengers?
9. What is the biggest problem in your company's e-ticketing system?
10. Are you satisfied with the overall performance of your company's e-ticketing system?
11. Is the implementation of your company's e-ticketing system cost-effective?

The above investigative questions were directly related to evaluating advantages and disadvantages of implementing e-ticketing in airline companies in areas such as costs, revenues, security, and management.

Relationships Tested

Based on the above questions, measurement questions via a survey were sent out to the target population in order to test the hypothesis which was to test whether airline companies can increase their net income and reduce their operating costs by implementing e-ticketing.

Specific Data Gathered

The data essential to this research was divided into two types: primary data and secondary data. The primary data, which was gathered by conducting a survey of managers and professionals from airlines offering the e-ticketing service, was used to answer the research questions and most of the investigative questions. The primary data was also used for evaluating the advantages and disadvantages of implementing e-ticketing in the airline industry. These advantages and disadvantages were found mainly in areas such as costs, revenues, security, and management.

The secondary data was gathered from journals such as the Wall Street Journal and the Journal of Business Research, magazines such as Aviation Week & Space Technology, Air Transportation World and Business Week, newspapers such as the Washington Times and the New York Times, and books such as History of the Airline Industry. It included the history and general background of e-ticketing implemented by airline companies, its advantages and disadvantages, its impacts on travel agents, and its trends. The secondary data also helped answer the research questions, and some of the investigative questions.

Study Population

According to International Air Transportation Association, an increasing number of airlines have begun offering either partially or fully the e-ticketing service to customers (McEwen, 2003). The target population in this research included 100 managers and professionals from the following e-ticketing airlines: Continental Airlines, Delta Air Lines, Northwest Airlines, Southwest Airlines, United Airlines, Air Canada, Air France, Air New Zealand, British Airways, Cathay Pacific Airways, China Airlines, Japan Airlines, KLM Royal Dutch Airlines, Korean Air, Lufthansa Airlines, Qantas Airlines, Scandinavian Airlines, Singapore Airlines, Swiss International Airlines, and Thai Airways International.

Sampling Technique

In the study, the researcher employed a non-probability sampling technique, which utilized a quota sample of managers and professionals from the 20 airlines mentioned above. The researcher decided to utilize quota samples to improve representativeness (Cooper & Schindler, 2002). The researcher sent the questionnaires to 100 managers and professionals from each of the airlines mentioned under Study Population.

Method of Inquiry

Research Methods

The paper was a formal study that tested the hypothesis and answered the research questions. In order to answer the research questions, the opinions of the target population were required. The researcher employed the survey as a method of data collection by using a questionnaire. The ex post facto design was used in the study; therefore, the researcher had no

control over the variables (Cooper & Schindler, 2002). The research was descriptive since it was concerned with finding out answers to the questions such as: “Can the implementation of e-ticketing help increase your company’s net income?”, “Can the implementation of e-ticketing help reduce your company’s operating costs?”, and “Is the implementation of your company’s e-ticketing system cost-effective?”

The time dimension of the paper was cross-sectional. The questionnaires were sent out to the target population only once. A statistical study was used to manipulate the information received from the returned questionnaires. The research was conducted in the field. The target population perceived deviations as the researcher induced. However, the deviations did not introduce significant bias to the gathered data (Cooper & Schindler, 2002).

Techniques

The researcher emailed five questionnaires to customer service department of each of the 20 airlines stated under Study Population and asked them to distribute to the management who were involved with the e-ticketing system. Together with each questionnaire, an envelope with returning address and postage was included.

Sequence of Events

The research was conducted using the following sequence of events. First, the researcher developed the question hierarchy to approach the research process and to identify the basic problem that incited the research. Second, in order to develop the survey, extensive data was gathered from secondary sources. The Literature Review section conveyed the information concerning implementing e-ticketing in the airline industry. Third, the survey instrument was drafted. The content and wording were of major concern in this process. Questions had a proper scope and covered all required data.

