EVALUATION OF TOURISM WEBSITE ADOPTING DESTINATION MANAGEMENT SYSTEMS (DMS) FROM THE LOCAL ENTERPRISE PERSPECTIVE: A CASE STUDY OF DA NANG CITY

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Abstract - With the remarkable advancement of Information Technology (IT) and the Internet, IT applications have been widely integrated into various fields, particularly tourism. This evolution compels local tourism enterprises, especially small and medium enterprises (SMEs), to adopt technological innovations such as Destination Management Systems (DMS). However, research on DMS adoption in Vietnam, particularly in Da Nang, remains limited. This study employs quantitative methods, collecting data from 219 local enterprises and analyzing it using the Importance-Performance Analysis (IPA) matrix. The aim is to evaluate the significance and performance of the DMS website (danangfantasticity.com) across seven dimensions. Findings reveal that certain features are missing from the platform, while others exist but do not meet the expectations of local enterprises. Based on these results, the study proposes several managerial implications for improving the DMS-based tourism website in Da Nang.

Key words - Small and Medium Tourism Businesses (SMTB); Tourism; Da Nang destination; IPA matrix; Destination management system (DMS)

1. Introduction

The impact of IT on the tourism industry is evident and has proven to be a crucial tool in an information-intensive industry [1]. The Internet and IT/IS innovation have provided tourism organizations with new opportunities to enhance their communication processes while reducing search and distribution costs [2]. The United Nations Conference on Trade and Development (UNCTAD) [3] has emphasized the potential of electronic tourism (e-tourism) in unlocking untapped opportunities for economic development, particularly in developing countries. If such opportunities are effectively seized, they can contribute substantially to the growth and competitiveness of the tourism sector. However, in the context of increasingly intense digital competition, it remains unclear whether small and medium-sized tourism enterprises are truly harnessing this potential, leading to risks of wasted investment and reduced competitiveness.

One of the most significant technological applications in tourism is the Destination Management System (DMS). These integrated systems facilitate the distribution of tourism products through various digital channels, typically within a specific geographical area. DMSs are designed to support the work of Destination Management Organizations (DMOs), offering a comprehensive, customer-centric approach to managing and marketing destinations [4]. They provide real-time booking services, destination information, and tools for managing tourism, particularly benefiting small- and medium-sized tourism providers [5]. However, the actual application level and effectiveness of DMS-oriented websites have not been evaluated, creating an information gap for both academia and practice.

Despite the ambition of many tourist destinations to deliver a holistic and seamless visitor experience, the industry remains fragmented, mainly due to the dominance of SMEs [6]. Research has consistently shown that these SMEs face challenges in adopting e-business solutions, mainly due to limited resources and technological capabilities [7]. Nevertheless, their role is vital to the sector's development, necessitating greater support [8]. Therefore, a detailed analysis of how SMEs leverage DMS on their sites and why they continue to face barriers is essential to propose timely support solutions. In this context, collaborative e-marketing strategies implemented through DMSs can be especially effective in helping SMEs overcome these barriers, boosting destination visibility, facilitating online bookings, and enhancing the overall online presence of the destination [9].

Addressing the digital gap among tourism SMEs is essential, as it directly affects service quality and resource optimization across the sector. It is particularly relevant to emerging destinations like Da Nang City, which has gained a reputation as one of Vietnam's top tourist cities. Known for its cultural richness, international connectivity, and strong branding as a “city worth living," Da Nang has been praised as a safe and welcoming destination [10]. Its tourism sector has become a key driver of economic development, contributing to employment and improved quality of life for residents. However, similar to many developing destinations, Da Nang still faces several challenges, such as a heavy reliance on SMEs, underdeveloped human resources, and limited digital infrastructure [11]. Moreover, SMEs account for over 97% of enterprises, contribute 45% of GDP, and provide about 60% of employment in Da Nang [12], further underscoring the critical role they play in the local economy and the importance of enhancing their digital capabilities via DMS. Given that Da Nang is a dynamic destination yet still faces significant digitalization challenges, this study focuses on evaluating DMS here to derive lessons applicable to similar localities.

In light of these challenges, DMSs in less developed regions often differ in scope and functionality compared to those in more advanced economies, particularly lacking transactional features such as booking and payment tools due to contextual limitations [13]. However, they still play an essential role in simplifying marketing and transactions. Da Nang has proactively implemented digital solutions, supported by national policies such as Resolution No. 08-NQ/TW and Directive No. 16/CT-TTg [10], with the launch of danangfantasticity.com in 2015, serving as a central platform for tourism promotion.

