Hedonic preference of airline passengers

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A R T I C L E I N F O

A B S T R A C T

The purpose of this study is to determine which airlines Davao City-bound and outbound passengers prefer. Passenger information was acquired via survey questionnaires employing the Likert scale. In this study, non-experimental quantitative research employing a casual research method was employed. Using descriptive and informal research methodologies, this study investigated whether demographic variables and airline service quality influence the airline service choices of Davao City passengers. This investigation employs artificial neural network research to determine which factors influence airline preference. The majority of air carrier respondents are between the ages of 21 and 35, are predominantly female, and are employed by private companies. The airline preferences of passengers are influenced by price, cabin services, flight schedule, safety, on-time performance, and employee conduct. Important airline demographics included age, occupation, and sex. Price is the most significant criterion when selecting an airline, followed by flight schedule, on-time performance, and employee conduct. Flights should offer discounts to students and senior citizens. They may adjust fares based on the findings. To attract a broader age range of customers, airlines should strategically organize their marketing and focus on specific market niches. To increase sales, airlines may consider offering discounted, low-cost, or one-peso fares during certain times. To assist time-sensitive travelers in reaching their destinations in the event of airline delays or cancellations, alternative flights are advised. To gain a deeper understanding of airline carrier selection, research should be extended, employing a larger sample or alternative statistical methods.

1. Introduction

Air transport is a vital part of the total travel and tourism industry. Air services have played a significant role in the growth of tourism in many parts of the world (Nadiri et al., 2008; Richardson and Butler, 2012). With increasing competition and advancing technology, air transportation has become more affordable to a broader ray of tourists (Sultan and Simpson, 2000). In recent years full service has been losing market share to low-cost carriers in some routes (Atalik, 2007). Low-cost carriers have proven to be significant competitors to full-service airlines. In the United States, a recent survey identified that passengers tend to evaluate airlines based on their satisfaction with the in-flight service (An and Noh, 2009; Park et al., 2006). In Africa, the government's priority programs were the development of safe, efficient, and reliable air transportation. Thus, excellent passenger satisfaction is one of the greatest assets (Namukasa, 2013), coupled with other service quality attributes (Archana et al., 2012). Passenger's dissatisfaction with the quality of service is considered to affect the buying decisions for other flights since the delivery of service quality is essential for airlines' survival and competitiveness (Ahadmotlaghi and Pawar, 2012; Park et al., 2006; Zeng et al., 2009). Air carriers must develop the flexibility to adjust to market changes and retain repeat customers (Benner, 2009). With the rise of new competitors, traditional network carriers must adjust to remain competitive (Shiwakoti et al., 2022). In the Philippines, the growth in aircraft carriers at NAIA increased passenger demand (Fabian et al., 2013). The same happened in Davao City, where Philippine

Airlines, Cebu Pacific, Air AsiaZest (formerly ZestAir and AirAsia), and Tiger Airways have constant domestic flights from Francisco Bangoy International Airport (a sister company of Cebu Pacific). These airlines compete; therefore, each has its market. Their demographic profile determines their preferences.

Information can be used to make a fine selection while choosing an airline. Two or more alternative items are part of the complex consumer decision-making process (Sokolovskyy, 2012). Studies show that airline service quality is a significant element in traveler choice (De Jager et al., 2012; McKechnie et al., 2011). Price, staff courtesy, onboard comfort and cleanliness, safety, attendant responsiveness, onboard entertainment, and extended trip service are crucial to airline passengers (Tsaura et al., 2002). According to a study, on-time performance is a crucial decision-making component (Surovitskikh and Lubbe, 2008) price as the primary factor in airline sector rivalry, as espoused by Tsaura et al. (2002), is now an obsolete theory since customers look beyond price alone.

This study aims to determine the factors that matter most to airline passengers of Davao City in selecting an airline to travel to. Other specific objectives are:

1. To determine the demographic profile of airline passengers in terms of age, sex, civil status, and employment
2. To determine the factors related to airline preference in terms of cabin services, price, flight schedule, safety, on-time performance, and personnel behavior
3. To determine the influence of passengers' profiles on their preference for airline carrier
4. To identify the factors that influence passengers' preference for airline carrier

In line with the preceding statement of the problem and objectives, the following hypothesis was tested in this study:

Ho1. The passengers' profile does not influence their preference for an airline carrier.
Ho2. None of the factors significantly influence passengers' preference for an airline carrier.

2. Literature review

Previous studies on airline choice focused on one of three aspects: Airline structure, global alliance benefits (how they affect customers' choice), and choice between low-cost and full-fare airlines based on passengers' opinions. In aviation, full-service, cargo, and low-cost airlines operate (Venkatesh, 2013). Aviation is one of the economy's most intangible services (Tiernan et al., 2008) as espoused by Doganis (2005), low-cost carriers are characterized by high aircraft utilization, short turnaround time, internet booking, e-ticketing, minimum cabin crew, one-class of seating, simple fare structure and pricing strategy, no seat allocation, and no free meals on board.

