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Research on key factors of travel agency website service quality

Han-Chen Huang*

Department of Tourism and MICE, Chung Hua University, Hsinchu city, Taiwan.

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Abstract

In the internet environment of e-commerce, website operators need to focus on meeting customer needs and increasing consumption opportunities. A company's success on an online platform depends not only on the quality of its products or services but also on various factors such as website design, user experience, and service quality. This study utilizes the Analytic Network Process (ANP) to construct a hierarchical framework for evaluating the service quality of travel agency websites. First, relevant literature was reviewed to identify evaluation criteria covering multiple dimensions of website service quality, including website design, functionality, usability, security, and customer service responsiveness. Next, questionnaires were administered to industry experts to collect professional opinions and establish the hierarchical framework. The Interpretive Structural Modeling (ISM) method was used to explore the interrelationships among these elements, understanding how they interact and influence each other. Finally, ANP was employed to determine the weight of each element. The results show that the most important aspect of travel agency website service quality is "transaction security," with a weight of 0.3820, indicating that users have very high expectations for website security. The least important aspect is "website design," with a weight of only 0.1679, suggesting that users place less emphasis on the visual presentation of the website and more on its security and usability.

Keywords: Service Quality; Website Design; Competitive Advantage

1. Introduction

With the rapid development of information technology, the internet has become an indispensable tool in people's work and life due to its convenience and widespread application in information, communication, and multimedia entertainment [1]. As the World Wide Web becomes more ubiquitous, major enterprises are increasingly aiming to improve customer satisfaction and build strong customer relationships through information technology [2, 3]. Consequently, many companies are dedicated to developing their e-commerce websites and enhancing their existing information systems with web interfaces to attract customer browsing and usage [4, 5]. Additionally, the proliferation of social media, mobile applications, and cloud services drives enterprises to continually innovate and provide more diverse and personalized services [6, 7]. As customer needs evolve and technology advances rapidly, businesses must continually adapt to new challenges and opportunities. In the future, companies should focus more on the application of data analytics and artificial intelligence (AI) to better understand customer needs and offer more targeted services [8, 9]. Moreover, ensuring user privacy and data security will be crucial for gaining customer trust in the online environment [10, 11].

The comprehensive application of these factors will help businesses maintain a competitive edge in the digital age. Compared to traditional brick-and-mortar services, online service platforms have the advantage of allowing users to easily switch to other relevant websites with just a click, making it easier to compare product information and service quality across different platforms to decide whether to use them. According to Jain et al., [12], the unique economic model of e-commerce operations makes customer loyalty even more critical. Acquiring customers on the internet is

* Corresponding author: Han-Chen Huang

costly, and without continued engagement and repeat purchases, profitability is difficult to achieve. Establishing habitual usage can help maintain loyal relationships with existing customers, effectively reducing company costs and increasing profits to maximize profitability [13, 14]. Therefore, identifying the key factors influencing online service quality to enhance customer browsing and consumption with minimal cost and boost market competitiveness has become an important issue. This study aims to address this by employing methods such as questionnaires, Interpretive Structural Modeling (ISM), and the Analytic Network Process (ANP) to construct a set of evaluation criteria for assessing the quality of travel agency website designs. These criteria encompass multiple dimensions of website service quality, including website design, functionality, usability, security, and customer service responsiveness [15]. The goal is to identify the most critical factors for improving the service quality of travel agency websites. The research results will provide specific references for companies in designing and optimizing their websites, helping them stand out in the highly competitive market.

2. Literature Review

2.1. Service Quality

Service quality refers to a provider's ability to consistently meet or exceed customer expectations, which is a critical source of competitive advantage for businesses. It is typically defined as the customer's perception of the service, based on their actual experience compared to their prior expectations [16, 17]. Enhancing service quality is a crucial factor in a company's competitiveness and requires systematic strategies and ongoing efforts. Through in-depth research and practice, companies can continuously improve their service levels to meet customer needs and gain an edge in the market. According to the SERVQUAL model proposed by Parasuraman, Zeithaml, and Berry, service quality comprises five dimensions [16, 18].

- Reliability: The ability to perform the promised service accurately and dependably.
- Responsiveness: The willingness to help customers and provide prompt service.
- Assurance: The knowledge, courtesy, and trustworthiness exhibited by employees.
- Empathy: Providing caring and individualized attention to customers.
- Tangibles: The physical evidence of the service, such as facilities, equipment, and the appearance of personnel.

