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doi: https://10.55124/csdb.v2i2.250

SciForce

International Journal of Computer Science and Data Engineering

Journal homepage: www.sciforce.org

Service quality assessment in the airline industry: A TOPSIS-based analysis of Hawaiian Airlines and global competitors

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ARTICLE INFO

Article history:
Received: 20250210
Received in revised form: 20250215
Accepted: 20250218
Available online: 20250226

Keywords:
Aviation, crisis;
TOPSIS;
Sustainability;
Airlines;
Analysis;
Strategy;
Hawaiian;
multi-criteria;
Downsizing.
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ABSTRACT

This study examines crisis management strategies used in the aviation industry and creates a set of internationally relevant evaluation standards for the Greek aviation industry. The research employs a multi-criteria analysis in an ambiguous setting because of market uncertainty. The criteria are weighted according to news analysis and worldwide literature. Departure (partial or total operational shutdown), innovation (strategic organizational renewal), sustainability (maintaining the status quo), and reduction (cutting costs and assets for immediate survival) were some of the strategies the aviation industry employed to deal with the COVID-19 crisis. The study looks at various strategies used by airports, airlines, civil aviation firms, and aircraft manufacturers. The TOPSIS (Technique for Priority Sorting by Similarity, Similarity to Ideal Solution) method, which finds solutions that are closest to the ideal across a number of criteria, is the analysis method used in this study. This method works well in ambiguous circumstances, particularly when handling linguistic metrics and measurement uncertainty. In order to objectively evaluate competitiveness and handle heterogeneity with suitable tactics, the approach integrates the entropy-tips technique. Aegean Airlines, Alaska Airlines, Delta Airlines, Hawaiian Airlines, and Philippine Airlines are among the airlines that are examined in this analysis.

They are assessed based on factors including responsiveness, empathy, and dependability. Hawaiian Airlines does well by facilitating penetration in unexplored areas through smart fleet expansion, even in the face of natural events like tropical storms. The report also looks at the U.S. aviation industry's sustainability initiatives, which are aimed at reaching net-zero greenhouse gas emissions by 2050. It highlights issues including the fact that sustainable aviation fuels (SAF) are far more expensive than conventional jet fuel. With comparatively low investments, fleet modernization is becoming a more affordable option than buying new airplanes and has positive environmental effects. Stakeholders in the aviation sector can benefit greatly from this thorough analysis's insightful advice on how to overcome obstacles and implement sustainable growth plans.

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Introduction

The purpose of this study is to analyze crisis management tactics in the aviation industry and rank them according to a number of criteria. The criteria used in the prioritization process are weighted and developed from an analytical study of worldwide literature and news. The multi-criteria analysis will be carried out in an ambiguous setting because of the aviation market's uncertainties. A set of globally applicable criteria for evaluating crisis management strategies in the Greek aviation industry will be created by this study. To deal with the COVID-19 dilemma, the aviation sector used tactics like departure, innovation, sustainability, and downsizing. Reducing expenses and assets was part of downsizing in order to guarantee immediate survival. Innovation sought to strategically refresh the organization, while sustainability sought to preserve its current status. Conversely, exit meant that operations were stopped, either entirely or partially [1]. Airlines, civil aviation firms, airports, and aircraft manufacturers are just a few of the many institutions and organizations that make up the civil aviation sector. Based on their business models, airlines can be categorized and play a vital part in this industry.

These categories are based on things like target client profiles, revenue streams, value added in services, items offered, and revenue creation strategies. Each airline has been able to adapt its business model to rivals thanks to market rivalry and liberalization. Flight crew planning is frequently the first step in making long-term strategic decisions for airlines, followed by route and fare planning. Planning the flight crew effectively is essential to creating well-informed long-term plans. This procedure combines information from multiple airline sources, such as passenger volume, earnings, flight performance, and anticipated operating expenses. Airlines can produce precise projections and make wise judgments by examining this information [2]. The 262-ton Ecuador of Newburyport, commanded by Captain Elisha Folgers, and the Balena of New Bedford, commanded by Edmund Gardner, were the first whaling ships to arrive in Hawaii.

The Beaver, a 101-foot, 109-ton steamer constructed in England in 1835 for the Hudson's Bay Company, was the first steamship to arrive in the Hawaiian Islands. On November 4, 1840, the first lighthouse in Hawaii was put into service at Keawaiiki, Lahaina. With the 106-foot, 114-ton side-wheeler Akamai, the Hawaiian Steam Navigation Company launched the first scheduled interisland steamship service in late 1853.The Hawaiian Packet Line joined the Regular Shipping Company's scheduled sailing packet service between Hawaii and the mainland in 1855, nine years later. Six fast-sailing ships were used by these lines for limited passenger service and cargo. On August 1, 1914, the U.S. Navy towed its F-1 and F-3 submarines, which were the first to be permanently stationed in Hawaii. On August 24, the F-2 and F-4 were towed as well. On April 1, 1960, the Hawaiian Citizen, a renovated ship that could transport 436 twenty-four-foot containers, went into operation, making it the first all-container carrier in the Pacific trade [3].