On the other hand, Fabian et al. (2013) stated that low-cost airlines improved the country's socioeconomic situation by increasing passenger demand. Some low-cost carriers provide promotional pricing that dissatisfies passengers, bringing them into competition with full-service carriers on service expectation, service perception, service value, passenger satisfaction, and airline image (Fourie and Lubbe, 2006) which also confirmed by Morales and Fitzsimons (2007) emergence of airlines increased competition.

Since low-cost flights offer cheaper pricing than full-fare airlines, one would expect them to overgrow and hold a significant market share. However, competition made this problematic; full-fare airlines adapted to low-cost airlines' market shifts by reducing costs and expenses (ICAO, 2012). Most full-fare airlines would not give up extra services and amenities; therefore, they could not match competitors' costs. Finally, these two types of carriers co-existed by offering different levels of service at matching pricing (Sokolovskyy, 2012). Most started focusing on specific customer groups. Most full-fare carriers target business passengers who desire flexibility and comfort (Garfinkel, 2008).

Further, cabin service, environment, ambiance, and crew behavior, determine customer satisfaction, according to Morales and Fitzsimons (2007). Since the airline industry influences passenger satisfaction, service adjustments have occurred (Atilgan et al., 2003; Young et al., 1994). Also, according to Khuong (2014), a tangible aspect among airlines is the appearance of in-flight services, including seat comfort, aircraft interior cleanliness, cabin crew appearance, and in-flight equipment (reading lights, call buttons, air conditioners, newspapers, TV screens, video games, etc.).

Preacher and Hayes (2008) said tangibles include food and beverage quality and seat comfort (seat materials, pitch, and size). Satisfaction with cabin services can shape passengers' view of overall service quality (Brady and Cronin, 2001). Additionally, Alex and Thomas (2011) espoused that pricing directly affects customer satisfaction, and most passengers are more price sensitive than service sensitive. Mason (2001) also found that short-haul business travelers are increasingly price-sensitive. Wisenblit and Schiffmann (2018) supported Erickson and Johansson (1985); claimed that consumers judge product quality by pricing. Similarly, Thanasupsin et al. (2010) said flexible tickets let passengers book flights on demand. Depends on the type of traveler and the availability of alternative flights. Also, Martín and Román (2001) said that price, frequency, quality/availability of food, and low penalties for ticket changes were the essential factors in airline choice. Moreover, Charoensettasilp and Wu (2013) averred that flight schedules are essential for the customer who choose air travel, which is the fastest mode of transportation. Meanwhile, Campbell and Vigar-Ellis

(2012) said airlines could leverage flight scheduling and punctuality as strengths. Some airline industry factors are beyond airline firms' control. On the other hand, Lin et al. (2011) stated that airlines could govern their everyday operations to improve on-time performance.

Along with the factors that determine the passenger's preference are price, safety, timeliness, luggage transportation, food, and beverage quality, seat comfort, check-in process, on-board service, and marketing promotion of airlines are essential to airline customers (Kalitesi and Araştırma, 2012; Graham and Bansal, 2007). The study by Graham and Bansal (2007) also showed that airlines responded to safety demands by making safety improvements and marketing them to inform consumers about them. The statement was also supported by Oyewole et al. (2007) that the safety of the airlines is a part of the image it brings to the consumers, and it also constitutes an essential contribution to the image of an airline. Also to Barnett (2020), safety is arguably the most important "quality" attribute of commercial aviation. Nevertheless, it rarely figures into overt inter-firm rivalry. On the other hand, the on-time performance of flights is also an essential consideration for passengers in selecting a flight carrier. Hess et al. (2007) stated that the factor with the most significant explanatory power of air travel choice behavior is flight frequency. Interestingly, Di Wang et al. (2014) added that schedule changes might affect the flight's departure time and, therefore, customer preferences for that flight.

Attitude is another aspect of airline preference. Sometimes staff behavior irritates customers, which affects their buying decisions. Service quality is a vital success component; thus, it is essential to identify both client happiness and essential factors in offering high-quality service (McKechnie et al., 2011). Service quality is also a factor in which to consider in any service. The studies of Zeithaml et al. (1996), Hutchinson et al (2009), and Heskett et al. (2010) exhorted a typical pronouncement, stating that the relationship between service behavior and service quality has proven its role and importance in management/marketing.

The emergence of more airlines has increased the number of passengers together with increasing airline competition on service quality attributes such as cabin services, price, flight schedules, safety, on-time performance, and personnel behavior. The factors mentioned can contribute to the company in making new strategies to attract more passengers since it will affect the purchasing behavior of the travelers. Hence, the service quality attributes that matter most to them will be the means for the airline companies to survive with the innovative and global competition; through these, strategies for improvement of services will be implemented.

