

Utilizing Machine Learning for Analysing Digital Marketing's Influence on Gen-Z Travellers' Destination Selection

Pattaraporn Warintarawej

Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Thailand

Jariya Seksan

Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Thailand

Nattaporn Thongsri

Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Thailand

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Abstract

Digital marketing significantly influences travellers' decision-making processes. This research aims to analyze the specific digital marketing strategies affecting Gen-Z travellers' decisions. Machine learning techniques were employed to uncover key insights. Data were collected through a survey using a convenience random sampling of 346 university students in Thailand. Correlation analysis and machine learning approaches, such as logistic regression and neural network analysis, were used to explore the relationships between various digital marketing strategies and their impact on Gen-Z travellers' destination choices. The findings indicate that Online Travel Agency (OTA) websites exert the most significant influence on Gen-Z travellers' decision-making processes, with an odds ratio of 1.6879. This is followed by the use of social media marketing strategies and businesses having their own websites. To validate these results, an Artificial Neural Network (ANN) technique was also employed, confirming the importance of rankings derived from the logistic regression analysis. This research provides valuable insights into which digital marketing strategies most influence Gen-Z travellers' decision-making processes. These insights can help tourism businesses make informed investments in digital marketing strategies, prioritizing those that align with the preferences of Gen-Z travellers.

Key Words: Digital Marketing strategies, Tourism, Machine Learning, Logistic regression, Neural network, Gen-Z

JEL Classification: C45, C89, M31

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1. Introduction

Advancements in information technology and communication occur at a rapid pace, affecting many aspects of human life. Starting with the existence of digital devices, applications, and the internet, as well as several other developments, this entire digital technology movement helps humans carry out their daily duties (Jansson, 2022). Consequently, as consumers increasingly shift their base of operations online, digital marketing plays a critical role in enabling businesses to respond to technological advances by using not only websites, Search Engine Marketing (SEM), Search Engine Optimization (SEO), social media, travel apps, but also content marketing and influencer marketing strategies to persuade potential buyers and encourage current customers to continue using the seller's services, thereby developing buyer-seller relationships (Ababneh, 2022). In this context, businesses must carefully tailor their strategies to

cater to their target audience, enabling them to effectively present products and services, acquire new customers, and generate sales (Kumawat & Bhamboo, 2022; Mahmoud Al Azzam, Fattah Al-Azzam, & Al-mizeed, 2021).

In the tourism industry, the utilization of digital marketing to convey information has become a fundamental necessity. Unlike businesses involved in the purchase and sale of products, travel decisions necessitate a multifaceted consideration of factors. These factors encompass the nature of the destination, travel activities, transportation, accommodation, dining, and proximity to nearby attractions. According to the recent Booking.com study (Visser, 2019), Generation Z (Gen-Z) who were born between 1995 and 2009 is marked by its strong expertise in technology utilization, which influences their travel preferences significantly. As to the report, the "online world" continues to have an impact on Gen-Z travel. Following the poll conducted by TravelTeach firm Roller (Roller, 2022), 97% of Gen-Z utilize social media as their primary source of inspiration to travel, and approximately 68% use the internet to search for information, follow influencer reviews, research directions, book flights and lodging, plan excursions, and transact online and always prefer to support online-accessible services first.

Several studies have been conducted to explore the significance of Gen-Z tourists' motivations in influencing travellers' intentions in the digital landscape through decision-making processes. Ho Tra (2022) found that Gen-Z values the utility of social media, utilizing it for knowledge-seeking (push factor), which subsequently influences their intention to visit a destination. Sasunthorn et al. (2021a) utilized the Theory of Planned Behavior (TPB) to formulate structural equations investigating the variables that impact social media usage. The research findings indicate that Gen-Z individuals are more inclined to use social media for travel purposes when influenced by subjective norms. These norms include familial approval for using social media in travel, recommendations from friends, or the influence of close relationships. Long (2022) employed the Information Adoption Model (IAM) to formulate structural equations elucidating the relationship between electronic word-of-mouth (eWOM) from social network sites and the intention to purchase tourism accommodation among Gen-Z individuals in Vietnam.

Previous research emphasized the use of Structural Equation Modeling (SEM) with Regression techniques to study linear relationships between independent and dependent variables. However, the approach has certain limitations. First, it assumes a linear relationship between the variables, which may not always be the case. Second, it can be difficult to use SEM to model complex relationships between multiple variables. Thus, this study proposes a different analytical approach by employing machine learning techniques, namely logistic regression, and neural network analysis, which fall under the category of classification techniques. This approach is motivated by the flexibility of these techniques, which do not impose the condition that the independent and dependent variables must exhibit linear relationships, unlike regression analysis or SEM. The strengths of both techniques lie in their ability to handle complex variable relationships.

The research is aimed to investigate the digital marketing strategies that impact the travel destination choices of Gen-Z travellers. The study explores the influences of Gen-Z traveller's digital marketing strategy preferences by using logistic regression and neural network analysis. It offers a data-driven approach to understand and adapt to the evolving preferences of Gen-Z travellers, shaping the future of destination marketing in the digital age. By utilizing machine learning techniques, particularly logistic regression and neural networks, this research seeks to close this knowledge gap by providing insights into the variables impacting Gen-Z travellers' destination preferences within the framework of digital marketing tactics.

2. Literature review

The literature and research relevant to this study encompass several key focus areas, as described below.