Forth, the survey was tested and corrected. Pretesting was conducted by eight respondents. From the pretest, the second draft of the survey instrument was developed. Fifth, the sample size was determined. Sixth, the survey was conducted. The questionnaires were sent out via email to the 20 airlines mentioned in the Study Population section. Seventh, the data from returned questionnaires was collected and manipulated statistically. The findings were analyzed, and the results of the statistical testing of the hypothesis and investigative questions were interpreted. Finally, a summary was developed, and conclusions and recommendations were addressed.

Analysis Performed

The Analysis Performed section is divided into the following subsections: variables of interest, levels of measurement, statistical tests run, and criteria for acceptance/significance.

Variables of Interest

The variables of interest of this research are listed below:

1. The advantages and disadvantages of implementing e-ticketing.
2. Satisfaction level of airline companies toward implementing e-ticketing in areas of their operations, management, and performance.
3. The problems resulted from operating e-ticketing.
4. The ability of airlines to increase net income and reduce operating costs as a result of implementing e-ticketing.

Levels of Measurement

The questions in the survey were used to measure the advantages and disadvantages of implementing e-ticketing in the airline industry. Most of the questions in the survey were closed questions. The researcher used five-point measurement scales in the survey. The researcher used two different types of measurement scales which were nominal and interval scales. Nominal scales were used to classify different elements while interval scales processed the characteristic in which the distance between each of the numbers is equal.

Statistical Test Run

Most of the questions in the survey were closed questions that required no coding. These types of questions were involved with nominal and interval scales. However, only interval measurements were analyzed, using the t-test.

Criteria for Acceptance / Significance

The researcher used five-point measurement scales in the survey. The acceptance criteria throughout the survey was set at 3.3. This was because the researcher believed that the acceptance criteria should account for two-third of a five-point measurement scale, which was approximately 3.3. The significance level (α) was set at 0.05 or a 95 percent degree of confidence. The interval estimate was set at 0.2.

ANALYSIS OF DATA

Discussion of Issues

Findings

One hundred questionnaires were emailed to the 20 preselected airlines mentioned above. To be more specific, 100 questionnaires were sent out to each of the 20 airlines. However, only 35 questionnaires were returned, with at least one questionnaire from each of the airlines surveyed. Therefore, the survey's response rate was 35 percent. Out of those 35 returned questionnaires, five were returned unmarked. Therefore, only 30 questionnaires could be used for analysis. On each questionnaire, there were eleven questions, five of which were significant. The findings of the significant questions which were questions 4, 5, 8, 10, and 11 were shown as follows.

Figure 1

Breakdown of the Respondents' Opinions on Whether the Implementation of E-ticketing Can Help Increase Their Companies' Net Income (Question 4)

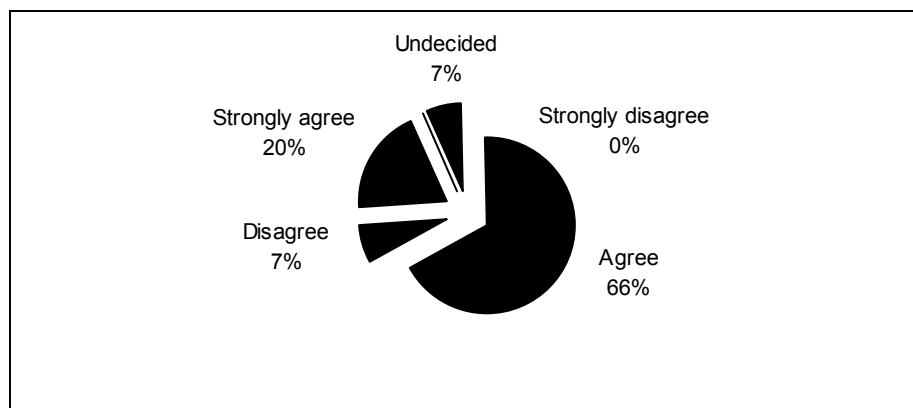


Figure 2

Breakdown of the Respondents' Opinions on Whether the Implementation of E-ticketing Can Help Reduce Their Companies' Operating Costs (Question 5)