Measuring and improving the performance of this website is crucial. A Destination Management System (DMS) that functions effectively enables SMEs to participate in digital markets by increasing their online visibility and access to customers, particularly in resource-constrained environments [5, 2]. Moreover, the platform must meet the expectations of stakeholders- including local businesses, policymakers, and tourists- by providing accurate information, seamless booking processes, and promotional tools that support destination competitiveness [14, 15]. Without systematic assessment, such systems risk inefficiencies, poor user satisfaction, and missed opportunities for sustainable development.

From a theoretical perspective, limited research exists on evaluating DMS performance in Vietnam, particularly in the context of Da Nang. Moreover, few practical tools have been applied to tackle this issue effectively. In this regard, Importance-Performance Analysis (IPA), first introduced by Martilla and James [16], provides a strategic management approach to service evaluation by identifying gaps between perceived importance and actual performance of service attributes [17]. In tourism studies, IPA has proven useful in assessing both destination management tools [14] and digital platforms [15], offering a simple yet effective visual framework for prioritizing improvements based on stakeholder perceptions.

Given the pressing challenges that SMEs face in emerging destinations, applying IPA not only addresses the research gap but also offers a context-specific framework for improving local digital capacity. Compared to more complex analytical models, IPA is particularly suited for destinations like Da Nang, where practical decision-making and resource prioritization are essential. Its ability to translate survey data into actionable insights makes it relevant for both academics and practitioners. In particular, evaluating the website's compatibility with the strategic objectives of destination management provides critical insights into how the digital platform can be improved to support promotional efforts, optimize resource allocation for SMEs, and enhance the overall visitor experience. This evaluation process is also instrumental in informing destination management strategies and promoting sustainable development. By focusing on SMEs, which are often constrained by limited resources and technological capacity, this study further emphasizes how DMS improvements can empower local businesses and foster inclusive growth in the tourism sector.

Recent studies have also validated and expanded upon the utility of IPA in tourism-related contexts. For instance, Botezat et al. [15] developed an Improved IPA (IIPA) framework to enhance decision-making by focusing on key destination attributes, including websites, thus optimizing resource allocation and marketing efforts. Similarly, Rašovská et al. [18] applied IPA to destination management by identifying improvement priorities to enhance visitor experiences; Simpson et al. [19] used IPA to inform visitor management strategies at marine wildlife tourism destinations; and Kokkhangplu & Kaewnuch [20] utilized IPA to assess tourism components in Southern Thailand, offering practical suggestions for more effective destination governance. These studies underscore IPA's adaptability and effectiveness in guiding digital and strategic enhancements within the tourism sector.

In summary, this study used SPSS 27.0 to conduct an Importance-Performance Analysis (IPA); this study evaluates the DMO-managed website danangfantasticity.com, a DMS-oriented platform, from the perspective of local SMEs. By plotting attribute importance versus actual performance on an IPA matrix, the study categorizes system features into priority quadrants-identifying key features to add or improve, and core strengths to maintain. These data-driven insights enable DMO managers to strategically allocate resources and design targeted capacity-building and technical assistance programs to encourage SME engagement and help them overcome resource-related barriers to technology adoption. By enhancing SME participation and tailoring the platform development process to the needs of stakeholders, this study provides a practical foundation for strengthening Da Nang's digital tourism infrastructure, thereby strengthening the city's competitiveness in a rapidly changing tourism landscape.

2. Literature Review

2.1. Concept of DMS

Destination management activities have evolved significantly over time [21, 22, 23, 24]. Increased competition and blurred geographical boundaries among tourist destinations require tourism marketers, tourism enterprises, and DMOs to collaborate to gain a competitive advantage [25, 26]. A crucial requirement for destination management strategies is to have sufficient knowledge about their customers. DMS enables destination marketers to apply micro-marketing concepts to meet the needs and desires of tourists more accurately; furthermore, their systems are dynamic and social, allowing a destination to connect with current and potential tourists directly.

From a technical perspective, DMS serves as a central connecting tourism to various suppliers and services globally, typically online and in real-time through web services. It enables users to buy products and access tourism services offered by these suppliers, with options to tailor choices based on corporate policies and geographic location.