2.1 Digital marketing

Digital marketing refers to a set of marketing strategies and tactics that leverage digital technologies and online platforms to promote products, services, or brands to a target audience. The primary goal of digital marketing is to reach and engage with potential customers through various digital channels to drive brand awareness, generate leads, and ultimately, achieve business objectives (De Pelsmacker, van Tilburg, & Holthof, 2018; Dunakhe & Panse, 2022; Jadhav, Gaikwad, & Bapat, 2023). Digital marketing plays a crucial role in the tourism industry, where numerous destinations have used digital marketing tools, especially to showcase the appeal of their locations, attractions, and activities. Compared to traditional advertising methods, digital marketing often offers a more cost-effective way to promote tourism services (Chaplaev, Martynova, & Yusupova, 2021).

Different digital marketing strategies are used in businesses according to the circumstances. For example, digital marketing that uses search engines as a tool to reach customers, called Search Engine Marketing (SEM) and Search Engine Optimization (SEO). SEM aims to increase website's visibility and traffic through paid advertising on search engines, primarily Google. To target potential tourists through SEM, travel companies must begin with comprehensive keyword research, the process involves budget allocation, the establishment of target tourist acquisition objectives, and the elucidation of specific marketing goals (Barry & Charleton, 2008; Moura & Casais, 2020). While SEO refers to the process of optimizing a website to align with the functioning principles of search engines, primary Google, with the aim of achieving top rankings in search engine results. SEO involves the manipulation of HTML code on web pages, allowing Google's algorithms to read and evaluate the page's content, relevance (called on-page strategy), and the actions taken outside a website to improve its search engine rankings (called off-page strategy). Several research studies emphasize the importance of SEO in the tourism industry (Antić, Dragović, & Tomić, 2021; Mendonça et al., 2022).

In addition, Social Media Marketing (SMM) involves marketing through online social media platforms such as Facebook, Instagram, YouTube, Line, TikTok, and others. These platforms enable customers to communicate and generate their own content. The use of social media in the tourism sector has been the subject of ongoing research from various perspectives (Chu, Deng, & Cheng, 2020; Ding & Md Syed, 2022; Keller & Printz-Markó, 2023; Sin, Mohamad, & Lo, 2020; Zarezadeh, Rastegar, & Gretzel, 2018; Žufan et al., 2020). Researchers such as Matikiti-Manyevere and Kruger (2019); Popović (2022); Yuan et al. (2022); Zajadacz and Minkwitz (2020) have studied its influence on planning and decision-making processes. Additionally, investigations have focused on the promotion and use of social marketing tools in the tourism industry (Jayasinghe & Madushanka, 2021; Lincényi & Bulanda, 2023; Myat, Sharkasi, & Rajasekera, 2023; Okonkwo, 2015; Pholphirul et al., 2021) and the analysis of how brands are created via social media (Huerta-Álvarez, Cambra-Fierro, & Fuentes-Blasco, 2020; Lestiani & Widiasanty, 2022).

To enhance communication with customers through the various channels mentioned above, content marketing is used to attract the appropriate audience and encourage them to become customers (Gurjar, Kaurav, & Thakur, 2019; Koiso-Kanttila, 2004; Vinerean, 2017). This strategy focuses on customer insights, outlining how to manifest value in various forms of content such as text, graphics, images, audio, and video, all designed to provide value to customers (Hollebeek & Macky, 2019; Repoviene & Pazeraitė, 2019). Influencer marketing is also a technique to engage the audience by employing influencers, whether celebrities or regular people, who are active on social networks to impact consumers' brand awareness and purchasing decisions (Glucksman, 2017; Sesar, Hunjet, & Kozina, 2021). Influencers have the capacity to disseminate corporate messages to a broader consumer base that may otherwise remain beyond the reach of companies (Yetimoğlu & Uğurlu, 2020).

Although social media plays important role for businesses, owning a website makes a company appear more credible and professional. Social media increase visibility, but a professional website builds relationships and sales (Mailchimp, 2020). A professional tourism website provides a platform for showcasing the business, engaging with customers, facilitating direct bookings, and adapting to industry trends. A well-structured website not only increases online visibility but also enhances the overall

customer experience, ultimately contributing to the success and growth of the tourism business (Dwiningwarni et al., 2021; Schmidt, Cantalops, & dos Santos, 2008). Travel web directories are also famous for tourists in order to find destination's information especially those associated with tourism organizations or well-known travel websites such as TripAdvisor.com or LonePlanet.com. User-generated content strategies, such as, reviews, user rating, or blogs, are gaining importance in travellers' decision-making processes and provide valuable information for destination management (Godnov & Redek, 2019; Iswari & Putra, 2023; Sánchez-Franco & Rey-Tienda, 2023; Shivakumar & Agarwal, 2014) and also a recommendation system integrated into websites helps create satisfaction and entice customers to choose to travel or use services (Badouch & Boutaounte, 2023).

Furthermore, email has been considered one of the crucial tools for online marketing. E-mail, in its role, serves as a means of communication similar to sending letters, but it is electronic, efficient, and cost-effective. It also provides benefits as traditional mail but at a much faster and lower cost. E-mail remains a fundamental tool in both daily life and business. Despite the advent of social networks, email continues to be a widely favoured means of communication. According to Mailchimp (2023), the world's largest email marketing service, the email performance report for customers in 2019 demonstrated the ongoing effectiveness of email marketing. The average email open rate stood at 21.33%, and the average click rate was 2.62%. The primary objective of email communication is to fortify relationships with both present and previous clients, so improving their loyalty and target-group contributions, as well as promoting announcements (Florivic, 2018).