With a range of projects, including hotels, resorts, apartment complexes, a retail centre master plan, and an office tower in downtown Honolulu, Minoru Yamazaki and Associates (MYA) significantly influenced the development of the Hawaiian Islands in the late 1980s. MYA's Hawaii projects, especially the Queen Emma Gardens housing development, show how a firm's design and technological goals change with time, albeit being distinct from Pruitt-Igoe. Customer preferences, market developments, and financial constraints that impact investors' choices all have an impact on these shifts. To maintain Hawaii's standing as a paradise travel destination, funding is required for both kinds of initiatives. This study analyses MYA's Hawaiian projects within the larger development of post-war travel architecture, placing them at the intersection of high modernist architectural ambitions, developer financial restrictions, and a recently formed state negotiating questions of race and identity. While gentrification brought on by tourists was a global issue, its impacts were amplified in Hawaii, especially on Oahu, due to a lack of available land for construction. These advances attracted a lot of public attention and occasionally strong criticism, and they frequently confronted competing possibilities and difficulties [4]. Experts on Hawaii's economic development concur that, given the current economic structure, it is doubtful that this boom will continue, despite some people's expectations to the contrary. The concentration of land ownership may be a barrier to further growth. Agriculture has long been associated with Hawaii's prosperity, but current patterns suggest that the composition and organization of output are changing. Hawaii imposes a comparatively low percentage on property owners, while having significant tax burdens. Furthermore, the state provides a 50% exemption on the entire assessed property value, which keeps over 50% of the homes tax-free.

These tax laws will have an impact on the creation of an all-encompassing economic strategy for the future, considering Hawaii's important role in state planning [5]. Upgrading the current fleet is a sensible substitute for purchasing new aircraft. In addition to lowering CO2 emissions temporarily, renewals benefit airlines financially. These improvements can help achieve short-term emissions targets in a cost-effective way with a relatively small investment. Composite wings, electric taxi systems, and lighter cabins are some potential rejuvenation possibilities. Current profit margins make SAF an impractical option for airlines. However, with policy incentives, capital investment, time, and industry collaboration, these fuels could become a sustainable solution. Progress is already being made as private companies, airports, airlines, and the federal government work together to promote the widespread adoption of SAF [6]. Airlines are no longer solely classified as full-service network carriers (FSNCs) or low-cost carriers (LCCs).

Rather, hybrid airlines have surfaced, using elements of both models to help them grow their clientele and stay competitive in a market that is becoming more and more difficult. In order to integrate several product and operational elements and simplify the complexity of different airline models, this article aims to create an airline business model spectrum. This concept depicts airlines on a continuum rather than dividing them into discrete divisions. This strategy, which combines aspects of the full-service network carrier (FSNC) and low-cost carrier (LCC) models, is especially helpful for promoting hybrid and regional airlines [7]. For many Americans, a Hawaiian vacation started at 30,000 feet during the height of the jet age.

Major airlines operating flights to Honolulu sought to set the trip apart from other domestic flights in order to increase the attraction and enthusiasm. United Airlines pledged that travelers will “step into Hawaii” as soon as they stepped onto its Royal Hawaiian aircraft, highlighting that “for most individuals, a visit to Hawaii is not just a typical trip, but the fulfillment of long-held expectations." Hawaiian-print uniformed flight attendants offered "a complete gourmet adventure" that included delicacies like "Hawaiian-style" lobster and filet mignon teriyaki [8]. An analysis of flight ratings for low-cost carriers (LCCs) in India was conducted by Sankaranarayanan and Rathod (2017). Three

Indian LCCs' Trip Advisor reviews were the subject of their investigation. The results showed that whereas other passenger segments gave flight services top priority when selecting an airline, young adult travelers were predominantly drawn to low-cost carriers (LCCs) because of their reasonable ticket prices. Air Asia was the most productive airline among those examined, which resulted in great customer satisfaction. According to the literature assessment, there hasn't been much research done on examining customer sentiment at the aspect level in the aviation sector, as far as the candidates are aware. The majority of research has mostly examined elements like ratings and flight delays or evaluated the general attitude polarization in airline services [9]. In order to help the country reach its target of net-zero greenhouse gas emissions by 2050, the U.S. aviation industry is implementing a number of techniques, including sustainability initiatives.

Airlines, a major worldwide emitter, have taken a variety of steps to reduce their carbon footprint, including adopting sustainable and alternative practices. The cost of SAF is sometimes many times higher than that of conventional jet fuel. Given the often low profit margins in the airline business, this substantial price premium presents a serious problem for the company. Despite the environmental advantages of SAF, airlines have found it difficult to increase its use in the absence of further financial incentives or legislative backing [10]. Tensions between the military and local people still exist despite the military's lengthy history and substantial economic influence. These battles began in 1893, when the Hawaiian monarchy was overthrown with the help of a security force made up mainly of American and European citizens and reinforced by U.S. naval forces. Relationships are now much more complex by growing worries about how military actions affect the environment.

Local people have long opposed industrial expansion, particularly on rural and poorly inhabited islands, thus this conflict is not new. Creating an Environmental Impact Statement (EIS) and Environmental Assessment (EA) is a major obstacle for infrastructure projects in the Hawaiian Islands. Project costs can increase by hundreds of millions of dollars due to the approval process and related litigation, which frequently causes delays that last months or even years [11]. Thanks to the rise of the tourism industry and excellent market conditions, Hawaiian Airlines has seen tremendous growth in recent years. The airline has great growth potential despite its modest capacity and lack of brand recognition. With the acquisition of 22 new aircraft, it will be able to penetrate untapped and less competitive sectors, enhancing its strong performance and guaranteeing steady, modest growth going forward. Peak traveler arrivals and Hawaiian Airlines' highest revenue levels correlate with the third quarter of the year, when about 84% of tropical cyclones occur.