Based on previous research, DMS is also viewed as an integrated platform for managing and marketing

destinations, supporting DMO functions by connecting SMEs and customers [27]. DMS serves both marketing (providing information and promoting the destination) and management roles (online booking, customer data analysis, business-user relationship management). The study highlights DMS's dual role, supporting the views of Buhalis & Collins [27] and Horan & Frew [5] while incorporating the digital technology perspective of Jiang and Phoong [28]. Hence, DMS is a strategic tool that optimizes destination management through data and technology integration.

In addition, Kanazawa et al. [29] highlighted that destination website management is not only about providing comprehensive tourism information but also about fostering stakeholder collaboration and enhancing visitor engagement. This perspective aligns with the role of DMS in bridging the gap between DMOs, tourism enterprises, and end-users, emphasizing the need for continuous website optimization to enhance user experience and stakeholder participation.

2.2. Functions of DMS

A comprehensive DMS consists of four interconnected functional components, as identified by Wang and Russo [30]: a Virtual Information Space (VIS) to provide thorough and quality information about the destination; a Virtual Communication Space (VCS) to enable effective and continuous interaction with consumers; a Virtual Transaction Space (VTS) to allow the DMS to generate revenue; and a Virtual Relationship Space (VRS) to facilitate the creation of appropriate and sustainable relationship-building mechanisms with tourists.

According to Sigala [31], the primary role of DMS for tourism businesses is to act as an electronic intermediary, providing functions related to electronic distribution, electronic marketing, and electronic sales for the entire destination and tourism suppliers.

Park and Gretzel [32] conducted a review of published articles to evaluate websites approaching DMS, suggesting that nine continuous aspects appear in proposed evaluation tools for website success. Li and Wang [33], in analyzing China's official website, identified five areas. Luna-Nevarez and Hyman [34] identified 26 attributes grouped into six types. The scale conducted by Sigala [14] is chosen as it summarized and reviewed comprehensive previous research to ensure scale validity from the perspective of stakeholders when evaluating DMS performance. His study selects a research framework with 34 attributes across seven aspects, such as Cost and Benefit dimensions, Collaboration Outcomes of the DMS website, Collaboration Acceptance, Technical issues, E-commerce Functionality, Information Quality, & E-commerce Data [14].

2.3. The Importance of Creating DMS to Attract Participation from Small and Medium Tourism Businesses

Ndou and Petti [35] note that local tourism businesses often develop services individually, leading to fragmented destinations. Inter-organizational information systems (IOIS) support entire destinations in the tourism industry [36], and DMS enhances DMOs' operations and coordination with private suppliers [6]. Improved coordination through DMS combats fragmentation and promotes consistent activities [37, 35, 38]. DMS fosters collaboration among tourism stakeholders, resulting in joint products that attract demanding tourists [39, 40, 14] and allows suppliers to bypass powerful intermediaries. As a technology platform, DMS manages dynamic destinations by enabling real-time information exchange [41, 10, 42]. Estêvão et al. [43] attribute DMS failures to issues in small and medium enterprises. Thuy and Nguyen [10] identify factors hindering SMEs' participation in DMS, such as DMS awareness, business capabilities, trust in DMOs, environmental awareness, and technology factors.

3. Research Methodology

Although the importance of measuring the performance of websites approaching DMS has been acknowledged [44, 45, 10, 46], there is still limited research on this topic in the tourism field. This is a significant gap because measuring the performance of websites approaching DMS is essential for identifying and improving problems and ensuring reliability, responsibility, and commitment among all collaborating partners [5, 47, 48]. Indeed, providing information on collaborative activities for all stakeholders is vital, as stakeholders tend to have different interests, motivations, values, and perceptions of their cooperation [49, 5].

To investigate the perceptions of tourism businesses at the tourist destinations in Da Nang City and assess the performance of websites approaching DMS, the measurement will follow Sigala's approach [14]. Sigala conducted a comprehensive review of a wide range of literature to ensure content validity from the stakeholders' perspective when assessing DMS performance [14]. The measurement consists of 7 aspects representing 34 attributes measuring the performance of websites approaching DMS. Each factor includes multiple indicators addressing all the objectives that DMS access websites should fulfill. With the components and scale identified, in-depth interviews with three experts were conducted. To ensure data collection, initially, 10 target respondents were invited to answer the questionnaires, enabling the review of the clarity of the questions and ensuring that respondents understood the content correctly.