2.1. Theoretical framework

The study is based on Seddighi and Theocharous (2002), who said destination choice is a complicated model that incorporates essential tourism product qualities (which affect traveler choice and generate a feeling about the location in the visitor's head). They say the cost of living, tourism package price, facilities, transportation cost, promotion and advertising, quality of services, and political instability are essential.

Customer satisfaction is a holistic notion representing the complete emotional response following consumption, from dissatisfaction to contentment (Gursoy et al., 2005). Keeping clients in a competitive climate is preferable to finding new ones. Price and service are vital elements in consumer satisfaction theories for service organizations like airlines. Cabin services, price, flight schedules, safety, and on-time performance of an airline all influence the selection and must be analyzed to develop solutions (Snyder and Tài, 2014).

The arguments were used to determine the determinants of airline passengers' preferences. Fig. 1 indicates that the dependent variable is air travelers, and the independent variable is determinant qualities. Cabin services evaluate customer satisfaction. Price influences consumer happiness in several research. Along with this is the flight schedule, which is vital for transportation because it gives passengers options. Safety and on-time performance are crucial aspects of airline services.

3. Research methodology

The study aims to determine the factors that affect the airline passenger's choice of an airline to travel to. This chapter discusses the research design, research participants, sampling frame, instrument, and statistical treatment of the data.

3.1. Research design

The study used non-experimental causal quantitative research. Quantitative design involves organizing data, identifying themes, classifications, and trends, and testing hypotheses (LePine et al., 2011). Causal research needs a causal inference based on a relationship between two occurrences, the time-lag order that cause must precede effect, and excluding other explanations (Marczyk et al., 2005).

This study employed descriptive and causal research methodologies to determine if demographic characteristics and airline service feature influence Davao City passengers' airline service preferences. This study uses artificial neural network analysis to determine airline preference-sensitive factors. Artificial neural networks (ANNs) are statistical learning models inspired by biological neural networks (the central nervous systems of animals, especially the brain). They estimate or approximate functions that depend on many unknown inputs (Bhadeshia et al., 2009).
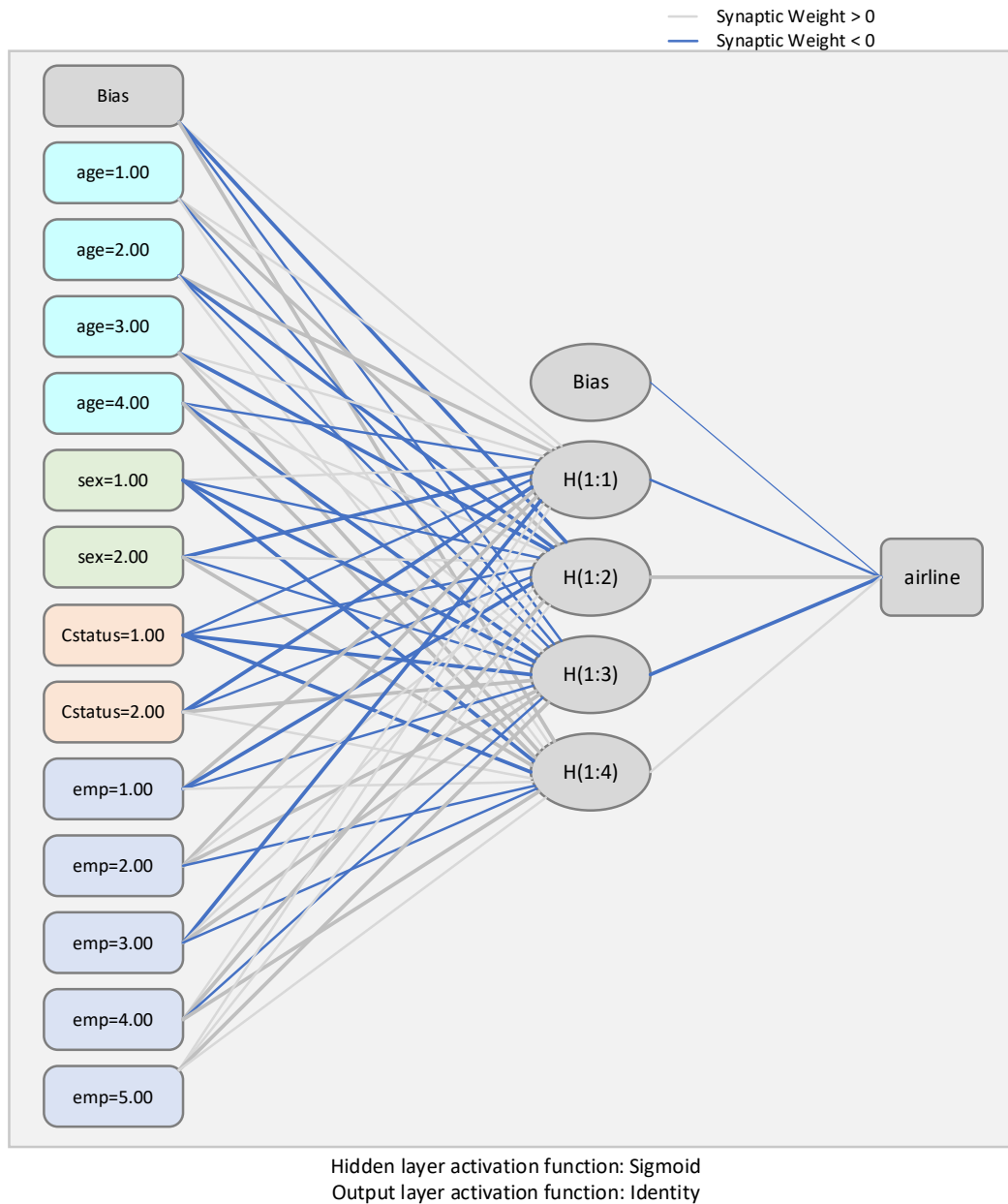
Fig. 1: Diagrammatic representation of the neural network and the synaptic weights (Model 1)