Major earthquakes or tsunamis are uncommon, and while cyclones are frequent, they are often dispersed. As a component of the island's ecosystem, these natural occurrences can be controlled to have as little of an effect as possible on the local economy and tourism. As seen in Figure XVI, which emphasizes previous catastrophes, Hawaiian Airlines has managed to continue operating well in spite of these difficulties [12]. An example of a project with possible environmental effects, pertinent environmental regulations, arguments from both sides, the history of the proposed marketing effort, and the larger need for Hawaii to lessen its reliance on tourism will all be covered in this judgment. Although the main focus of the discussion will be legal analysis, Native Hawaiian opinions will also be included. The Hawaii Supreme Court was considering the matter at the time of publication [13].

The COA is happy to inform that active duty and reserve officers can now take advantage of priority seating and/or reduced baggage fees on Southwest, United, Allegiant, and Spirit Airlines. We already pledged to notify you of any developments pertaining to American, Sun Country, Harrison, Republic, Delta, and Sun Country Airlines. We also mentioned that JetBlue and Hawaiian Airlines are already examining the request. The airline has revised its customer service manual to include USPHS officers in its baggage tax waiver policy, according to a recent announcement by Hawaiian Airlines Assistant General Counsel Steven Wilson.

The strong focus on family, friendship, and community in the Hawaiian language, ohana, is well known to those who speak it. This emphasis also affects how Hawaiians do business and work. The Law Offices of Shannon James and Hawaiian Airlines have our deepest sympathies [14]. As far as the candidate is aware, not much research has been done in the aviation sector, especially with regard to feature-based sentiment analysis. The purpose of this study is to close that knowledge gap and offer insightful information to assist consumers in selecting airlines. Furthermore, it will assist US-based airlines in determining their areas of improvement, assessing their performance in comparison to rivals, and fortifying their position in the market [15].

MATERIALS AND METHOD

Aegean Airlines: The top airline in Greece, Aegean Airlines, provides both domestic and international service. As a member of the Star Alliance, it was established in 1987 and is renowned for its outstanding service and wide-ranging network throughout Europe, the Middle East, and beyond. Its contemporary fleet puts efficiency, Greek hospitality, and passenger comfort first.

Alaska Airlines: One of the biggest American airlines, Alaska Airlines is well-known for its wide network throughout North America. It was established in 1932, is a part of the one world alliance, and offers dependable and superior service. The airline prioritizes customer satisfaction, innovation, and sustainability in its operations and passenger experience, and it boasts a modern fleet.

Delta Air Lines: One of the top American airlines, Delta Air Lines flies to both domestic and foreign locations. Known for its dependability, inventiveness, and customer service, it was founded in 1925 and is a part of Sky Team. Delta offers first-rate travel experiences throughout North America, Europe, Asia, and beyond with a contemporary fleet that prioritizes sustainability, comfort, and connectivity.

Hawaiian Airlines: Hawaiian Airlines is the biggest and most established airline in Hawaii, having been established in 1929. It connects the islands to Asia, the South Pacific, and North America with both domestic and international flights. The airline, which is well-known for its friendliness and convenience, runs a contemporary fleet that prioritizes dependability, high-quality service, and the genuine Hawaiian experience.

Philippine Airlines: The biggest and most established airline in Hawaii was established in 1929 and is called Hawaiian Airlines. By connecting the islands with North America, Asia, and the South Pacific, it provides both internal and international flights. Known for its friendliness and ease, the airline runs a contemporary fleet that prioritizes dependability, high-quality service, and the genuine Hawaiian experience.

Tangibility: Being tactile means having a tangible presence or being perceptible by touch. It makes a distinction between concrete things and intangible ideas. It has to do with material assets like buildings or machinery in the commercial world. By offering tangible proof of a product's worth, calibre, or existence, it improves credibility in the consumer experience.

Reliability: The ability of a person, group, or product to consistently and dependably operate as anticipated is referred to as reliability. It is crucial in many domains, including as relationships, business, and engineering. High reliability is essential to long-term profitability and customer happiness because it fosters confidence, guarantees performance, and lowers risks.

Responsiveness: The ability to react swiftly and efficiently to demands, modifications, or circumstances is referred to as responsiveness. It is crucial for timely and effective interactions in communications, technology, and customer service. Being highly responsive is essential for both personal and professional success since it increases trust, satisfaction, and adaptability.

Empathy: The capacity to comprehend and experience another person's emotions, empathy promotes compassion and strong bonds. It improves communication and trust and is essential for relationships, leadership, and customer service. In both personal and professional contexts, empathy fosters kindness, collaboration, and efficient problem-solving by recognizing feelings and viewpoints.

TOPSIS analysis is then carried out after OWD evaluation. An integrated plan is created to align the designed aggregation while taking into account the criterion values for the best positive and negative solutions. Several criteria are used to determine the distance between the solutions, and weight calculations are made for each criterion. Lastly, the alternatives are taken into consideration along with the positive and negative solutions to calculate the weighted distance [16]. Multi-attribute decision making (MADM) is a procedure aimed to improve decision making by examining many features and characteristics of categorized alternatives. It emphasizes on making the best decision and guaranteeing pleasure, particularly when faced with a lot of options. Even though MADM is frequently utilized in daily decision-making, difficulties frequently occur when the process grows more complicated in real-world scenarios [17]. After discussing aggregation techniques and the prioritization of various operators, the use of TOPSIS in uncertain scenarios is examined. Based on the findings of earlier studies, various operator types are examined. The fuzzy TOPSIS method is presented as a novel method for prioritized aggregation in uncertain scenarios. A fuzzy prioritized aggregation technique is presented in this research and used in a real-world case study.