To ensure the representativeness of our sample, this study targeted a diverse range of tourism enterprises operating in Da Nang, including hotels, restaurants, and travel agencies. The sample was selected using a convenience sampling method, which, given the practical constraints of data collection, was deemed appropriate. Nonetheless, the sample closely reflects the heterogeneous nature of Da Nang’s tourism sector enterprises, which vary by size, operational focus, and market experience. Specifically, the sampling criteria ensured that only SMEs, as defined by the Government Decree of 2018, were included. According to the decree, SMEs must have been in operation for at least two years, maintain a workforce of

fewer than 100 employees, and achieve an annual revenue below the stipulated threshold. The sample size for data collection is determined according to the principle of Hair et al. [50], that is, 34 x 5 = 170. Moreover, the final dataset, comprising 219 valid responses from 230 approached enterprises, achieved a response rate of 95%, which strongly supports the reliability and representativeness of the collected data.

Additionally, demographic analysis of the respondents (e.g., age, gender, and position within the enterprise) reveals a balanced distribution, further affirming that the sample mirrors the broader population of tourism SMEs in Da Nang. According to local industry reports, the structure of our sample is consistent with the overall distribution of businesses in this sector. This comprehensive sampling approach underpins the robustness of the subsequent statistical analyses and the generalizability of the research findings.

After collecting data, the raw data was cleaned and imported to SPSS for further data analysis. Moreover, this study applies Abalo et al.'s [17], improved by Martilla and James IPA matrix grid [16], to evaluate the importance and performance of websites adopting DMS in Da Nang City. Specifically, IPA allows us to assess the gap between the importance businesses place on DMS attributes and the actual performance of the website, helping prioritize improvements. It aligns with the research goal of providing practical insights for Da Nang's DMO. To be more specific, the mean scores for each attribute were calculated. These mean values were then normalized to fit the IPA grid format with performance on the Y-axis and importance on the X-axis, as per Abalo et al. [17]. Scatterplots were drawn, the mean scores for each importance and performance metric were calculated, the median line was drawn to divide the four regions, and a diagonal line was drawn starting from (X, Y) Min to (X, Y) max to directly compare the "Importance" (Y-axis) and "Performance" (X-axis). This comprehensive approach enables more precise visualization of priority areas, ultimately supporting strategic decision-making for enhancing the digital marketing strategies of Da Nang's tourism websites.

4. Research Findings

4.1. Description of samples

Data were collected from 230 businesses, and after screening, the data from 219 firms were determined to be suitable for analysis. The majority of surveyed businesses were restaurants and hotels, accounting for 36.7% and 33.6%, respectively. The scale of companies included both small and medium enterprises, with proportions of 34% and 61%, respectively. All businesses had been operating for at least 2 years. The majority of business representatives who responded were aged between 23 and 40, accounting for 46.4%. Regarding gender, males accounted for 49%, while females accounted for 51%. Respondents with IT backgrounds accounted for 68.9%, and directors accounted for 31.1%.

4.2. Cronbach's Alpha Reliability

The Cronbach's Alpha coefficient result was 0.901 (> 0.7), indicating high reliability. For the attributes, Cronbach's Alpha coefficients ranged from 0.862 to 0.922, with all inter-item correlations > 0.3. Therefore, the measurement scales of the research variables met the criteria for reliability, with no variables being excluded.

4.3. Exploratory Factor Analysis (EFA)

Results showed that 34 attributes of the seven aspects in the proposed framework for measuring the performance of websites approaching DMS were subjected to EFA using Principal Components Analysis with Varimax rotation. The Kaiser-Meyer-Olkin (KMO) measure was 0.805, greater than 0.5, and Bartlett's Test of Sphericity had a value of 5942.167, with p = 0.000, indicating no attributes were excluded. All 34 attributes were grouped into seven principal aspects extracted at eigenvalues of 1.34. These seven principal aspects explained 72.3% of the total variance. Thus, all attributes within the seven aspects were reliable and not excluded.