Moreover, the sharing economy platform has played a significant role in the tourism industry, especially in centralized websites for accommodations, known as Online Travel Agencies (OTA) (Long & Shi, 2017; Tzioras, 2018). The OTAs such as Booking.com, Agoda.com, and Airbnb.com let hotels advertise their rooms and offer commissions based on the price of services supplied. Tourism professionals must maintain awareness of emerging opportunities and potential threats within the realm of tourism distribution channels to ensure their continued competitiveness and success (Angeloni & Rossi, 2021; Inversini & Masiero, 2014).

The challenge is that numerous digital marketing formats are available for tourism businesses to utilize. Due to constraints such as budget, time, and human resources, businesses must choose digital marketing channels that are appropriate for their target customer segments.

2.2 Generation Z

Generation Z (Gen-Z), alternatively referred to as post-millennials, is the demographic group succeeding the Millennials. The name Generation Z was suggested, although journalist Bruce Horowitz of USA Today in 2012 (Trejo, 2021). The term became well-known with the release of a 2014 presentation by New York advertising firm Sparks and Honey with the tagline Meet Generation Z: Forget Everything You Learned About Millennials (Sparks & Honey, 2014). Gen-Z consists of those born between 1995 and 2009, who are now between the ages of 12 and 26 years old, and are seen as the next generation, frequently referred to as "the world's primary consumers.". Modern technologies have a big impact on what Gen-Z buys and experiences. They anticipate that new gadgets and electronic procedures will become essential for convenience, information, and fast transactions. With around 2 billion Gen-Z individuals globally, this demographic is a key driver in the tourism industry. (Roller, 2022; Visser, 2019).

2.3 Machine Learning Techniques

In this study, machine learning techniques were applied to analyze decision-making processes, utilizing the following algorithms.

2.3.1 Logistic Regression

Logistic Regression (LR) is one of the supervised learning machine learning algorithms aimed at creating models for classifying input data. Currently, the Logistic Regression algorithm has been employed as a tool for data analysis and outcome prediction in various fields, such as studying factors influencing cyber victimization, examining factors affecting investor behavior in the stock market, and forecasting to enhance Key Performance Indicators in Supply Chains (Escario et al., 2023; Lan et al., 2018; Pietukhov et al., 2023), among others. In the marketing domain, LR has been adapted for a wide range of purposes, including sales forecasting, spam filtering, customer segmentation, and more (Akter et al., 2022).

Logistic Regression (LR) algorithm is a classification algorithm that constructs a model to represent the relationship pattern between independent variables or features and target for the benefit of grouping and forecasting target. In this research, we perform the binary LR model, which is LR model in which the dependent variable or target is classified into 2 different groups. LR model is as follows (1).

$$\ln\left(\frac{P}{1-P}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k \quad (1)$$

Where P is the probability that the event (success target) occurs, X_i are features and the coefficients β_1, \dots, β_k pertain to the feature variables, whereas β_0 corresponds to an intercept term. Since (1) is in the logarithmic form of ratio of probability, it is difficult to interpret as is. Therefore, it is often preferred to consider the odd ratio (OR) shown in formula (2) which is the number of times the chance of the event occurs to the chance of it not occurring.

$$OR = \frac{P}{1-P} \quad (2)$$

If $OR > 1$, it means that the chance of the event occurring is greater than the chance of it not occurring. The chances are equal if $OR = 1$, and the chance of event occurring is less than it not if $OR < 1$.

2.3.2 Artificial neural network approach (ANN)

Artificial neural network approach (ANN) is the method in artificial intelligence that teaches computers to process data in a way that is inspired by the human brain. It is a type of machine learning process called deep learning, which uses interconnected nodes or neurons in a layered structure similar to the human brain (Bouwman et al., 2019). This creates a self-adjusting system that computers use to learn from mistakes and continuously improve. Currently, ANN is applied in research to predict variable relationships (Leong et al., 2020; Thongsri & Tripak, 2023). In the case of ANN, it supports both linear and non-linear relationships (Talukder et al., 2020). The previous studies found that ANN reduces limitations in terms of variable relationships. It achieves this by processing multiple rounds of learning through sample groups (Wong et al., 2020). Finally, the outcomes from predictions made using ANN are robust and yield accurate results (Leong et al., 2020).

ANN is a robust framework influenced by biological neural networks, can grasp tasks through examples. Throughout training, the connections between network units are refined, and prediction errors are minimized. To forecast the output, each input unit is learned and then multiplied by a connection weight (Agatonovic-Kustrin & Beresford, 2000) shown as in formula (3):

$$Output = F(\sum_{i=0}^n x_i \cdot w_i + b) \quad (3)$$

Where F is activation function, x is input, w is weight, and b is bias.