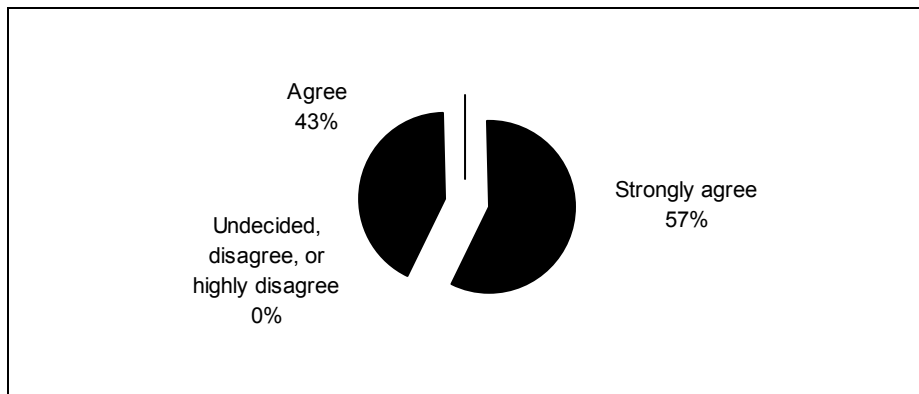


Figure 3

Breakdown of the Respondents' Opinions on Whether They Are Satisfied With the Way Their Airlines Manage the Ticketless Passengers (Question 8)

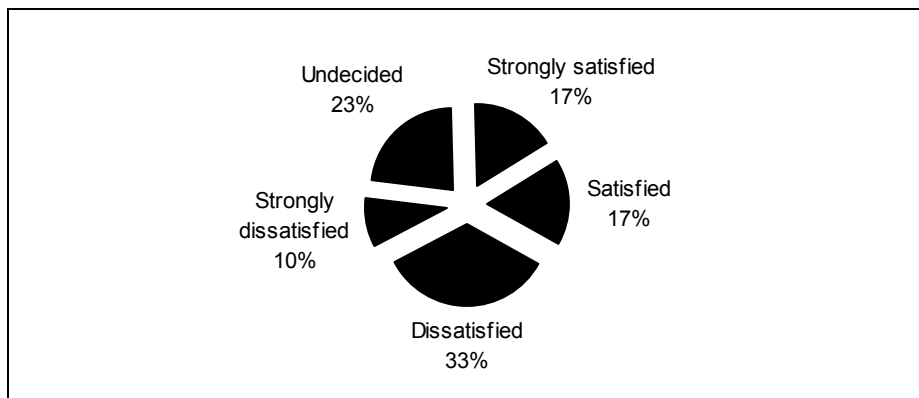


Figure 4

Breakdown of the Respondents' Opinions on Whether They Are Satisfied With the Overall Performance of Their Companies' E-ticketing Systems (Question 10)