4.4. Results of the seven aspects of assessing websites approaching DMS of Da Nang City.

Based on the validated evaluation framework by Sigala [14], Table 1 presents the presence/absence of attributes on websites approaching DMS of the tourism destination Da Nang as follows:

Table 1. *Result of the appearance of attributes on the website approaching DMS evaluated by businesses*

Aspects	Number of Required Attributes	Appeared	%	Not Appeared	%
1. Costs and Benefits (CP)	6	0	0	6	100
2. Collaboration Outcomes (HT)	6	6	100	0	0
3. Collaboration Acceptance (CHT)	3	3	100	0	0
4. Technical Issues (KT)	5	3	60	2	40
5. E-commerce Functionality (TM)	5	1	20	4	80
6. Information Quality (TT)	4	4	100	0	0
7. E-Commerce Data (STM)	5	2	40	3	60
Total	**34**	**19**	**56**	**15**	**44**

According to Table 1, there are 15 attributes (accounting for 44%) that have not been displayed on the DMS website of the tourism destination in Da Nang City. Three dimensions including Collaboration Outcomes, Acceptance of cooperation, and Information quality have attributes that appeared at a high level (100%) on the DMS website. The dimensions of E-commerce Functionality and E-Commerce Data have attributes appearing at low rates, 20% and 40% respectively.

4.5. Evaluation of businesses on the importance and performance of websites approaching DMS in Da Nang City

4.5.1. Costs and Benefits

The results in Table 2 indicate that all the attributes of the Cost and Benefit aspect are highly valued by tourism businesses, ranging from 4.5 to 4.8. However, based on Table 1, there are no attributes of this aspect appearing on the website approaching DMS.

4.5.2. Collaboration Outcomes:

The results show that all six tourism service attributes are considered important, rated between 4.5 and 4.8. Notably, *"Managing negative perceptions of tourists" and "Assistance in attracting tourists to more locations and longer stays"* are rated highest at 4.8. However, performance for these attributes is low, all below 3, with the lowest at 0.3 for *"Managing negative perceptions" and "Purchasing power of tourists."* The P-I discrepancy is the largest.

Table 2. *Results of attributes on the website approaching DMS evaluated by businesses*

Attribute [36]	Encode	Importance (I)	Performance (P)	Difference interval (P-I)
Cost and Benefit dimensions				
1. Number of tourist bookings from the website.	CP1	4.8	*	*
2. Revenue generated from bookings made through the website.	CP2	4.6	*	*
3. Cost per booking from the website (e.g., transaction fees/commissions).	CP3	4.7	*	*
4. Profit margin obtained compared to the investment cost for bookings on the online website.	CP4	4.8	*	*
5. Registration fee for website participation.	CP5	4.5	*	*
6. Sales promotion costs related to website participation.	CP6	4.7	*	*
Collaboration Outcomes of DMS Website				
1. Impact of the website on building and enhancing the destination brand image.	HT1	4.5	3.0	- 1.5
2. Level of online promotion and online presence of the destination.	HT2	4.7	3.0	-1.7
3. Management of any negative perceptions of tourists about the destination.	HT3	4.8	0.3	- 4.5
4. Purchasing power of tourists attracted by the website.	HT4	4.5	0.3	- 4.2
5. Number of tourists attracted to the destination by the website.	HT5	4.6	2	- 2.6
6. Assistance in attracting tourists to more locations and longer stays.	HT6	4.8	2.2	- 2.6
Collaboration Acceptance				
1. Proportion of tourism companies/organizations making bookings on the website.	CHT1	4.2	2.8	-1.4
2. Proportion of tourism companies/organizations listed on the website.	CHT2	4.3	3.1	-1.2
3. The diversity level of tourism companies/organizations listed on the website.	CHT3	4.5	2.8	-1.7
Technical issues				
1. Users can easily find the electronic portal of the website.	KT1	5	2.2	- 2.8
2. The electronic portal of the website is user-friendly.	KT2	5	3.1	- 1.9
3. Smooth execution of operations on the website.	KT3	4.6	3.2	- 1.4
4. Other information systems used in my organization are integrated with the website.	KT4	2.6	*	*
5. The Danang website is integrated with the national website of Vietnam.	KT5	4.2	*	*
E-commerce Functionality				
1. Tourists are satisfied with the information and services offered on the destination website.	TM1	4.7	*	*
2. The website features communication and interaction with tourists.	TM2	4.7	3.2	- 1.5
3. The website allows the purchase of tourism packages and the customization of tourism packages according to requests.	TM3	4.8	*	*
4. The website has a customer relationship management feature.	TM4	4.6	*	*
5. The website features providing and filtering information/features in a personalized manner.	TM5	4.3	*	*
Information Quality				
1. Website information is regularly updated.	TT1	4.6	3.6	- 1
2. Website information is high quality and unique.	TT2	4.8	3.8	- 1
3. Multilingual website information	TT3	4.5	4	- 0.5
4. Building and promoting destination content using web 2.0 tools so that tourists can interact with the destination.	TT4	4.2	3.7	- 0.5
E-commerce Data				
1. Number of online website visitors (electronic index for customer reach/attraction).	STM1	4.7	2.2	- 2.5
2. Number of registered users on the website (electronic index for customer attraction).	STM2	4.7	*	*
3. Percentage of website users making bookings (conversion electronic index).	STM3	4.7	*	*
4. User website navigation time (electronic index for attracting users to revisit the website).	STM4	4.5	2.0	- 2.5
5. The collection and analysis of data related to user profiles/ behavior on the website (an electronic index for CRM customer relationship management)	STM5	4.8	*	*