By using language metrics to reduce measurement uncertainty, the results demonstrate the value of numerous criteria in decision making. The suggested approach also offers a framework for lowering information capture imprecision [18]. A novel approach to prioritization that is intended for practical use is presented in this study. It incorporates a variety of choice criteria, and empirical research shows that it works well, particularly when handling language measurements and measurement uncertainty. Furthermore, this research identifies possible information collection flaws in the suggested strategy and offers repair instructions [19]. To determine how similar two probability distributions are, a thorough analysis of the relative entropy determined by a particular technique is carried out. Using the TOPSIS approach, this assessment aids in determining the current state of the air quality.

An example is then provided to demonstrate the efficacy of the suggested method. In addition to clearly stating the state of the air quality, the approach offers insightful information that is crucial for administrative decision-making in the management of air pollution. The results demonstrate how useful this strategy is in real-world situations [20]. Mechanical equipment is getting more complicated as manufacturing rises. Cutting-edge defect diagnosis technology is necessary to guarantee their effectiveness and safety. Anticipating equipment failures, determining their underlying causes, and putting preventive measures and recommendations into place to lessen or avoid possible mishaps are crucial steps in this process [21]. Additionally, prior models have overlooked crucial elements and have not adequately taken assessors' uncertainty into account.

TOPSIS Method

By using an analogy with material suppliers, we suggest combining the Group Fuzzy Analytic Network Process (GFANP) with the TOPSIS technique for priority ranking in order to get over these restrictions. These voids are filled by our suggested quantitative methodology, which offers a solid framework for choosing the best material provider [22]. Cost and environmental impact are taken into account when determining the significance of comparing TIRs. Furthermore, consideration is given to the requirement for connectivity. The significance of these elements in determining the best solutions has been underlined in numerous research. Different strategies, like Dress A's similarity-based ranking strategy, can be employed to ascertain the relative value of various alternatives when assessing them using the TOPSIS method [23]. Predefined thresholds, like fixed sizes or peak defiles, combined with different statistical methodologies are common ways to determine alert levels. There are a number of methods for this, each with its own technique, such as establishing warning levels and designating severity with color codes. Nevertheless, there are differences in how these approaches determine warning levels, and each has unique benefits and drawbacks. Because of its distinct benefits, this study suggests using the TOPSIS technique to determine alert levels [24]. To achieve objectivity, we employed the entropy-dipsi technique to evaluate the competitiveness of industrial clusters. Our study produces results that accurately reflect these clusters' comparative performance, closely matching their real evolution [25]. The right strategy must be used in order to lessen the effects of heterogeneity.

For determining the significance of decision factors, the entropy method has shown itself to be a dependable choice. In order to train instructional materials, assess allocation estimates, and create an entropy-TOPSIS framework, this study incorporates the entropy approach into the TOPSIS model [26]. For data processing in this situation, the fuzzy-TOPSIS technique makes use of weighting variables and linguistic features. Employee hierarchy is established, decisions about pay increases are guided, top performers are identified, and mutual recognition between the organization and its employees is fostered based on predetermined criteria [27]. The ability of the TOPSIS technique to pinpoint the solutions that are closest to the ideal makes it stand out among the other multi-criteria decision analysis (MCDA) and decision making (MCDM) approaches. Despite its wide range of applications, it dependably yields dependable and beneficial outcomes [27]. Mutual funds are a popular choice among the many investment options available in the financial sector. Two main issues are the subject of this article. It first highlights how crucial it is to examine each sign separately rather than combining them all at once. It also draws attention to the difficulties in assessing the performance of mutual funds.

Assessing outcomes based on several variables emphasizes the necessity of a more sophisticated strategy. These elements are covered in the sections that follow [28]. In order to determine the most effective layout, the 2-opt method is iteratively employed to generate several layout possibilities for DEA starting with the original configuration. The layout is then progressively improved by introducing the 2-opt algorithm at each step. Every DEA iteration determines the best answer. A numerical case study is used to demonstrate the suggested algorithm's performance, and the conclusion highlights its benefits [29].The TOPSIS technique stands out among the several multi-criteria decision analysis and decision making (MCDA/MCDM) approaches due to its resemblance to the ideal solution. It is a dependable method for producing dependable solutions because its applications span numerous disciplines and constantly yield beneficial outcomes [30].

RESULTS AND DISCUSSION

TABLE 1. Hawaiian Airlines project

	Tangibility	Reliability	Responsiveness	Empathy
Aegean Airlines	3.228	3.498	3.414	3.295
Alaska Airlines	2.671	2.451	2.536	2.148
Delta AirLines	1.101	1.152	1.186	1.169
Hawaiian Airlines	3.38	3.312	3.481	2.924
Philippine Airlines	2.468	2.502	2.975	2.857

The TOPSIS method's assessment of Hawaiian Airlines and its rivals based on four factors consistency, dependability, responsiveness, and empathy is shown in Table 1. Strong service quality is demonstrated by Hawaiian Airlines' high responsiveness (3.481), consistency (3.38), and reliability (3.312) scores. Delta Air Lines receives extremely low rankings across the board, whereas Aegean Airlines performs competitively. Philippine Airlines outperforms Alaska Airlines in terms of responsiveness (2.975) and empathy (2.857), however both airlines have mediocre performance. Hawaiian

Airlines is a competitive choice in the airline sector due to its outstanding service quality overall, particularly in terms of reactivity.