2.4 Theoretical Foundations

This research employs the customer journey model (Barbosa, Saura, & Bennett, 2022; Chamboko-Mpotaringa & Tichaawa, 2023) to investigate the influence of various digital marketing strategies on tourist destination choices of Gen-Z Travelers. The customer journey model discusses the stages of the customer's decision-making process, starting from awareness, information search to evaluate options, purchasing decisions, retention, and advocacy (Lundin & Kindström, 2023). Digital marketing significantly influences travelers' decision-making processes through various stages. Initially, awareness is built via websites, social media, email marketing, and word of mouth, introducing the brand and its story to the target audience. As customers show interest, they enter the consideration phase, gathering information and comparing options through reviews, travel videos, and search engines. The purchase/conversion stage is crucial, where customers decide to buy products or services, emphasizing the need for smooth transactions and effective purchasing management systems. Retention and loyalty are fostered by ensuring product quality and excellent post-sales experiences, including personalized communication and accessible support services. Finally, advocacy is achieved when satisfied customers share their positive experiences, driving new customer acquisition through trusted word-of-mouth recommendations and influencer marketing.

From the customer journey theory, digital marketing strategies related to each stage of the decision-making process can be mapped as follows:

Table 1. Mapping customer journey and digital marketing strategies for traveler's decision-making stages

Customer Journey	Pre-trip period phase		Active tourism experience	Post-trip phase	
	Awareness	Consideration	Purchase/ Conversion	Retention/ Loyalty	Advocacy
Digital Marketing Strategies	<ul style="list-style-type: none"> • Content Marketing • SEO • Social media • OTA • Email • Own website • Travel directory website • Influencer • SEO 	<ul style="list-style-type: none"> • Recommendation System/User rating/ Reviews/Blog • SEO • Own website • OTA • Influencer • Promotion Campaign 	<ul style="list-style-type: none"> • Own website • OTA • Social Media 	<ul style="list-style-type: none"> • Reviews/ Blog • E-mail • Social Media 	<ul style="list-style-type: none"> • User rating • Influencer Marketing • Social Media

Source: Elaborated by the authors (2024).

Taking digital marketing strategies related to each stage of the customer's decision-making process and applying them to frame research, with the outcome variable (y) whether digital marketing strategies influence the purchasing decisions of Gen-Z travelers (yes/no), and the predictor variable (x) being the digital marketing strategies.

This research employs a diverse range of analysis methods, not just relying on a single technique. The study proposes a theory of classification analysis, utilizing a data mining technique as an alternative in cases where the relationship between predictor and outcome variables is not linear. Specifically, the Artificial Neural Networks (ANN) technique is employed and compared with Logistic Regression and traditional statistical inference methods. Logistic regression is suitable for categorical outcome variables and can handle data with non-linear relationships. On the other hand, ANN is suitable for complex relationships and can provide better explanations of results than regression analysis (Uysal & El Roubi, 1999). This is particularly useful when the relationship between predictor and outcome variables is not linear.

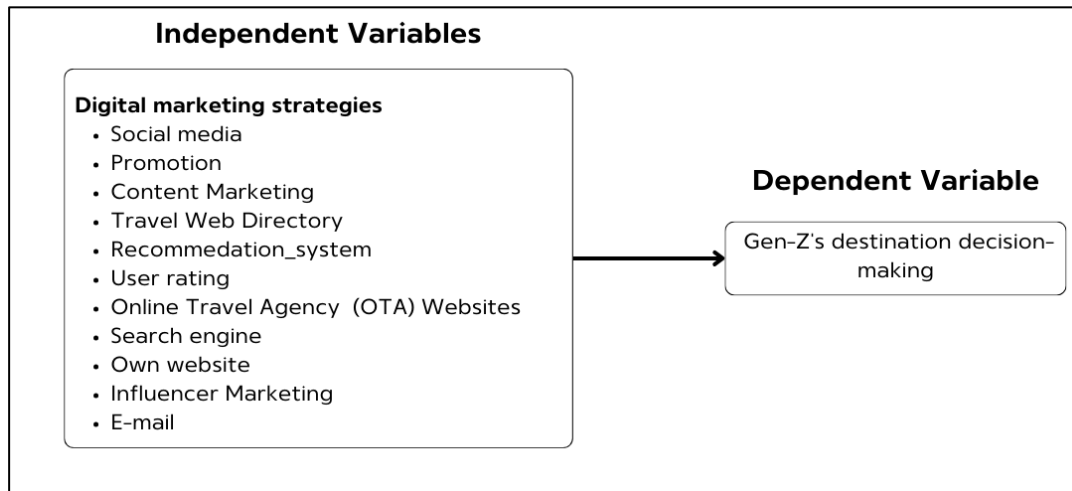
3. Methods

This research follows a structured framework and methodology, which includes the following stages.

3.1 Research Framework

This research was designed to address the objective of identifying the digital marketing strategies that influence the destination decision-making of Gen-Z travellers (Figure 1). The research defines the variables used for the study as follows.

Figure 1. The research framework



Source: authors' own contribution

The independent variables in this study consist of digital marketing strategies, which include: (1) Social media (2) Promotion (3) Content marketing (4) Travel Web Directory (5) Recommendation system (6) User rating (7) Online Travel Agency (OTA) Websites (8) Search engine marketing (9) Own website (10) Influencer marketing (11) E-mail marketing. The dependent variable has been designed as a binary variable, where a response of 1 indicates that digital marketing strategies have an influence on the decision-making, and a response of 0 indicates no influence.

The research designed a set of digital strategy variables by using a 5-point Likert scale (Aslan, 2018) shown as follows:

Table 2. Likert Scale Description

Scale	Likert Scale Description	Interpretation
1	1.00 - 1.80	Very low influence
2	1.81 - 2.60	Low influence
3	2.61 – 3.40	Moderate influence
4	3.41 - 4.20	High influence
5	4.21 - 5.00.	The highest influence

Source: (Aslan, 2018).