3.2. Research instrument

The study examines airline passenger choice elements, including cabin services, price, flight schedules, safety, on-time performance, and employee behavior. The study uses an adapted aviation website questionnaire that includes respondents' demographic information. Face-to-face interviews with respondents are another research tool.

To determine what elements affect a passenger's choice of airline, the second section lists six airline service features respondents believe essential. Demographic profiles, airline service qualities, and passenger views on better airline services will be gathered. 1=not important to 5=very significant on a 5-point Likert scale. Three experts validated the instrument's content to ensure it fits the study's context. Before collecting data, the validity index was improved.

4. Results

Based on the research questions from the last chapter, the results are given in an orderly way. The results are shown by figuring out the demographics of the respondents, how much they agree on the factors that affect their choice of airline, how much the passengers' profiles affect their choice of airline carrier, and how the factors that affect passengers' choice of airline carrier can be found using artificial neural network analysis.

4.1. Demographic profile of airline passengers

The following are the results of the statistical analysis, which shows the relative distribution of airline passengers in terms of demographic profile. Profile variables include age, sex, civil status, and employment.

As seen in Table 1, descriptive statistics revealed that the respondents of the study are primarily young adults, 21-35 years old (48%), a vast majority are females (71%), single (58%), and working in private institutions (65%).

In addition, Table 2 shows that the respondent's passengers chose Philippine Airlines for their travels (38%), followed by Cebu Pacific (35%). A significant number did not indicate their airline of choice (26%). Lastly, only one passenger (0.8%) expressed the choice of AirAsia as a flight carrier for his/her travels.

Table 1: Demographic distribution of respondents

Factors	f	%
Age		
20 years old	47	36
21-35 years old	63	48
36-50 years old	15	12
Older than 50	5	4
Sex		
Male	38	29
Female	92	71
Civil Status		
Single	76	58
Married	54	42
Employment		
Employee (private)	84	65
Unemployed	4	3
Self-employed	21	16
Student	19	15
Employee (NGO)	2	2

Table 2: Airline of choice of respondents

Airline of choice	f	%
Cebu Pacific	46	35
Philippine Airlines	49	38
AirAsia	1	0.8
Did not indicate	34	26
Total	130	100

4.2. Factors related to airline preference

In terms of cabin services, it was found that cabin services affect the preference for an airline choice to a relatively high degree, having an overall mean score of 3.27 with a standard deviation of 0.66. This influence stems from their experience of comfortable seats (having a mean score of 4.09 with a standard deviation of 0.83 and from the responsiveness of the flight crew (having a mean score of 4.01 with a standard deviation of 0.80).

These items were followed by facilities on board (having a mean score of 3.83 with a standard deviation of 0.81) and in-flight entertainment (having a mean score of 3.55 with a standard deviation of 0.98), both of which are rated high also. On the other hand, having means on board has the least yet moderate influence among the items, with a mean score of 3.28 and a standard deviation of 0.98.

The price of the fare is also a factor that affects preference to a relatively high degree (having an overall mean score of 3.48 with a standard deviation of 0.72), which is hugely manifested by the influence of promo fare (having a mean score of 4.24 with a standard deviation of 0.90). They are also influenced to prefer an airline carrier that offers low-cost fares

(mean score of 3.45 with a standard deviation of 1.12). The respondents are discouraged by an expensive ticket, based on the mean score of 2.78 with a standard deviation of 1.26.

Flight schedules reveal a high degree of influence, with an overall mean score of 3.81 and a standard deviation of 0.59. Though the respondents are expressing a preference for an airline with a morning schedule (having a mean score of 3.98 with a standard deviation of 0.88) and least for an airline that offers an evening flight (having a mean score of 3.63 with a standard deviation of 0.96).