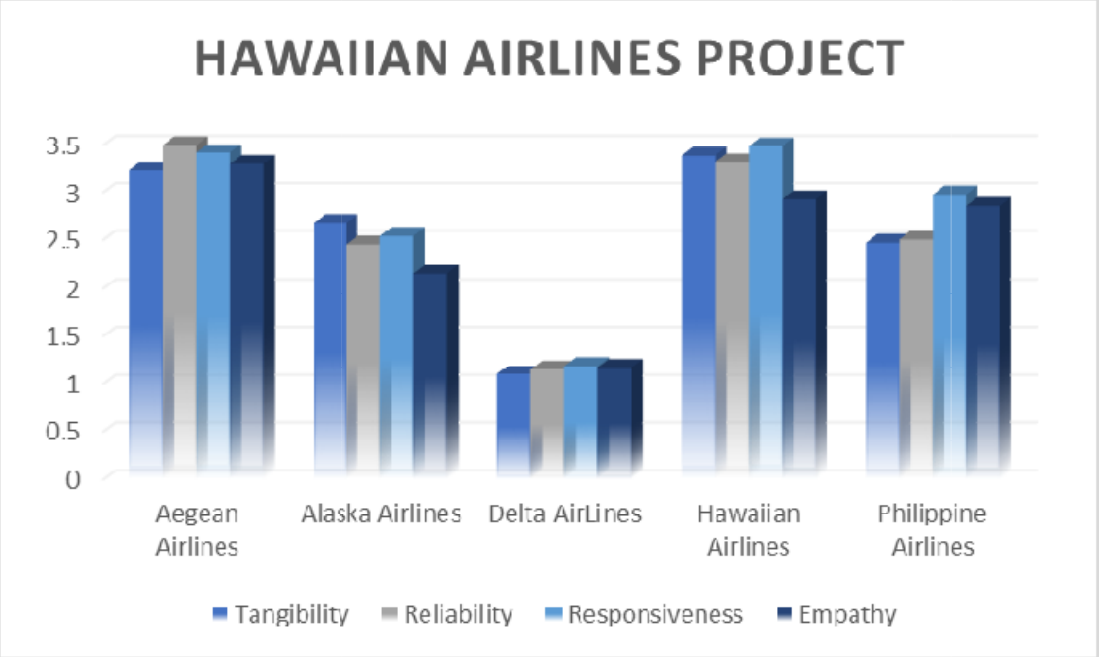

FIGURE 1. Hawaiian Airlines project

Using the TOPSIS technique, airlines are compared on four service quality criteria in Figure 1. Hawaiian Airlines does quite well in terms of responsiveness (3.481), consistency (3.38), and dependability (3.312). Delta Air Lines has a very low score, whereas Aegean Airlines also has a high ranking. Alaska Airlines and Philippine Airlines perform mediocrely according to the criteria.

TABLE 2. Normalized Data

	Tangibility	Reliability	Responsiveness	Empathy
Aegean Airlines	0.5359	0.5766	0.5367	0.5689
Alaska Airlines	0.4434	0.4040	0.3987	0.3708
Delta AirLines	0.1828	0.1899	0.1865	0.2018
Hawaiian Airlines	0.5611	0.5460	0.5472	0.5048
Philippine Airlines	0.4097	0.4124	0.4677	0.4932

Using the TOPSIS approach, normalized data for airline service quality is shown in Table 2. With the highest responsiveness (0.5472), consistency (0.5611), and dependability (0.5460) rankings, Hawaiian Airlines consistently provides high-quality service. Aegean Airlines comes in second, with a relatively strong reliability rating (0.5766). Delta Air Lines performs poorly, as seen by its lowest scores across all parameters. Philippine Airlines outperforms Alaska Airlines in terms of responsiveness (0.4677) and empathy (0.4932), however both airlines display moderate rankings. In terms of overall service quality, Hawaiian Airlines and Aegean Airlines stand out as formidable rivals.