The research process involves the following steps:

- 1) Analyse the relationship between digital marketing strategies and Gen-Z's destination decision-making using by the Pearson correlation (Point biserial correlation)
- 2) Analyse the influence of digital marketing strategies on the decision-making of Gen-Z travelers in choosing their travel destinations using simple logistic regression models.
- 3) Rank the strategies in terms of their importance for decision-making in selecting travel destinations among Gen-Z travelers using the Artificial Neural Network technique.

3.2 Sample and data collection

According to a report by the National Statistical Office (National Statistical Office, 2023), the Gen Z population, aged 18-24, has the highest access to telecommunications in Thailand. Given that this research focuses on digital marketing strategies in Thailand, the study population is therefore selected from the Gen Z age group, specifically those aged 18-24. The sample size was determined using Cochran’s formula (Wg, 1963) with a 5% margin of error. The questionnaires were distributed randomly to collect data from 346 participants belonging to the Gen-Z demographic in Thailand. The participation was on a voluntary basis.

4. Results

The results of the data analysis process are presented as follows.

4.1 The demographic characteristics and descriptive analysis

The sample for this study consisted of 346 individuals, aged between 18 and 24 years, with a mean age of 19.8 years and a standard deviation of 1.19 years. Among the participants, 80.9% were female, 14.2% were male, and 4.9% identified as part of the LGBT+ community. Besides, 53.34% of participants preferred traveling with their families and 60.98% indicated a preference for holiday travel. Given that data collection was based on voluntary participation, the distribution of responses varied across different demographic groups. To verify that these demographic differences did not affect the dependent variables in this study, a Chi-square test for independence was conducted, with the results presented in Table 4. The results show that the differences in demographic characteristics are not associated with the decision of the dependent variable.

Table 4. Independence test of demographic characteristics and dependent variable

Demographics	χ^2	p-value	Independent of the dependent variable
Gender	3.56	0.168	Yes
Type of travel	1.96	0.580	Yes
Period of travel	2.44	0.656	Yes

Source: Elaborated by the authors (2024).

To assess the influence of digital marketing strategies on destination decision-making, the study computed the average influences of these variables, as presented in Table 5. The participants collectively evaluated the impact of digital marketing strategies on their destination decision-making as significant (high influence), with an average rating of 4.20 and a standard deviation of 0.82. The digital marketing tactics have differing degrees of influence when it comes to Gen-Z's decision-making on travel destinations. Social media has an average rating of 4.48 and a standard deviation of 0.64, making it the most influential technique by far. Promotion is next in line and has a significant impact as well, scoring an average of 4.26 with a standard deviation of 0.77. Moreover, content marketing, with an average rating of 4.23 and a standard deviation of 0.77, is significant in the decision-making process.

Table 5. The influence of the digital marketing strategies on destination decision-making

Digital Marketing Strategies	Mean	Standard deviation	Interpret
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Social media marketing	4.48	0.638	The highest influence
Promotion	4.26	0.766	The highest influence
Content marketing	4.23	0.771	The highest influence
Travel directory website	4.23	0.843	The highest influence
Recommendation system	4.22	0.742	The highest influence
User rating	4.21	0.760	The highest influence
Online Travel Agency (OTA)	4.21	0.796	The highest influence
Search engine marketing	4.2	0.860	High influence
Own website	4.18	0.853	High influence
Influencer marketing	4.04	0.908	High influence
E-mail marketing	3.99	1.040	High influence
Average	4.20	0.820	High influence

Source: Elaborated by the authors (2024).

The survey results for the dependent variable indicate that the majority of respondents, accounting for 85.5%, reported that digital marketing strategies had influenced their destination decision-making, while 14.5% responded that it had no impact as shown in Table 6.

Table 6. The influence of digital marketing strategy on Gen-Z's destination decision-making

Did digital marketing strategies ever influence your decision in choosing a travel destination? (Y: Dependent variable)	Counts	% of Total
1 = Yes : Digital marketing have an influence on destination decision-making.	296	85.5 %
0 = No : Digital marketing have no influence on destination decision-making.	50	14.5 %

Source: Elaborated by the authors (2024).

4.2 Data Analysis

The details and results of each step of the data analysis are presented as follows.

4.2.1 Analysing the relationship between digital marketing strategies and Gen-Z Tourists' destination decision-making

Step 1 involves the analysis of the relationship between independent variables, which are digital marketing strategies, and the dependent variable, which is the decision-making in selecting travel destinations by Gen-Z travelers, using Pearson Correlation (point biserial correlation coefficient). This step serves to filter out independent variables that exhibit significant correlations with the dependent variable. The selected strategies, which demonstrate a substantial correlation with the decision-making process, are carried forward for further analysis in Step 2. Table 7 demonstrates the correlation between the independent variables, which are digital marketing strategies, and the dependent variable, which is

the influence of digital marketing strategies on the destination choices of Gen-Z travelers in Thailand, the result revealed that the following digital marketing strategies have a significant impact on the decision-making process for selecting travel destinations are 1) user rating, 2) influencer marketing, 3) content marketing, 4) social media, 5) OTA, 6) Own website and 7) Travel directory website. Conversely, the following digital marketing strategies were found to have no significant relationship with the decision-making process for selecting travel destinations within Thailand among Gen-Z travelers are recommendation system, promotion, search engine, and e-mail marketing.