Safety determines the preference for an airline choice at a relatively high degree (based on the overall mean score of 4.01 with a standard deviation of 0.63), as the respondents are negatively affected by an airline with flight interruptions (having a mean score of 3.91 with a standard deviation of 0.86) and records of accidents (having a mean score of 3.96 with a standard deviation of 0.77). They, however, prefer airlines with a proper safety procedure (having a mean score of 4.12 with a standard deviation of 0.83).

Efficiency performance is also weighed positively (having a mean score of 3.63 with a standard deviation of 0.69) described as punctuality of flights (having a mean score of 3.75 with a standard deviation of 0.98), as well as in the efficient checking-in (having a mean score of 3.68 with a standard deviation of 0.84).

Lastly, as the industry is a service industry, personnel behavior is considered one of the strong influences in choosing an airline based on the overall mean score of 4.03 with a standard deviation of 0.67, which is understood as the enthusiasm of the staff (having a mean score of 4.06 with a standard deviation of 0.76), making the staff looked approachable (having a mean score of 4.06 with a standard deviation of 0.82), assistance during boarding (having a mean score of 4.03 with a standard deviation of 0.75) and assistance during the flight (having a mean score of 4.00 with a standard deviation of 0.88). A high level of influence towards choosing an airline was also manifested from the respondents regarding staff interaction with passengers (having a mean score of 3.95 with a standard deviation of 0.79).

4.3. Influence of passengers' profiles on their preference of airline carrier

In order to determine the influence of passengers' profiles on their preference for airline carriers, an artificial neural network analysis was constructed. The network performance displays results as a basis for determining the model as "good," as presented in the model summary. The model summary contains the results by partition and overall sample, the error, the relative error of the incorrect prediction percentage, and the stopping rule. The basic rule to determine goodness-of-fit is achieving a very small error close to zero (Scardi and Harding, 1999). The model summary also indicates that the training and

testing passed the requirement as the number of errors is small.

The network information reveals four factors that served as input layers: The passengers' age, sex, civil status, and employment. Each of the discrete parameters under the profile variables served as units, summing up to thirteen parameters that are tested for their influence on the preference of airline carriers, which is a standardized scaled independent variable.

In addition, the training test also yielded one hidden layer in an identity activation function. The output layer uses the sigmoid standardized rescaling method as the activation function. It produces the sum of squares of error as the error function. The activation function follows a sigmoid function, which means the model stays at zero until the input current is received. At this point, the firing frequency increases initially but gradually approaches an asymptote at a 100% firing rate (Haykin, 1998).

The schematic presentation of the neural network is presented in Fig. 2. It should be noted that the lighter-colored synapses suggest positive synaptic weights, and the darker-colored implies negative synaptic weights. The neural network analysis is composed of networks with characteristically different shades of the network; the lighter network is a positive synapse which suggests a positive impact on the airline of choice, while the darker lines are negative synapses indicating a negative effect.

The demographic profiles are connected to the airline of choice through the hidden layer of the synapse networks. Factors that are connected with a positive synapse on the hidden layer connecting to hidden layers 2 [H(1:2)] and 4 [H(1:4)] are factors that influence choosing an airline.

The neural networks also present the parameter estimates indicating the influence of each factor. In particular, ages 20 and below had positive synaptic weights through layers H(1:1), H(1:2), and H(1:4), though passing through these layers reveals that only layers H(1:2) and H(1:4) affect the choice of the airline at a combine 0.47. Ages 21 to 35 years old affect the choice of the airline through H(1:2) and H(1:4); ages 36-50 years old affects through synaptic weights with H(1:1), H(1:3), and H(1:4) and ages above 50 through H(1:2) and H(1:4). As a whole, the age demography that is sensitive to the choice of airline is aged below 20, 21-35 years old and those above 50 years old.