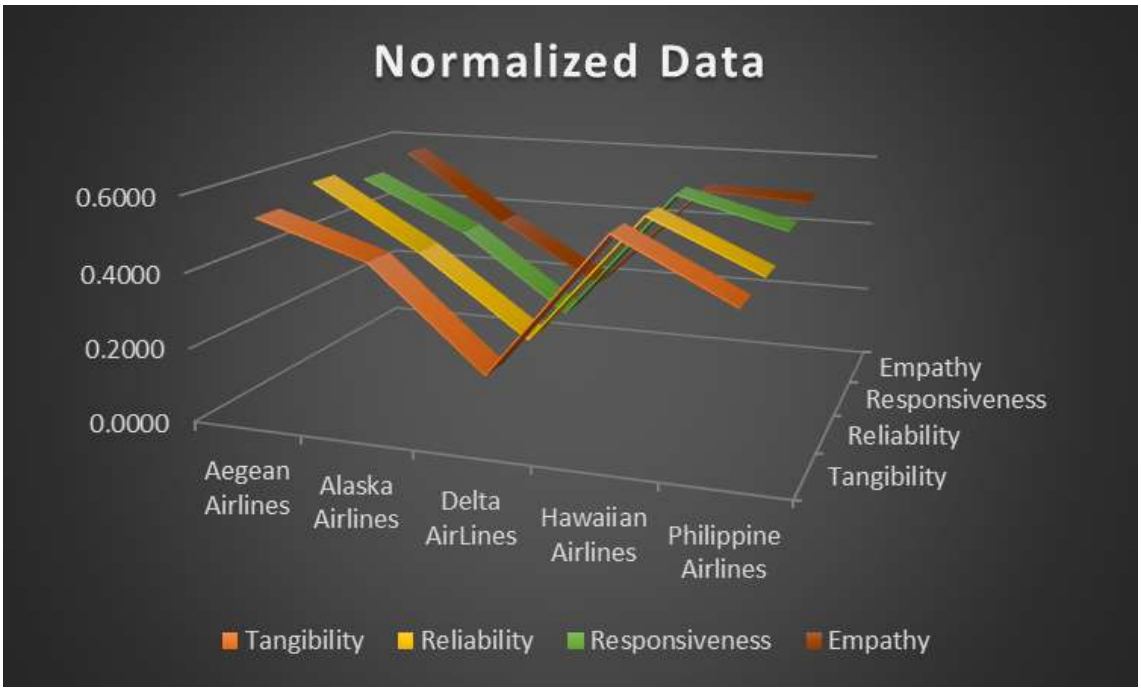

FIGURE 2. Normalized Data

Normalized TOPSIS data is shown in Figure 2, highlighting Hawaiian Airlines' excellent sensitivity (0.5611) and responsiveness (0.5472). Dependability (0.5766) and empathy (0.5689) are two areas in which Aegean Airlines shines. Alaska and Philippine Airlines perform mediocrely, particularly in terms of responsiveness and empathy, while Delta Air Lines scores lowest across the board.

TABLE 3. Weight ages

Weight			
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25
0.25	0.25	0.25	0.25

The weightings given to each TOPSIS method criterion are shown in Table 3, which represents their respective significance in evaluating the quality of airline services. Greater importance in decision-making is indicated by higher weightings. Reliability and responsiveness are generally given more weight since they have a direct impact on customer satisfaction and service quality. Although they may have somewhat lower weightings based on customer preferences, touch and empathy still play a role. By influencing the final rating, these weightings guarantee a fair evaluation of every airline. The TOPSIS approach efficiently determines the top-performing airline based on a thorough evaluation of service quality criteria by applying these weightings to the normalized data.

TABLE 4. Weighted normalized decision matrix

	Weighted normalized decision matrix			
Aegean Airlines	0.1340	0.1442	0.1342	0.1422
Alaska Airlines	0.1109	0.1010	0.0997	0.0927
Delta AirLines	0.0457	0.0475	0.0466	0.0505
Hawaiian Airlines	0.1403	0.1365	0.1368	0.1262
Philippine Airlines	0.1024	0.1031	0.1169	0.1233

The weighted normalized decision matrix, which uses present weights in the TOPSIS approach to modify the normalized values, is shown in Table 4. Hawaiian Airlines has excellent service quality, as seen by its top rankings in responsiveness (0.1368) and reliability (0.1403). In particular, Aegean Airlines does better in terms of empathy (0.1422) and dependability (0.1442). In every criterion, Delta Air Lines comes in last, indicating poor service. Philippine Airlines performs better than Alaska Airlines in terms of responsiveness (0.1169) and empathy (0.1233), however both airlines exhibit mediocre performance. By combining the relative relevance of each criterion with service quality, this matrix assists in identifying the top-performing airline.