Table 7. Pearson Correlation for Independent Variables and Dependent Variable

Independent Variables	Pearson Correlation
Digital marketing strategies (DMSs)	
1. User rating	0.124*
2. Recommendation system	0.068
3. Influencer Marketing	0.117*
4. Content Marketing	0.111*
5. Promotion	0.097
6. Social media marketing	0.116*
7. Online Travel Agency (OTA)	0.148**
8. Own website	0.106*
9. Travel directory website	0.141**
10. Search engine marketing (SEO and SEM)	0.105
11. E-mail marketing	0.066

** Correlation is Significant at the 0.01 Level (2-tailed)

Source: Elaborated by the authors (2024).

4.2.2 Analysing the influence of digital marketing strategies on the decision-making of Gen-Z travelers in choosing their travel destinations using logistic regression.

The findings presented in Table 8 reveal that the accuracy of all Logistic Regression (LR) models, irrespective of the strategy considered, consistently demonstrates a relatively high value of 0.87. As a result, further consideration is directed towards the odds ratio. The outcomes indicate that among the strategies, Online Travel Agency (OTA) websites exhibit the highest odds ratio (OR) at 1.6879. This signifies that OTA has the potential to influence Gen-Z travelers to modify their decisions approximately 1.6879 times more than travelers who opt not to alter their decisions. Subsequently, the order of influence, in descending order, follows with social media, own website, and travel directory website.

Table 8. Logistic Regression Results

Strategy	Precision	Recall	F1-score	Accuracy	Odd Ratio (OR)
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OTA	0.87	1.00	0.93	0.87	1.6879
Social media marketing	0.87	1.00	0.93	0.87	1.6154
Own website	0.87	1.00	0.93	0.87	1.5809
Travel directory website	0.87	1.00	0.93	0.87	1.5809
Content Marketing	0.87	1.00	0.93	0.87	1.3809
User rating	0.87	1.00	0.93	0.87	1.3441
Influencer marketing	0.87	1.00	0.93	0.87	1.2600

Source: Elaborated by the authors (2024).

4.2.3. Rank the strategies in terms of their importance for decision-making in selecting travel destinations among Gen-Z travelers using the Artificial Neural Network technique.

In Step 3, the Artificial Neural Network (ANN) approach is used to rank the strategies according to their significance in the decision-making process for choosing vacation locations among Gen-Z tourists. In this study, the application of ANN is employed to predict the significance of digital marketing strategy variables in influencing decision-making for selecting destinations within Thailand. The digital strategy variables considered for analysis were subjected to statistical tests in the first stage to determine their statistical significance. The configuration of the neural network model used is illustrated in Figure 2.

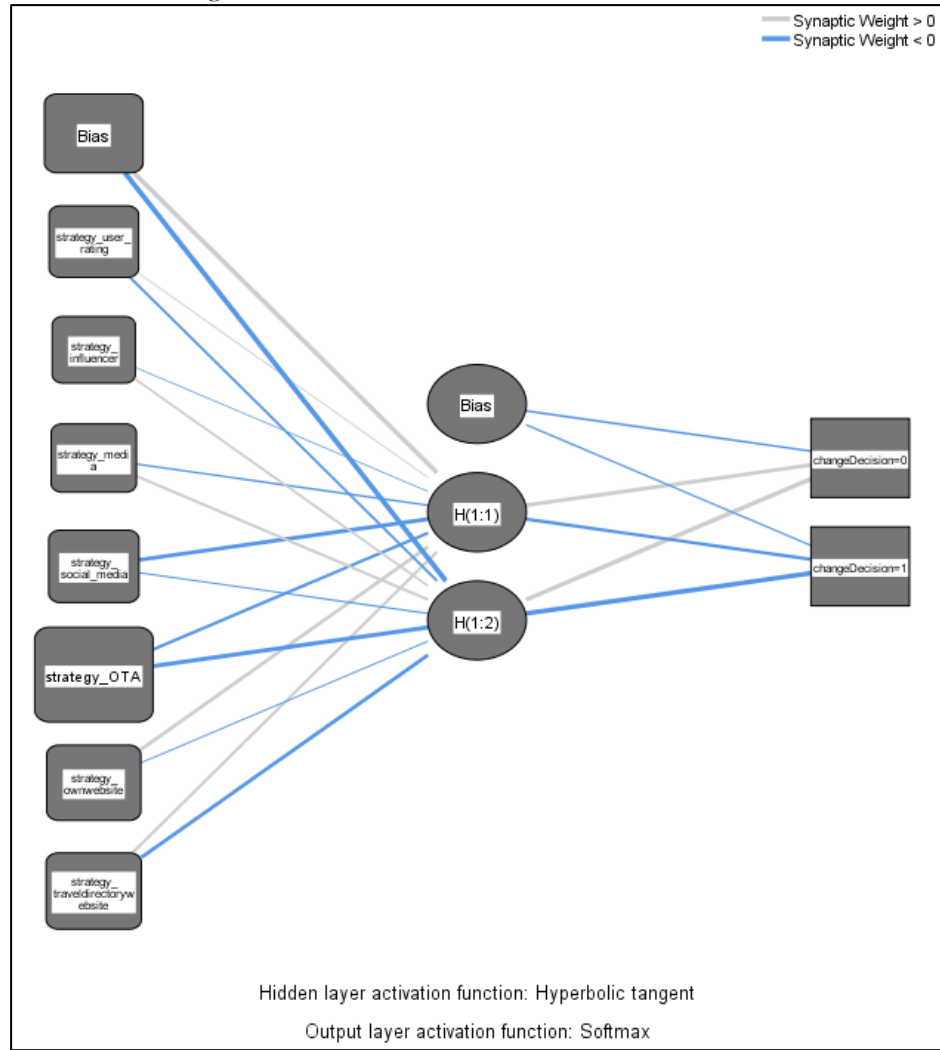
In the process of assessing the importance of variables, this research proposed a neural network model using data that incorporated seven digital marketing strategy variables from step 1. The dataset was partitioned, allocating 80% for training and 20% for testing. Furthermore, a 10-fold cross-validation was performed to guard against overfitting. Table 9 presents the statistical metrics obtained from the training and testing datasets (Agatonovic-Kustrin & Beresford, 2000). In evaluating the ANN, the accuracy as shown in formula (4) were performed for evaluation the model.