The SERVQUAL scale is a widely used tool for measuring service quality. This scale assesses the gap between customer expectations and their actual perceptions across the five dimensions (Reliability, Responsiveness, Assurance, Empathy, Tangibles) through surveys. Companies can enhance their service quality through various strategies [19, 20, 21], including:

- Employee Training: Improving employees' professional knowledge and service skills.
- Enhanced Communication: Establishing effective customer feedback mechanisms to address and resolve issues promptly.
- Process Optimization: Improving efficiency and accuracy through process improvements and technology.
- Personalized Services: Offering customized service solutions to meet different customer needs and increase satisfaction.

2.2. Online Service Quality

Online service quality refers to the ability of e-commerce platforms to meet or exceed customer expectations during service delivery, which is especially crucial in the digital age [22]. Unlike traditional services, online services must provide consistent and efficient experiences in a virtual environment, significantly impacting a company's competitive advantage. Online service quality is defined by customers' perceptions based on their actual experience compared to their expectations. Various tools and methods can measure online service quality, including [23, 24, 25, 26, 27]:

- E-SERVQUAL Scale: An extension of the traditional SERVQUAL model tailored to online service characteristics, assessing the gap between customer expectations and actual perceptions.
- Surveys: Collecting customer feedback to evaluate website performance across various service quality dimensions.
- Data Analysis: Using website analytics tools (such as Google Analytics) to monitor site performance, user behavior, and satisfaction indicators.

Companies can enhance their online service quality through the following strategies:

- **Website Design Optimization:** Improving interface design, navigation structure, and content presentation to enhance user experience.
- **Technological Upgrades:** Using the latest technologies and security measures to ensure website stability and security.
- **Customer Support:** Providing 24/7 online customer service to address issues and needs promptly.
- **Personalized Services:** Offering customized recommendations and services based on customer preferences and historical data.
- **Data Protection:** Ensuring the full protection of customer personal information and transaction data to build trust.

2.3. Key Aspects of Travel Agency Website Design

Key aspects of a travel agency website design include [28, 29, 30, 31, 32]:

- **Homepage Design and User Experience:** Using high-quality photos and videos, intuitive navigation, fast loading times, and showcasing brand image.
- **Content Quality and Search Functionality:** Providing detailed travel packages, customer reviews, and robust search features.
- **Security and Privacy Protection:** Implementing SSL encryption, secure payment gateways, strong password policies, multi-factor authentication, and regular security checks.
- **Customer Service and Interaction:** Offering multiple contact methods, real-time customer support, FAQs, personalized advice, gathering customer feedback, and providing after-sales service.
- **Multilingual and Social Media Integration:** Supporting multiple languages and integrating social media to encourage user sharing and interaction.
- **Employee Training and Security Awareness:** Conducting security awareness training and developing emergency response plans.
- **Website Performance Optimization:** Speeding up load times and compressing images and files.
- **Mobile Compatibility:** Using responsive design to ensure the site displays well on various devices.
- **Website Accessibility:** Adhering to accessibility design principles, including clear labels, keyboard navigation, and color contrast.
- **Timely Updates and Maintenance:** Regularly updating content, monitoring site performance, and fixing technical issues.
- **Data Analysis and Optimization:** Using analytics tools to track user behavior and adjusting content and features based on data.
- **Continuous Improvement and Innovation:** Analyzing competitors, understanding industry trends, and launching new features and services.

3. Research Methods

3.1. Interpretive Structural Modeling (ISM)

Interpretive Structural Modeling (ISM) is a structured modeling technique introduced by Warfield [33] in 1976. It utilizes graph theory and hierarchical directed graphs to describe the sequential and logical relationships among target elements, transforming abstract element orders into concrete and comprehensive hierarchical diagrams. This model effectively clarifies the interrelationships among elements, turning complexity into organized structures. ISM involves systematic steps, including identifying relevant elements, establishing interrelationship matrices, and generating directed graphs and hierarchical structure diagrams. ISM has various applications, such as policy making, management decision-making, technology planning, and system design. Its advantage lies in providing clear visual models that facilitate decision-makers' understanding and analysis. ISM helps identify and analyze key factors, revealing their interdependencies and influences, and it can be combined with other analytical methods to enhance accuracy and reliability [34, 35].