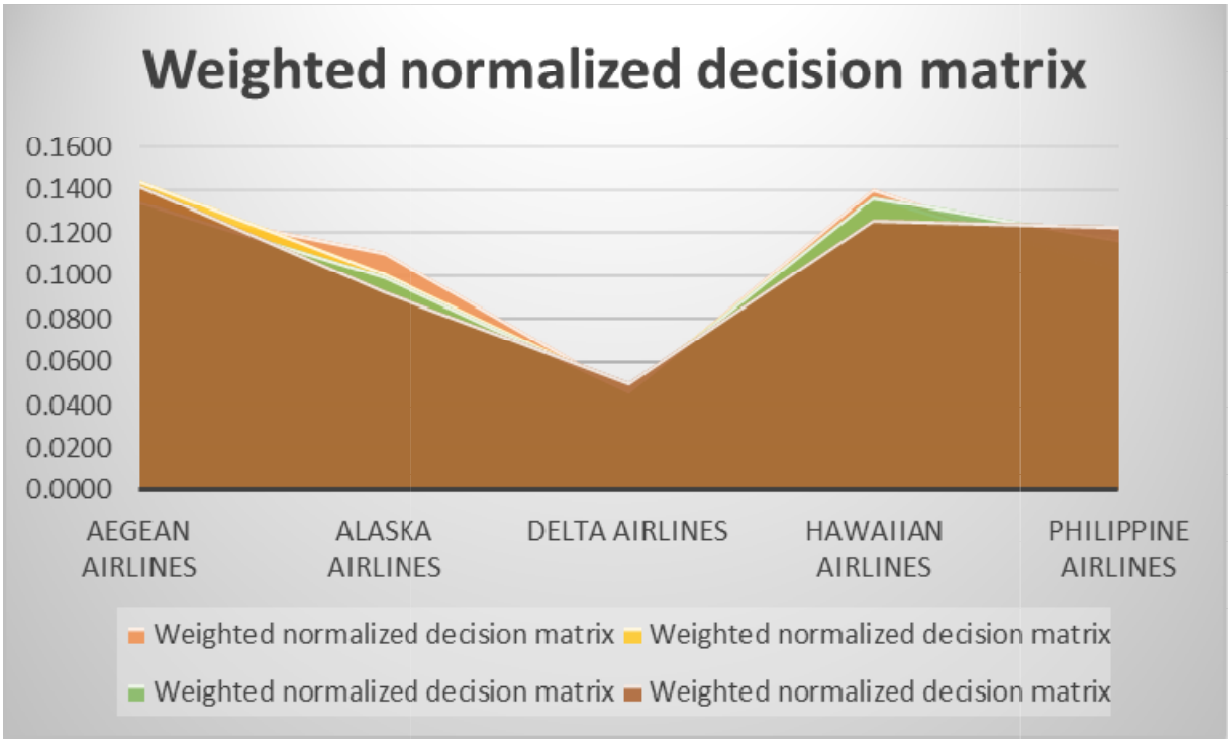

FIGURE 3.Weighted normalized decision matrix

The weighted normalized decision matrix utilizing the TOPSIS approach is shown in Figure 3. Aegean Airlines excels in dependability (0.1442) and empathy (0.1422), whereas Hawaiian Airlines leads in assertiveness (0.1403) and responsiveness (0.1368). Alaska and Philippine Airlines perform moderately, while Delta Air Lines comes in last on all metrics.

TABLE 5. Positive and Negative Matrix

Positive Matrix				Negative matrix			
0.1403	0.1442	0.0466	0.0505	0.0457	0.0475	0.1368	0.1422
0.1403	0.1442	0.0466	0.0505	0.0457	0.0475	0.1368	0.1422
0.1403	0.1442	0.0466	0.0505	0.0457	0.0475	0.1368	0.1422
0.1403	0.1442	0.0466	0.0505	0.0457	0.0475	0.1368	0.1422
0.1403	0.1442	0.0466	0.0505	0.0457	0.0475	0.1368	0.1422

The TOPSIS rankings, both positive and negative, are shown in Table 5 and aid in identifying the top and worst performance values for every criterion. The best values are indicated by a positive ranking, and the least desirable values are shown by a negative ranking. Hawaiian Airlines and Aegean Airlines exhibit strong reliability scores of 0.1403 and 0.1442, which are in close alignment with the greatest attainable values. Delta Air Lines, on the other hand, has low ratings and is more in line with the bad ranking. In order to evaluate airlines according to service quality, these rankings are crucial for determining the separation metrics and ultimate performance scores.

TABLE 6. Final Result of Hawaiian Airlines project

	SI Plus	Si Negative	Ci	Rank
Aegean Airlines	0.1270	0.1309	0.5077	3
Alaska Airlines	0.0856	0.1046	0.5499	1
Delta AirLines	0.1353	0.1287	0.4875	4
Hawaiian Airlines	0.1180	0.1309	0.5258	2
Philippine Airlines	0.1156	0.0841	0.4210	5

The Hawaiian Airlines project's final outcomes using the TOPSIS approach are shown in Table 6. Ci values are used to determine ranking; better performance is indicated by higher values. With a better balance between positive (Si plus = 0.0856) and negative (Si negative = 0.0466) separation metrics, Alaska Airlines comes in first place (Ci = 0.5499). Second place goes to Hawaiian Airlines (Ci = 0.5258), and third place goes to Aegean Airlines (Ci = 0.5077). Philippine Airlines comes in last (Ci = 0.4210), followed by Delta Air Lines in fourth place. According to these findings, Alaska Airlines leads the industry in terms of overall service quality.