$$\text{Overall accuracy} = \frac{TP + TN}{N} \quad (4)$$

When TP is True Positive, TN is True Negative, N is number of datasets.

The overall accuracy values presented in Table 10 range between 80.40% and 96.79%, indicating a high degree of performance. This signifies that the neural network model effectively aligns with the task of explaining the relationship between predictors and outcomes.

Figure 2. Neural network architecture



Source: Elaborated by the authors (2024).

Table 9. Number of training and testing dataset

Network	No. of training	No. of testing
1	271	75
2	282	64
3	261	85
4	276	70
5	273	73
6	278	68
7	266	80
8	269	77

9	275	71
10	272	74

Source: Elaborated by the authors (2024).

Table 10. 10-fold cross-validation of ANN approach

Network	Overall accuracy (training)	Overall accuracy (testing)
1	96.79%	81.59%
2	86.20%	84.30%
3	83.90%	92.49%
4	88.10%	85.74%
5	86.40%	89.79%
6	85.90%	84.50%
7	86.20%	87.50%
8	80.40%	90.79%
9	86.40%	91.90%
10	86.10%	90.79%

Source: Elaborated by the authors (2024).

Table 11. Independent Variable Importance

Rank	Variable Name	Digital Marketing Strategies	Importance	Normalized importance (%)
1	strategy_OTA	OTA	0.381	100 %
2	strategy_traveldirectorywebsite	Travel directory website	0.158	41.4%
3	strategy_ownwebsite	Own website	0.147	28.4%
4	strategy_social_media	Social Media marketing	0.110	28.5%
5	strategy_user_rating	User rating	0.103	27.0%
6	strategy_media	Content marketing	0.061	15.9%
7	strategy_influencer	Influencer marketing	0.040	10.6%

Source: Elaborated by the authors (2024).

The results obtained from the ANN in Table 11 present the ranking of the influential digital marketing strategies affecting the selection of travel destinations within Thailand. Notably, the variable holding the highest rank in terms of importance is OTA websites, aligning with the outcomes of the logistic regression analysis conducted in Step 2. Additionally, when considering the top 4 influencing strategies, the results from both analytical methods generally concur, albeit with minor variations in their specific rankings. Nonetheless, the analyses from both methods collectively emphasize that the primary predictor of decision-making is OTA websites.

5. Discussion

The research highlights that OTA are a crucial factor in Gen-Z travelers' destination choices. In the context of Thailand, a trend supported by Puttanont (2022) and Srichunpothikun and Kitisrivorapan (2023), who noted a rapid increase in Airbnb usage among Thai Gen-Z. The research found that marketing mix factors significantly influence online bookings through OTA. OTAs' popularity is driven by their ability to offer extensive information on accommodations, travel resources, and nearby attractions, along with user-friendly search and filter features that allow customization based on criteria like pricing and amenities (Bi et al., 2022; Pinto & Castro, 2019; Yang & Leung, 2018). As a result, tourism businesses, especially those in the accommodation sector, must prioritize marketing through OTA, with a particular focus on targeting Gen-Z. This can be achieved by creating content specifically tailored to this demographic, such as images, videos, and travel activity promotions. Additionally, businesses should carefully plan pricing strategies and allocate room availability across various OTA, followed by analysis to develop more insightful marketing campaigns in the future.

The research also found that significant importance on social media for travel planning. The previous research (Ding & Md Syed, 2022; Jayasinghe & Madushanka, 2021; Long, 2022; Popović, 2022; Zajadacz & Minkwitz, 2020) indicated that Gen-Z highly values the utility of social media, employing it as a means of seeking information that subsequently influences their intention to visit a destination. Gen-Z tends to turn to social media platforms to explore destinations that offer accessibility, showing a strong preference for locations with uncomplicated access, such as those with no visa requirements or neighboring destinations. Consequently, this inclination significantly enhances their intent to visit these particular destinations. In context if of Thailand, This is consistent with Sasunthorn et al. (2021b) that found Thai Gen-Z is more likely to use social media for traveling, especially if they are influenced by subjective norms such as family approval, friends' recommendations, or following close relationships. This highlights an opportunity for the tourism industry to engage in B2C marketing, directly selling to consumers through social media, especially for small to medium-sized accommodation businesses. This remains a promising opportunity to building a tourism brand, businesses should also prioritize cultivating a strong presence on social networks (Albayrak et al., 2020).