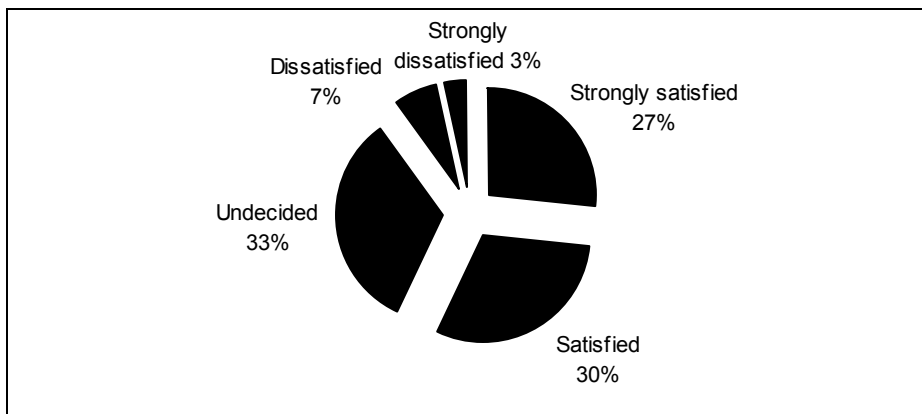
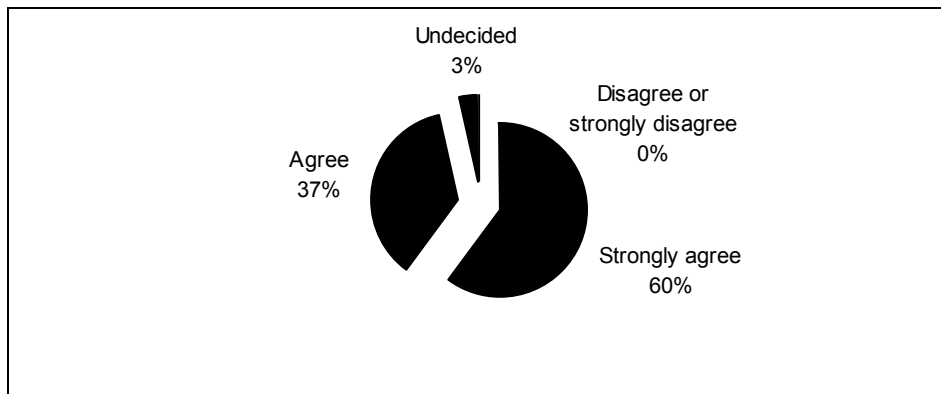


Figure 5

Breakdown of the Respondents' Opinions on Whether the Implementation of Their Airlines' E-ticketing Systems Is Cost-effective (Question 11)



Statistical Test

T-test

The statistical test used for analyzing the survey's data was the t-test. The t-test was used for testing of measurement questions 4, 5, 8, 10, and 11. These questions were connected to interval measurements. The reason that the above questions were chosen to be tested using the t-test was because the results of those questions could be used directly to determine whether the hypothesis was accepted or rejected. The breakdown of the responses to the above interval questions is represented in Table 1.

Table 1

Breakdown of the Responses to the Interval Questions

Question	Strongly Disagree	Disagree	Undecide	Agree	Strongly Agree	Total
4	0	2	2	20	6	30
5	0	0	0	13	17	30
8	3	10	7	5	5	30
10	1	3	10	8	9	30
11	0	0	1	11	18	30

The sample mean's calculation values, the sample standard deviation's calculation values, the t-test's calculation values, and the t-test's critical values are presented in Table 2.

Table 2

T-test Results Pertaining to the Interval Questions

Question	X	\bar{S}	T-calculated	T-critical
4	4.000	0.743	5.147	1.699
5	4.567	0.504	13.771	1.699
8	2.967	1.273	-1.435	1.699
10	3.800	1.133	2.415	1.699

Question 4 was tested using a t test to determine whether the implementation of e-ticketing could help increase the airlines' net income.

Null hypothesis (H_0): The implementation of e-ticketing could not help increase the airlines' net income, and alternative hypothesis (H_A): The implementation of e-ticketing could help increase the airlines' net income.

According to the t-test results in Figure 4-2, the t-calculated value (t_{cal}) was greater than the t-critical value (t_{cri}). Therefore, H_0 was rejected and H_A was accepted, meaning that the airlines' management agreed that the implementation of e-ticketing could help increase the airlines' net income.

Question 5 was tested using a t-test to determine whether the implementation of e-ticketing could help reduce the airlines' operating costs.

H_0 : The implementation of e-ticketing system could not help reduce the airlines' operating costs, and H_A : The implementation of e-ticketing system could help reduce the airlines' operating costs.