3.2. Analytic Network Process (ANP)

The Analytic Network Process (ANP), proposed by American operations research expert Thomas L. Saaty [36] in 1996, is a multi-criteria decision-making method that addresses the complexity and interdependencies in decision-making

processes. Unlike the traditional Analytic Hierarchy Process (AHP), ANP considers both the hierarchical structure of decision elements and their mutual influences and feedback effects. The basic concepts and steps of ANP are as follows:

- Construct Decision Network Model: Identify the decision problem, decision goals, criteria, sub-criteria, and alternatives, and establish the network structure diagram.
- Establish Comparison Matrix: Determine the importance of each element through pairwise comparisons and fill in the comparison matrix.
- Calculate Super matrix: Organize the weights from the comparison matrix into a super matrix, including the interrelationships among all decision elements.
- Solve Weight Vector: Normalize the super matrix and iterate to calculate the stable weight vector.
- Comprehensive Weight Evaluation: Perform a comprehensive evaluation of the alternatives based on the weights to determine the optimal solution.

ANP has broad applications in various fields, including business management, policy formulation, technology selection, risk assessment, and resource allocation. Its main advantage is the consideration of interdependencies among elements, enabling the handling of complex system decision-making problems. Additionally, ANP can be combined with other decision analysis methods to improve analysis accuracy and reliability, providing comprehensive decision support for decision-makers.

4. Empirical Verification

This study aims to identify and prioritize the key factors of travel website service quality using the ANP model for validation. Through Interpretive Structural Modeling (ISM) and expert interviews, critical dimensions and criteria were identified, and the ANP was utilized to calculate the priority of service quality dimensions and criteria. The steps are as follows:

4.1. Constructing Problem Hierarchy and Dependency Model

The study gathered extensive literature on online service quality and, through analysis, identified the main dimensions and specific criteria of travel website service quality. Experts with over ten years of experience were interviewed, confirming four main dimensions: "Website Design," "Customer Service Design," "Website Information Content," and "Transaction Security," with a total of 14 criteria under these dimensions (Figure 1).

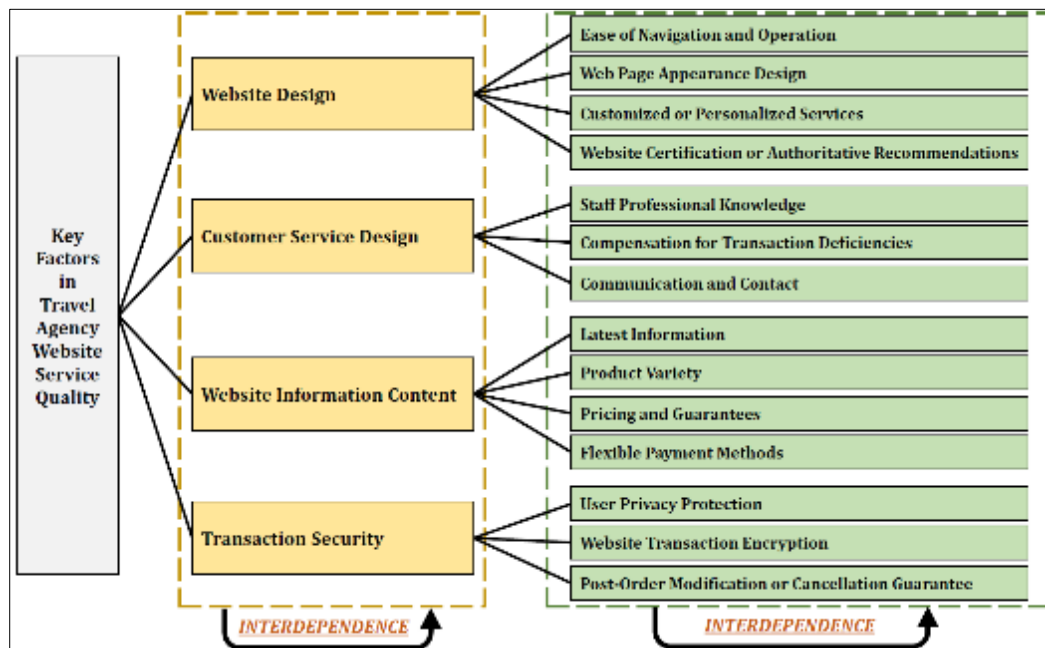


Figure 1 Hierarchy Structure of Service Quality in Travel Websites

4.2. ISM and ANP

After consolidating expert opinions, a hierarchical structure diagram for travel website service quality was constructed. To align more closely with the nature of decision-making issues, a second-phase expert questionnaire was conducted for ISM analysis, establishing dependency and feedback relationships among the criteria.