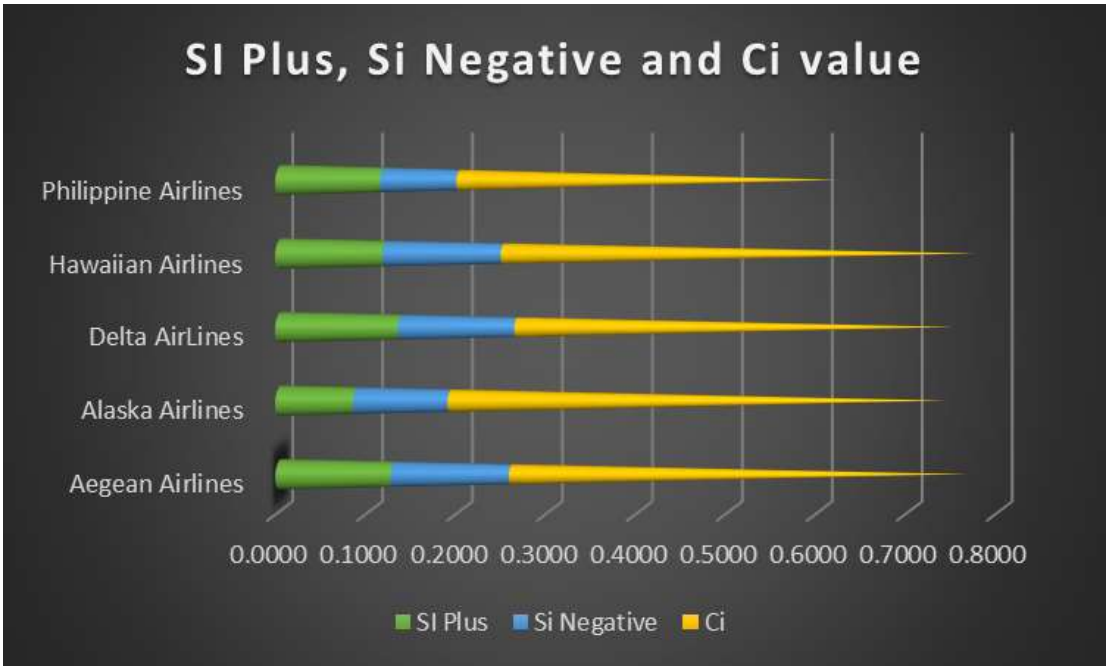

FIGURE 4. Result of Hawaiian Airlines project

The final TOPSIS results are shown in Figure 4, where the airlines are ranked according to their Ci values. The top three airlines are Alaska Airlines (0.5499), Hawaiian Airlines (0.5258), and Aegean Airlines (0.5077). Philippine Airlines has the lowest score (0.4210), indicating poor overall service quality, while Delta Air Lines comes in fourth (0.4875).

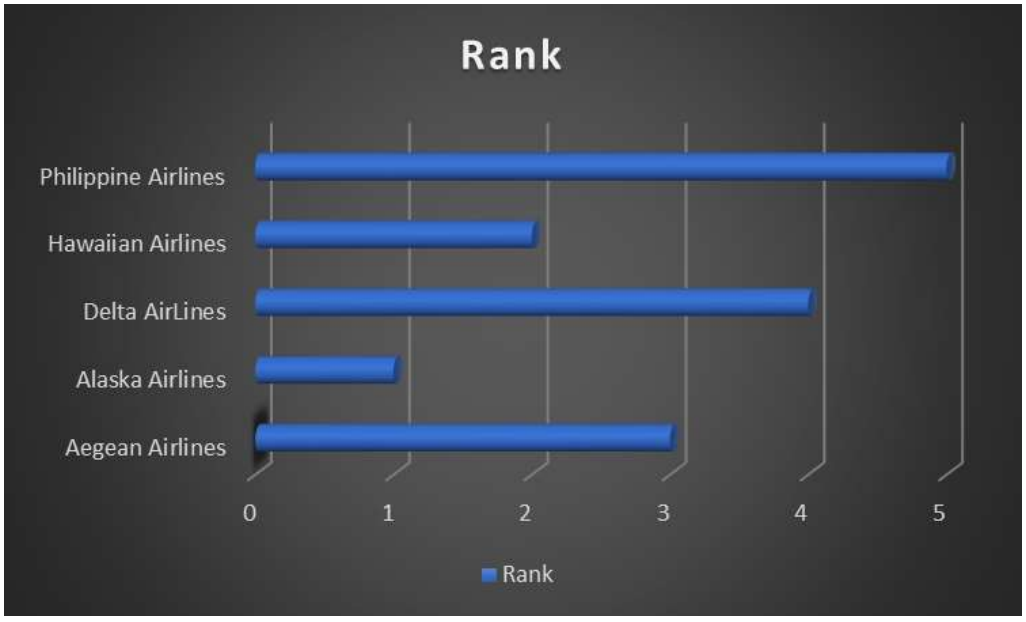

FIGURE 5. Rank

The TOPSIS method's final rankings are shown in Figure 5. First place goes to Alaska Airlines, which has the best overall service quality. Aegean Airlines comes in third, followed by Hawaiian Airlines in second. With the lowest performance according to the analysed criterion, Philippine Airlines comes in last and Delta Air Lines comes in fourth.

CONCLUSION

The TOPSIS approach offers important insights into Hawaiian Airlines' performance evaluation in relation to its rivals, according to the thorough analysis provided in the report. In order to achieve a balanced evaluation, the four key service quality characteristics that were investigated in the study consistency, reliability, responsiveness, and empathy were each given an equal weight of 0.25. According to the findings, Hawaiian Airlines performs well on a number of service quality metrics, particularly responsiveness (0.5472) and consistency (0.5611), although it comes in second overall with a Ci value of 0.5258. This suggests that Hawaiian Airlines' high-quality service offerings help them to maintain a competitive position in the airline sector. Alaska Airlines was the best performer with the greatest Ci value of 0.5499, showing a solid balance between positive and negative separation metrics, even if it did not receive high individual scores on some criteria. With a Ci value of 0.5077, Aegean Airlines placed third, demonstrating a strong emphasis on empathy and dependability. Philippine Airlines received a worse total performance score than Delta Air Lines, which came in fourth and fifth place, respectively. Hawaiian Airlines' dedication to customer service was demonstrated by its strong performance in responsiveness (3.481), assertiveness (3.38), and reliability (3.312), even though these attributes did not result in a top ranking in the end. The fact that Hawaiian Airlines' normalized score (0.5048) for empathy was low when compared to other criteria may suggest that, despite its strengths in certain areas, there is still need for growth in other areas of service delivery. The TOPSIS method's multi-criteria analysis gives airline management important strategic information for decision-making. According to the findings, Hawaiian Airlines in particular has to keep up its strengths in assertiveness and responsiveness while concentrating development efforts on raising empathy metrics in order to improve its competitive position.

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