Males' demography affects through H (1:1), while females are through H(1:2) and H(1:4); thus, females are much more sensitive in choosing an airline than their male counterparts.
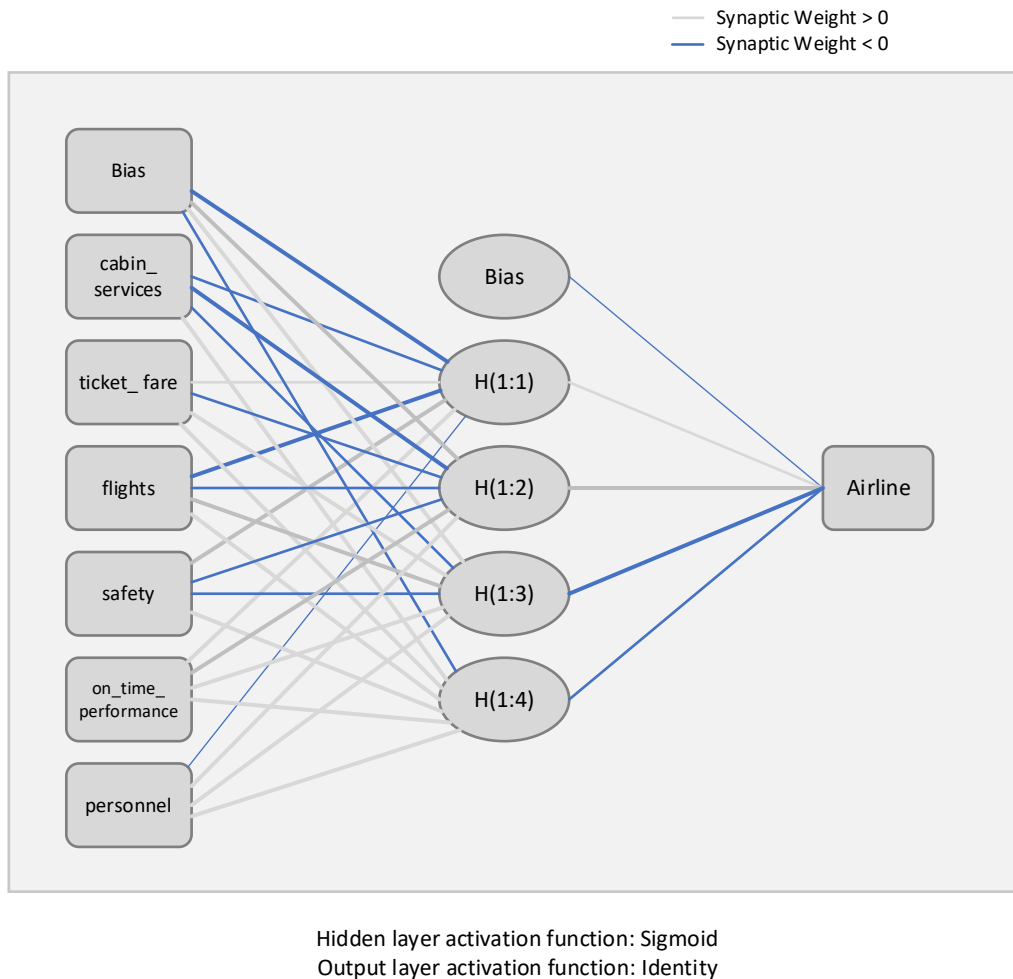

Hidden layer activation function: Sigmoid
Output layer activation function: Identity

Fig. 2: Diagrammatic representation of the neural network and the synaptic weights (Model 2)

By employment, those who are working in private firms are affected through H(1:1) and H(1:4). In contrast, the unemployed (dependent on someone else for the purchase of ticket) are affected through H(1:1), H(1:2) and H(1:3); the self-employed through H(1:2) and H(1:3); the students through H(1:1), H(1:2) and H(1:4). Finally, the NGO workers' choice of airline passes through all the layers. Thus, overall, the most sensitive to airline choice are the students.

Using simulated variable importance, age happened to be an essential variable in consideration of an airline, followed by employment, then least by sex.

4.4. Factors that influence passengers' preference for airline carrier

In order to identify the factors that influence passengers' preference for airline carriers, a second artificial neural network analysis was constructed. The network performance displays results as a basis for determining the model as "good," as presented in the model summary. The model summary contains the results by partition and overall sample, the error, the relative error of the incorrect prediction percentage, and the stopping rule. The basic rule to determine goodness-of-fit is achieving a minimal error close to zero (Scardi and Harding, 1999). Model summary for the model testing for the determinants of the airline industry reveals that it passed the neural network analysis procedure requirement. The network information reveals that six factors served as input layers: Cabin services, price, flights, safety, on-time performance, and personnel behavior. In addition, the training test also yielded one hidden layer in an identity activation function. In an identity activation function, the neuron of a particular layer gets the same type of activation function. In almost all cases, non-linear activation functions are used. The output layer uses the standardized rescaling method, sigmoid as an activation function. It produces the sum of squares of error as the error function. The activation function follows a sigmoid function, which means that the model stays at zero until input current is received, at which point the firing frequency increases quickly at first, but gradually approaches an asymptote at a 100% firing rate (Haykin, 1998).

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The network diagram for the airline characteristics reveals that synaptic effects through layers H(1:1) and H(1:2) positively affect the preference of an airline. Therefore, airline characteristics that are linked to these layers reveal an impact on airline choice.

In particular, cabin services relate to the hidden layer H(1:4) but this hidden layer did not bear an impact on the airline choice. Price, on the other hand, interacts with the output layer through H(1:1), H(1:3), and H(1:4). The Flight characteristics interact through H(1:3) and H(1:4); Safety characteristics through H(1:1) and H(1:4); on-time performance all through the layers; and finally, the personnel behavior through H(1:2), H(1:3) and H(1:4). Note that the price, safety and on-time performance are considered to be the characteristics that will increase preference of an airline.

However, relative importance analysis reveals that the price is the most important character in choosing an airline, followed by flight schedule characteristics, on-time performance, and least for personnel behavior.