- Step 1: Structural Self-Interaction Matrix (SSIM), Initial and Final Reachability Matrix (RM), Establish the initial reachability matrix and then include transitivity relationships to construct the final reachability matrix, revealing the interdependencies and feedback among criteria.
- Step 2: Constructing Pairwise Comparison Matrix and Calculating Eigenvalues and Eigenvectors: The values in the pairwise comparison matrix reflects subjective judgments by decision-makers, who may find it challenging to achieve consistency due to numerous levels and factors. Saaty [36, 37] suggested using the Consistency Index (CI) and Consistency Ratio (CR) to test for consistency and avoid contradictions.

Consistency Index (CI): Calculated using the formula $CI = (\lambda_{max} - n) / (n - 1)$, where $CI = 0$ indicates perfect consistency, and $CI > 0.10$ suggests inconsistency, requiring re-evaluation. Saaty (36) recommended $CI \leq 0.10$ as acceptable.

Consistency Ratio (CR): CR is calculated as $CR = CI / RI$, where RI is the Random Index [36], dependent on the matrix size. A $CR \leq 0.1$ indicates acceptable consistency in the matrix's evaluation values.

The study then presented the pairwise comparison matrix for travel website service quality dimensions (Table 1) and relative weight comparison matrices for each dimension (Tables 2 to Table 5).

- Step 3: Constructing the Super matrix and Algorithmic Dimension and Criterion Weight Table: The calculation process of the ANP method involves three matrices: the unweighted super matrix, the weighted super matrix, and the limit super matrix. After the operation of limit super matrix integration, according to the convergence values presented by the limit super matrix, the obtained weights correspond to each criterion. The weight table of dimensions and criteria in this study is shown in Table 6.

Table 1 Pairwise Comparison Matrix for Dimensions of Travel Website Service Quality

Dimensions	Website Design(A)	Customer Service Design (B)	Website Information Content (C)	Transaction Security (D)	Description
Website Design (A)	1	1.1388	0.3611	0.5571	$\lambda_{max} = 4.1904$ C.I.=0.0634 C.R.=0.0705 n=4 R.I.=0.9
Customer Service Design (B)	0.8780	1	1.1722	0.4265	
Website Information Content (C)	2.7693	0.8530	1	0.5541	
Transaction Security (D)	1.7948	2.3442	1.8045	1	

Table 2 Pairwise Comparison Matrix for Website Design (A) Dimension

Criteria	Ease of Navigation and Operation (A1)	Web Page Appearance Design (A2)	Customized or Personalized Services (A3)	Website Certification or Authoritative Recommendations (A4)	Description
Ease of Navigation and Operation(A1)	1	2.1666	0.3333	0.557	$\lambda_{max}=4.1967$ C.I.=0.0655 C.R.=0.0728 n=4 R.I.=0.9
Web Page Appearance Design (A2)	0.4615	1	0.4222	0.3670	
Customized or Personalized Services (A3)	3.0001	2.3685	1	0.4800	
Website Certification or Authoritative Recommendations (A4)	1.7948	2.7243	2.0829	1	

Table 3 Pairwise Comparison Matrix of Customer Service Design (B) Dimension

Criteria	Staff Professional Knowledge (B1)	Compensation for Transaction Deficiencies (B2)	Communication and Contact (B3)	Description
Staff Professional Knowledge (B1)	1	0.875	1	$\lambda_{max}=3.0019$ C.I.=0.0009 C.R.=0.0016 n=3 R.I.=0.58
Compensation for Transaction Deficiencies (B2)	1.1428	1	1.3055	
Communication and Contact (B3)	1	0.7659	1	

Table 4 Pairwise Comparison Matrix of Website Information Content (C) Dimension

Criteria	Latest Information (C1)	Product Variety (C2)	Price and Guarantee (C3)	Flexible Payment Methods (C4)	Description
Latest Information (C1)	1	1.8333	1.1388	0.6944	$\lambda_{max}=4.2500$ C.I.=0.0833 C.R.=0.0926 n=4 R.I.=0.9
Product Variety (C2)	0.5454	1	0.4777	1.4722	
Price and Guarantee (C3)	0.8780	2.0930	1	2.3888	
Flexible Payment Methods (C4)	1.4400	0.6792	0.4186	1	