For these two attributes, at -4.5 and -4.2, respectively, while the other attributes have smaller discrepancies.

Specifically, the attributes of: "*Number of tourists attracted to the destination by the website"*, "*Assistance in attracting tourists to more locations and longer stays*", and "*Level of online promotion and online presence of the destination"* have discrepancy ranges of 2, 2.2, and 1.7, respectively. The attribute with the lowest discrepancy range is *the "Impact of the website on building and enhancing the destination's brand image"* with a value of -1.5.

4.5.3. Collaboration Acceptance:

The results indicate that all 3 attributes are considered important (rated at a level of 4) Among them, the attribute "*diversity level of tourism companies/organizations listed on the website"* is rated as the most important with a value of 4.5. The attribute with the lowest level of importance is the "*Proportion of tourism companies/organizations making bookings on the website"*, rated at 4.2.

In terms of performance, specifically for the attributes "*Proportion of tourism companies/organizations making bookings on the website", "Proportion of tourism companies/organizations listed on the website", and "diversity level of tourism companies/organizations listed on the website*", the ratings are 2.8, 3.1, and 2.8, respectively.

The P-I discrepancy range shows that the attribute of "*diversity level of tourism companies/organizations listed on the website"* has the largest discrepancy range at 1.7.

4.5.4. Technical issues

The results show that 4 out of 5 attributes in the technical dimension are considered important by tourism service businesses, ranging from 4.2 to 5. Specifically, the attribute "*Other information systems used in my organization are integrated with the website"*, has a lower level of importance at 2.6. The two attributes with the highest performance are "*Users can easily find the electronic portal of the website"* and *"The electronic portal of the website is user-friendly"*, both rated at the highest level of 5.

The performance of the attributes is around level 3. The attribute with the highest performance is the *Smooth execution of operations on the website*, rated at 3.2. The attribute *Users can easily find the electronic portal of the website* has the lowest rating at 2.2.

Only 3 out of 5 attributes in this dimension are present on the destination website of Da Nang City. The attribute "*Users can easily find on the electronic portal of the website"* has the largest discrepancy range at -2.8. The attribute "*Smooth execution of operations on the website"*, rated with the lowest discrepancy range, is at -1.4.

4.5.5. E-commerce Functionality

The results indicate that all 5 attributes are considered important, rated above level 4. Among them, the attribute "*The website allows the purchase of tourism packages and the customization of tourism packages according to requests"* is rated highest at 4.8. The attribute with the lowest importance is "*The website features providing and filtering information/features in a personalized manner"*, rated at 4.3.

Currently, 4 out of 5 attributes in the e-commerce functionality dimension are not available on the DMS website of the tourist destination Da Nang. Only the attribute "*The website features communication and interaction with tourists"* is present and has a performance rating of 3.2. The discrepancy range for this attribute is -1.5.

4.5.6. Information Quality

The results show that all four attributes are rated as important, with scores above 4. Among them, the attribute "*Website information is high quality and unique"* is rated highest at 4.8. The attribute with the lowest importance is "*Building and promoting destination content using web 2.0 tools so that tourists can interact with the destination",* rated at 4.2.

Moreover, all 4 attributes in the e-commerce data aspect are available on the websites approaching DMS of the tourist destination Da Nang. The performance of these 4 attributes is around level 4, with the attribute "*Multilingual website information"* having the highest performance rating at 4.0. The range of discrepancy for this attribute is also among the smallest (0.5).

4.5.7. E-commerce Data

The results demonstrate that all five attributes are rated highly, ranging from 4.5 to 4.8. Among them, the attribute of "*The collection and analysis of data related to user profiles/behaviour on the website (an electronic index for CRM customer relationship management)*" is rated the highest in importance at 4.8.