4.5. Discussion

In terms of cabin services, it was found that cabin services affect the preference for an airline choice to a relatively high degree. This bears similarity with the postulation of Chang and Chen (2007) who see that a suitable flight carrier of choice is translated to possess a responsive cabin service. The responsiveness dimension considers efficiency factors in passenger guidance, such as smooth seating, safety instructions, etc. Moreover, willingness to help with inquiries and prompt handling of requests, complaints, and inquiries are measured within this dimension (Yunus, 2013). It should be noted that prompt handling of requests was more important and less satisfactory than guidance by cabin crew (Chang and Chen, 2007; Yunus, 2013).

The price of the fare is also a factor that affects preference to a relatively high degree. This study's pronouncement is consistent with Güreş et al. (2011) findings, which enunciated that "price" is the most important reason for selecting airlines for passengers, either domestic or international flights. This postulation has a similar bearing on the statement of Güreş et al. (2011), saying that satisfying customers need not appear costly. More so, Chen et al. (2008) mentioned that price tends to be a crucial consideration in the service quality of airline companies. Service quality is considered a critical dimension of competitiveness, which means that customers are willing to pay if they are provided with excellent service quality.

Similarly, Fageda et al. (2011) pointed out that the core features of the low-cost model are high aircraft utilization, use of secondary airports, minimum cabin crew, one class of seating, short 'on the ground' turnaround times, e-ticketing, no seat allocation, passengers having to pay for food and drinks, flexible working terms and conditions for employees, and point to point services.

Flight schedules also revealed a high degree of influence on the choice of airline carriers in Davao

City. Such a result is bearing congruence with the statement (Sokolovskyy, 2012), stating that having an on-schedule flight also contributes to the reputation of the flight company. In the case of business passengers (Sokolovskyy, 2012) furthered that flexibility (fare and schedule) tops the factors which influence an airline's choice, along with frequent flyer programs, overall service quality, comfort, and access to business lounges.

Lastly, Yunus (2013) denoted the service quality of flight carriers in terms of airline safety perceptions and on-time performance. These two factors were found to be crucial for both leisure and business travelers. On-time performance to often be very significant for business travelers on short-haul flights, while passengers taking long-haul flights are usually more time-flexible (Cho, 2006; Sokolovskyy, 2012).

Safety determines the preference for an airline choice to a relatively high degree. This is analogous to the verbalizations of Khuong (2014) who mentioned that the safety of airline carriers is a manifestation of its assurance of service delivery. Assurance includes employees' competence and courtesy and the ability to convey trust and credibility (Benner, 2009).

The dimension of assurance is connected to underlying attributes such as trustworthiness among the flight crew, knowledge and competence to answer questions and inquiries, and the level of courteousness among the flight crew. The most critical element within this quality dimension is the level of safety felt by the passengers. This element receives the most severe penalty if not performed desirably (Chang and Chen, 2007; Yunus, 2013).

On-time performance has been a highly rated factor influencing passengers' preference in choosing a flight carrier in Davao City. Several papers by Benner (2009) and Hess et al. (2007), who studied the choice of airlines, also considered factors like access time, in-vehicle access time, walk time to access mode, access cost, and flight schedule assistance when making a decision about an air flight carrier. Likewise, some authors (Fourie and Lubbe, 2006; Sokolovskyy, 2012) exhorted that travelers usually select low-cost, on-time flight options only because of the airfare.

As the industry is a service industry, personnel behavior is considered one of the strong influences in choosing an airline. This finding bears similarity with the exhortation of Heung and Chu (2000), who averred that the most important factor among the 29 identified factors for flight choice is flight agent and personnel behavior. Of the 29 factors suggested, out of which staff attitude was selected and considered vital, among other factors like word-of-mouth communication and the reputation of the flight carrier.

Second, the focus of this paper is to simulate in an artificial neural network approach the demographic variables which have a bearing on the choice of air carriers in Davao City. The results of the artificial neural network analysis are discussed in the succeeding paragraphs, which connect demographic variables to the airline of choice through the hidden layer of the synapse networks. The neural networks also present the parameter estimates indicating the influence of each factor.

As a whole, the age demography that is sensitive to the choice of airline is aged below 20, 21-35 years old, and those above 50 years old. Such a result of the simulation was also evident in several studies, espousing that as consumers and citizens, young adults are a critical group to consider. Although their disposable income is generally below average, their propensity to fly is high, an attribute that is reflected in the targeting of youth markets by low-cost airlines across Europe (Uittenbogaard, 2009). One-half of adults flew in 2001, with about 50% of these making one return flight, and the rest two or more flights (Maddern, 2013).

In addition, females are found to be much more sensitive in choosing an airline than their male counterparts. This significant result contradicts one study's findings, which averred that the sex of an air traveler does not matter. The demand for air travel is derived and the actual demand to be satisfied might not have anything to do with the gender of the person. Trip purposes do not have a gender undertone (Wilfred et al., 2012).