Although social media is crucial for businesses, the existence of a well-established business website (Own website strategy) can also contribute to the credibility of the enterprise. This includes having the website listed in reputable web directories (Travel directory website), especially those associated with tourism organizations in the city or country, which can further enhance awareness. A well-designed website improves client satisfaction and online visibility, which in turn helps the tourism industry succeed and expand (Dwiningwarni et al., 2021).

From the results of this research, it can be concluded that the top three digital marketing strategies influencing Gen-Z's decision to choose travel destinations are OTAs, social media, and owning a website. These three channels are touchpoints in the customer decision-making process. Specifically, OTAs, social media, and owning a website can create awareness, provide information for decision-making, and facilitate the booking or purchase of products and services. This aligns with the digital media usage behavior of Gen-Z, who seek quick, agile interactions and seamless business transactions through digital media.

6. Conclusion

Digital marketing holds a pivotal role in the realm of tourism. It serves as a means to convey information and narratives that can inspire individuals in making travel choices. To achieve this, tourism businesses must formulate digital marketing strategies that furnish tailored content to enthrall potential travelers, aid them in their decision-making journey, and pick the most effective tools for engaging with

their intended audience. This study analyzes various of marketing strategies within the decision-making process of tourists, which differs from previous research that typically focused on a single strategy.

The research suggests employing machine learning techniques to analyze the digital marketing strategies that affect the travel destination decisions of Gen-Z travelers. According to the findings of the investigation conducted using the Pearson Correlation approach, seven digital marketing methods have an impact on Gen-Z travelers' destination decision-making which are user ratings, influencer marketing, content marketing, social media, Online Travel Agency (OTA) websites, own websites, and travel directory. On the other hand, the digital marketing tactics like email marketing, search engine optimization, promotional campaigns, and recommendation systems do not show statistically significant impacts on decision-making at a 95% confidence level.

Utilizing logistic regression techniques to assess the relationship among the independent variables, which encompass the seven digital marketing strategies from the initial phase, it is evident that all seven strategies hold the potential to sway Gen-Z travelers in altering their destination preferences. Notably, data derived from Online Travel Agency (OTA) websites exerts the most substantial impact, evidenced by an odds ratio of 1.6879. Subsequently, social media strategies and the establishment of their individual business websites within the travel industry exhibit a diminishing level of influence, aligning with the findings yielded by the Artificial Neural Network (ANN) analysis.

From the results of the study, it can be observed that logistic regression and Artificial Neural Network (ANN) techniques serve as valuable tools for analyzing the influence of digital marketing strategies on the decision-making process of Gen-Z travelers when choosing their travel destinations. Logistic regression offers a transparent and interpretable way to understand how various digital marketing strategies are related to the likelihood of a Gen-Z traveler selecting a particular destination. This is valuable for businesses and marketers seeking to grasp the specific impact of each strategy and identify those with statistically significant effects on Gen-Z travelers' destination choices, allowing them to prioritize the most influential strategies. In addition, ANNs can capture intricate and nonlinear relationships between multiple digital marketing strategies and the decision-making process of Gen-Z travelers. They are capable of modeling complex patterns that may not be evident through traditional statistical methods (Bozak & Aybek, 2022).

However, demographic variables were not comprehensively focused on, as they were not within the scope of the research, which resulted in a limitation on the application of the findings of this research. Future studies may consider incorporating demographic variables, including other age groups, into their analysis, encompassing individuals across all age groups, to explore variances. Such an approach would enable the formulation of digital marketing strategies tailored to the unique preferences of diverse target customer segments. Furthermore, in-depth investigations could be conducted into specialized forms of tourism, such as digital marketing for community-based tourism, with the goal of increasing awareness, expanding accessibility, and enhancing economic opportunities within these communities.

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Brief description of Author/Authors:

Pattaraporn Warintarawej, Ph.D.

ORCID ID: <https://orcid.org/0000-0002-2034-1932>

Affiliation: Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Thailand.

Email: pattaraporn.w@psu.ac.th

Pattaraporn Warintarawej received the Ph.D. degrees in Computer Sciences from Université Montpellier-II, France. She joined the Department of Applied Mathematic and Informatic, Faculty of Science and Industrial Technology, Prince of Songkla University (PSU), Surat Thani Campus, Surat Thani, as a lecturer since 2006. Her current research interests include data mining, business data analysis, mobile programming, and web programming.

Jariya Seksan, Ph.D.

ORCID ID: <https://orcid.org/0000-0003-2875-072X>

Affiliation: Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Thailand.

Email: jariya.se@psu.ac.th

Jariya Seksan obtained her Ph.D degree in Applied Statistics from National Institute of Development Administration, Thailand. She is now a lecturer at the Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Thailand. Her current research focuses on statistical modeling, data science, operations research, and applied statistics.

Nattaporn Thongsri, Asst. Prof.

ORCID ID: <https://orcid.org/0000-0002-4077-8517>

Affiliation: Faculty of Science and Industrial Technology, Prince of Songkla University, Surat Thani Campus, Thailand.

Email: nattaporn.th@psu.ac.th

Nattaporn Thongsri is currently an assistant professor in Information Systems. She received a scholarship from the Chinese government to pursue her doctoral studies. She earned her PhD in Management Science and Engineering from the School of Management at Huazhong University of Science and Technology, Wuhan, China. Her teaching and research interests include business intelligence, data science, technology acceptance, educational informatics, and information systems.