However, two out of five attributes already present on the Da Nang tourist destination DMS website, namely "*Number of online website visitors (electronic index for customer reach/attraction)*" and "*User website navigation time (electronic index for attracting users to revisit the website)*" are rated quite low, at 2.2 and 2.0 respectively. The discrepancy range for both is -2.5.

4.5.8. IPA Matrix of Tourism Service Businesses Regarding Websites Approaching DMS of Da Nang Tourist Destination

The results of the IPA matrix regarding the Website approaching DMS of the Da Nang tourist destination are represented in Figure 1 below:

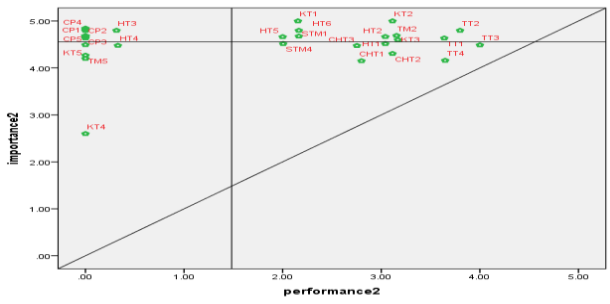

Figure 1. *IPA Matrix of the website approaching DMS in Da Nang Evaluated by Tourism Businesses*

IPA analysis was conducted using SPSS 27.0 to calculate the mean scores of Importance (I) and

Performance (P) for each attribute, which were plotted on a two-dimensional grid following Abalo et al. [17], with a diagonal line separating high/low performance relative to importance.

Survey responses were averaged from 219 businesses for each attribute's Importance (I) and Performance (P) scores, with the difference (P-I) calculated to identify performance gaps. According to Figure 1, all attributes are positioned above the diagonal line, indicating that, in general, attributes across all seven groups are rated as more important than their actual performance. The farther an attribute is from the diagonal, the greater the discrepancy between importance and actual performance, where importance scores (ranging from 2.6 to 5.0) significantly exceed performance scores (ranging from 0.3 to 4.0). It suggests that these attributes are considered crucial but underperform in practice. Specifically, attributes within the Cost and Benefit dimension are clustered in the upper-left quadrant (Quadrant I). It indicates that businesses highly value these attributes, but since they have not been integrated into the website, their performance score remains zero.

Further, attributes from the Collaboration Outcomes of the DMS website, Collaboration Acceptance, Technical Issues, E-commerce Functionality, Information Quality, and E-commerce Data dimensions are already present on the website but are distributed across all four quadrants (I, II, III, and IV). Notably, the attribute TT3 (Multilingual website information) is in Quadrant IV, showing that its actual performance slightly exceeds its perceived importance. However, since it is closest to the diagonal, the discrepancy is minimal, indicating a relatively balanced performance. TT2 (Website information is high quality and unique) is located in Quadrant II and is also one of the closest attributes to the diagonal in this quadrant. This suggests that while it performs well, its balance with importance should be maintained.

Conversely, the attribute KT4 ("Other information systems used in my organization are integrated with the website") is positioned at the lowest point in the bottom-left of Quadrant III, far from the diagonal. This indicates that it requires significant attention and improvement. These analysis results align with the findings of Botezat et al. [15], in which the IPA matrix was used to evaluate smart destination attributes. The identified gaps, particularly in the E-commerce Functionality and Technical Issues dimensions, are consistent with the conclusions of Estêvão et al. [51], who emphasized that these attributes are essential for a fully integrated DMS.

Overall, danangfantasticity.com functions as a basic DMS, lacking advanced features- a common characteristic in resource-constrained countries [28]. In the context of Da Nang, the presence of important attributes with low performance or absence suggests that the DMS-oriented website has not yet met the expectations of local tourism businesses.

5. Conclusion, Discussion & Managerial Implications

This study applies Sigala's evaluation framework [14] to analyze the destination management system (DMS) website of Da Nang from the perspective of 219 local tourism businesses, primarily restaurants, hotels, and travel agencies, which constitute a significant portion of the tourism industry and play a decisive role in the sector's overall revenue. The analysis results indicate a significant discrepancy between importance and performance levels and the dispersion of attributes across quadrants in the IPA matrix, following Abalo et al. [17].

Regarding attributes that are important but absent, all attributes in the Costs and Benefits (CP) dimension are missing from the website (0/6 attributes), despite their high importance ratings (I ranging from 4.5 to 4.8), placing them in Quadrant I. For example, "*Number of tourist bookings from the website*" (I = 4.8) and *"Profit margin obtained compared to the investment cost for bookings on the online website"* (I = 4.8) indicate that the website lacks transactional functions and the ability to generate direct economic benefits-core components of a complete DMS, according to Estêvão et al. [51]. This limitation highlights the website's inability to support tourism SMEs in Da Nang effectively.