Table 5 Pairwise Comparison Matrix of Transaction Security (D) Dimension

Criteria	User Privacy Protection (D1)	Website Transaction Encryption (D2)	Post-Order Modification or Cancellation Guarantee (D3)	Description
User Privacy Protection (D1)	1	1.41667	1.0555	$\lambda_{\max} = 3.0481$ C.I.=0.0240 C.R.=0.0415 n=3 R.I.=0.58
Website Transaction Encryption (D2)	0.7058	1	1.4375	
Post-Order Modification or Cancellation Guarantee (D3)	0.9473	0.6956	1	

Table 6 Weight Table of Evaluation Dimensions and Evaluation Criteria

Dimensions	Weight	Ranking	Criteria	Criterion Weight	Total Weight	Ranking
Website Design (A)	0.1679	4	Ease of Navigation and Operation (A1)	0.1852	0.0311	13
			Web Page Appearance Design (A2)	0.1144	0.0192	14
			Customized or Personalized Services (A3)	0.3066	0.0515	11
			Website Certification or Authoritative Recommendations (A4)	0.3938	0.0661	7
Customer Service Design (B)	0.1905	3	Staff Professional Knowledge (B1)	0.3173	0.0605	8
			Compensation for Transaction Deficiencies (B2)	0.3791	0.0722	5
			Communication and Contact (B3)	0.3036	0.0578	9
Website Information Content (C)	0.2597	2	Latest Information (C1)	0.2715	0.0705	6
			Product Variety (C2)	0.1855	0.0482	12
			Pricing and Guarantees (C3)	0.3400	0.0883	4
			Flexible Payment Methods (C4)	0.2030	0.0527	10
Transaction Security	0.3820	1	User Privacy Protection (D1)	0.3781	0.1444	1

(D)		Website Transaction Encryption (D2)	0.3330	0.1272	2
		Post-Order Modification or Cancellation Guarantee (D3)	0.2890	0.1104	3

The research results indicate that in terms of the quality of service provided by travel websites, the most important dimension is "Transaction Security," with a weight value of 0.3820, suggesting that users have extremely high expectations for website security. Following this is "Website Information Content," with a weight value of 0.2597. The weight values for "Customer Service Design" and "Website Design" are 0.1905 and 0.1679 respectively, indicating that users prioritize security and practicality over the visual presentation of the website.

Regarding specific evaluation criteria, "User Privacy Protection" and "Website Transaction Encryption" rank at the top with weight values of 0.1444 and 0.1272 respectively, further emphasizing the importance of transaction security to users. "Post-Order Modification or Cancellation Guarantee," "Price and Guarantee," and "Compensation for Transaction Deficiencies" have weight values of 0.1104, 0.0883, and 0.0722 respectively, ranking third, fourth, and fifth. Relatively, "Product Variety," "Ease of Navigation and Operation," and "Web Page Appearance Design" are the least important criteria, with weight values of 0.0482, 0.0311, and 0.0192 respectively. In conclusion, "Transaction Security" is a key factor in enhancing the quality of service provided by travel websites, with "User Privacy Protection" being the most important specific criterion.

5. Conclusion

Based on the literature review and interpretation of the structural model, this study identified four key dimensions of service quality on travel websites, namely "Website Design," "Customer Service Design," "Website Information Content," and "Transaction Security." Through literature collection and expert interviews, 14 evaluation criteria were identified under these dimensions. Under the dimension of "Website Design," criteria include "Ease of Navigation and Operation," "Web Page Appearance Design," "Customization or Personalized Services," and "Website Certification or Authority Recommendations." Under "Customer Service Design," criteria include "Staff Professional Knowledge," "Compensation for Transaction Deficiencies," and "Communication and Contact." Under "Website Information Content," criteria include "Latest Information," "Product Variety," "Price and Guarantees," and "Flexible Payment Methods." Under "Transaction Security," criteria include "User Privacy Protection," "Website Transaction Encryption," and "Post-Order Modification or Cancellation Guarantee."

The research results indicate that the most important dimension in the service quality of travel websites is "Transaction Security," with a weight value of 0.3820, demonstrating users' high expectations for website security. Following this is "Website Information Content," with a weight value of 0.2597. The weight values for "Customer Service Design" and "Website Design" are 0.1905 and 0.1679 respectively, indicating that users prioritize security and practicality over the visual presentation of the website.

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