However, there exists an interesting aspect concerning differences in male and female preferences on airlines. Accordingly, travel is widely associated with masculine values such as adventure and pleasure, and numerous researchers do not recognize gender-specific concerns and incorporate gender-neutral values into travel. Many women feel discriminated against and perceive airlines as masculine organizations. Thus, there is a need to understand and satisfy the needs of female travelers (Milioti et al., 2015; Wilfred et al., 2012).

By employment, the most sensitive to airline choice are the students. However, employment/occupational status was found to be an insignificant predictor of the choice of the airline (Wilfred et al., 2012), students emphasized their capability to choose a desirable flight carrier (Chang and Chen, 2007). Even though students below the age of eighteen are not expected to have a tangible income that can be able to afford airfares, one still sees them travel. Thus the age of an air traveler, one can say, does not determine the choice decision-making of which airline to use. Aircraft seats do not even consider the age or size of air travelers as they are made to meet a general standard for everybody (Wilfred et al., 2012).

Lastly, a second artificial neural network analysis was constructed to identify the factors that influence passengers' preferences for airline carriers. The network information reveals that there are six factors that served as input layers, which are cabin services, price, flights, safety, on-time performance, and personnel behavior. In particular, only price, safety, and on-time performance are considered to be the characteristics that will increase an airline's preference.

However, relative importance analysis revealed that the price is the most important character in choosing an airline, followed by flight schedule, on-time performance, and least for personnel behavior. This is congruent with the verbalizations of Güreş et al. (2011), finding price as the most important reason for selecting airlines for passengers, either domestic or international flights.

More so, Chen et al. (2008) mentioned that price tends to be a crucial consideration in the service quality of airline companies. However, other core features of the low-cost model that cannot be eliminated from consideration of choice are high aircraft utilization, use of secondary airports, minimum cabin crew, one class of seating, short 'on the ground' turnaround times, e-ticketing, no seat allocation, passengers having to pay for food and drinks, flexible working terms and conditions for employees, and point to point services (Uittenbogaard, 2009).

For the succeeding factors, Yunus (2013) denoted the service quality of flight carriers in terms of airline safety perceptions and on-time performance. These two factors were found to be crucial for both leisure and business travelers. On-time performance to often be very significant for business travelers on short-haul flights, while passengers taking long-haul flights are usually more time-flexible (Gursoy et al., 2005; Sokolovskyy, 2012; Wen et al., 2014). Longer wait time for a flight is an additional cost and inconvenience for customers to use air flight services (Brueckner and Flores-Fillol, 2007). If more flights are offered for a route during a period of time, customers are more likely, on average, to depart at the time they want and to reduce their wait time at the gate (Cho, 2006). Consequently, delays negatively impact customers. Poor on-time performance increases the chance that a customer arrives late at their final destination or misses a connecting flight at the intermediate airport. Poor operational quality should decrease the probability that a customer will choose a particular airline (Cho, 2006).

As for the least-rated factor, personnel behavior is a very important attribute. It is important at the ground level and onboard the aircraft. At the ground level, it can be vital in capturing undecided air travelers who have yet to choose an airline. Such customer relations can be vital since they could be responsible for many choices of certain airlines (Wilfred et al., 2012).

5. Conclusions

The result shows that most of the respondents of flight carriers are young adults with ages ranging from 21-35 years old, the majority are females, singles, and working in private institutions. In addition, cabin services, price, flight schedule, safety, on-time performance, and personnel behavior were found to have a strong influence on the passengers' preference for flight carriers.

On the other hand, among the demographic variables, age happened to be an essential variable in consideration of an airline, followed by employment, then least by sex. Lastly, price is the most essential character in choosing an airline, followed by flight schedule characteristics, on-time performance, and least personnel behavior.

6. Recommendations

In light of the results of this study, the following recommendations were made:

- Since age is the most important demographic factor in the choice of airline carriers, it is recommended that airline companies will consider discounts on the fares for students and the elderly (senior citizens). They may consider the findings as a basis for certain fare price adjustments. Airline companies are encouraged to strategically plan their marketing activities and direct to specific market segments to effectively attract more patronage from different age groups.
- Since the price, safety, and on-time performance of flight carriers were found to be sensitive towards the choice of its passengers, it is suggested that airline companies will consider regular offerings of discounted, low-cost, or one-peso fares at certain times to boost their sales.
- More so, airline companies are encouraged to regularly inspect the condition of their airbuses as well as their engines if they are conditioned for flights. Coordination with airports in the vicinity and alternative flights are also encouraged in case there are possible delays or cancellations of flights to accommodate those who are particular with schedules.
- Deeper studies are encouraged with respect to airline choice, which may involve longer periods of time, the bigger scope of the research participants, or the use of other statistical treatments to shed new knowledge with regard to the choice of airline carriers.

Compliance with ethical standards

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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