According to the t-test results in Figure 4-2, the t_{cal} was greater than the t_{cri} . Therefore, H_0 was rejected and H_A was accepted, meaning that the airlines' management agreed that the implementation of e-ticketing could help reduce the airlines' operating costs.

Question 8 was tested using a t-test to determine whether the airlines' management was satisfied with the way their airlines managed the ticketless passengers.

H_0 : The airlines' management was not satisfied with the way their airlines managed the ticketless passengers, and H_A : The airlines' management was satisfied with the way their airlines managed the ticketless passengers.

According to the t-test results in Figure 4-2, the t_{cal} was not greater than the t_{cri} . Therefore, H_0 could not be rejected and H_A was not accepted, meaning that the airlines' management could not agree that they were satisfied with the way their airlines managed the ticketless passengers.

Question 10 was tested using a t-test to determine whether the airlines' management was satisfied with the overall performance of the e-ticketing system.

H_0 : The airlines' management was not satisfied with the overall performance of the e-ticketing system, and H_A : The airlines' management was satisfied with the overall performance of the e-ticketing system.

According to the t-test results in Figure 4-2, the t_{cal} was greater than the t_{cri} . Therefore, H_0 was rejected and H_A was accepted, meaning that the airlines' management agreed that they were satisfied with the overall performance of the e-ticketing system.

Question 11 was tested using a t-test to determine whether the implementation of the e-ticketing system was cost-effective.

H_0 : The implementation of the e-ticketing system was not cost-effective, and H_A : The implementation of the e-ticketing system was cost-effective.

According to the t-test results in Figure 4-2, the t_{cal} was greater than the t_{cri} . Therefore, H_0 was rejected and H_A was accepted, meaning that the airlines' management agreed that the implementation of the e-ticketing system was cost-effective.

Data Analysis

The findings of the statistical testing of the hypothesis and the significant questions were analyzed and interpreted as followed. According to the survey's results of question 4, it indicated that the surveyed airlines' managers and professionals agreed that the implementation of e-ticketing could help increase the airlines' net income. According to the hypothesis testing of question 5, it showed that the surveyed airlines' managers and professionals agreed that the implementation of e-ticketing could help reduce the airlines' operating costs. According to the hypothesis testing of question 8, it indicated that the surveyed airlines' managers and professionals could not agree that they were satisfied with the way their airlines managed the ticketless passengers.

According to the hypothesis testing of question 10, it indicated that the surveyed airlines' managers and professionals agreed that they were satisfied with the overall performance of the e-ticketing system. According to the hypothesis testing of question 11, it showed that the surveyed airlines' managers and professionals agreed that the implementation of the e-ticketing system was cost-effective. In conclusion, it was proven that the airline companies could increase their net income and reduce their operating costs by implementing e-ticketing. Based on the data analysis, it appeared that the advantages of implementing e-ticketing outweighed its disadvantages.

CONCLUSION

Based on the findings obtained from review of the literature, the survey results, and the findings of the t-testing of the hypotheses and the significant investigative questions shown under Analysis of the Data, the conclusions were made as follows. Even though the implementation of e-ticketing was able to help the airlines increase their net income and reduce their operating cost, approximately one-third of the airlines' managers and professionals surveyed was not really satisfied with the way their airlines managed the ticketless passengers due to many problems particularly in area of multi-airline codeshare itineraries.

Another problem taking place quite frequently was that the airlines had a problem in quickly and positively identifying the passenger, and verifying that the person presenting himself or herself for travel was the correct one. This was because there was no paper ticket involved in the ticketing process. Finally, the airlines' managers and professionals were satisfied with the overall performance of the e-ticketing system and agreed that the

implementation of the e-ticketing system was cost-effective. Based on the findings under Analysis of the Data, it implied that the advantages of implementing E-Ticketing outweighed its disadvantages.

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