Regarding attributes with significant performance-importance gaps, attributes within the Collaboration Outcomes (HT) and E-commerce Data (STM) dimensions exhibit substantial P-I gaps. "*Management of any negative perceptions of tourists about the destination"* (HT3) has

P = 0.3 and P-I = -4.5, while "*Number of online website visitors"* (STM1) has P = 2.2 and P-I = -2.5. These findings suggest that the website is ineffective in attracting tourists or managing e-commerce data, reducing its actual value for businesses.

The only attribute with a low importance rating (I = 2.6) and absent from the website (performance = 0) is "*Other information systems used in my organization are integrated with the website"* (KT4). This suggests that businesses in Da Nang have not prioritized integrating internal information systems with the DMS website, possibly due to limited technological awareness [11] or concerns over loss of information control in the Vietnamese context.

Regarding theoretical implications, the study confirms Sigala's framework [14] and aligns with the general state of tourism websites in developing countries, where DMSs often only fulfill basic marketing functions while lacking advanced features such as real-time transactions or big data analytics [28, 52]. However, even a basic DMS still plays a role in marketing and limited transaction support [13]. The performance gaps reflect resource constraints and low technological adoption levels among SMEs in Da Nang City, highlighting the need for better integration to enhance competitiveness.

In the practical aspect, the findings of this study can be used to propose recommendations to enhance the performance of the website approaching DMS for the Da Nang destination.

Firstly, Da Nang's DMO should prioritize integrating crucial but absent attributes, particularly in the Costs and Benefits (CP) dimension, for example, *"Number of tourist*

bookings from the website" and *"Revenue generated from bookings made through the website."* This will bring the website closer to a complete DMS model, as emphasized by Estêvão et al. [13]. Similarly, Botezat et al. [15] suggest integrating missing features such as tour bookings, customizable travel packages, and visitor forecasting, which are essential for supporting SMEs in increasing revenue through the system.

Secondly, it is essential to improve the performance of existing attributes. For existing attributes, efforts should focus on enhancing performance in the Technical Issues (KT) and Information Quality (TT) dimensions. This includes optimizing some functions like *"The electronic portal of the website is user-friendly"* and *"Users can easily find the electronic portal of the website".* Providing detailed, regularly updated, and multilingual content is also important *("Multilingual website information",* P = 4.0; *"Website information is regularly updated",* P = 3.6).

Next, it suggests that it is important to enhance interactive features *("The website features communication and interaction with tourists",* P = 3.2) through a customer feedback system.

Moreover, tourism businesses, especially SMEs, need training to utilize the DMS website's features effectively. Specifically, guidance on managing data, such as *"Number of online website visitors"* (STM1, P = 2.2), will help them maximize the system's benefits while increasing their involvement in website improvements. Training support for SMEs will enhance technological adoption and reduce barriers [53].

These recommendations will not only improve the current website but also lay the foundation for developing a more comprehensive DMS in the future, aligning with the latest technological advancements in destination management, as discussed by Reinhold et al. [52].

6. Limitations and Future Research Directions

As this is an initial study evaluating the quality of destination management information systems in Vietnam, specifically assessing the website approaching DMS for the Da Nang tourist destination, it still has some limitations:

Firstly, this study used a convenience sampling method, focusing mostly on restaurants, hotels, and hospitality enterprises. Therefore, in the future, a probability sampling method should be applied to ensure a balanced representation of different types of businesses in the service industry.

Secondly, this study was conducted only in the city of Da Nang; therefore, future research could consider conducting studies on a broader scope.

This study used the IPA model according to Abalo et al [17], however, the desired minimum level of businesses may vary. As a result, qualitative research should be conducted first to determine the minimum performance threshold desired by stakeholders to ensure a more effective IPA analysis.

Further performance research is needed from DMOs (using qualitative methods) not only from local tourism businesses as currently. Hence, this study focused on surveying domestic tourism businesses, so it needs to be expanded to international tourism businesses in the area. The analysis of differences between different types of tourism businesses or the incorporation of demographic factors is also necessary.

Moreover, as technology is constantly updating and evolving, the functionalities addressed in this study can be reevaluated in the future, and new functionalities can be considered according to the research context and time.

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