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IDENTIFICATION OF NEW MEDIA TECHNOLOGY FACTORS AND RESEARCH ON BIG DATA IN THE TOURISM INDUSTRY

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Abstract. *With the rapid development of Internet technology, various marketing tools are emerging and are being used in tourism destination areas. The characteristics of new media have many similarities with tourism marketing, which conforms to the characteristics of destination marketing's target market. Using the new media to perform marketing and increase the coverage of information is notably low-cost, enhances interactions, enables more convenient communications, and improves the efficiency of marketing. However, there are risks in the new media marketing, and there are certain limitations in certain aspects. To successfully use this double-edged sword to promote the overall promotion of tourism destination marketing, it is necessary to summarize the exploration and practice of new media on tourist destinations, introduce advanced marketing concepts, such as integrated marketing, relationship marketing, viral marketing and event marketing, and propose a set of effective new media marketing operations, methods and strategies. This paper studies the key success factors of tourist destinations. First, according to the nature of new media in tourist destination, the new media recognition standard for the tourist destination is proposed. Second, using the Delphi method and the system evaluation method, a new media related success factor identification scheme is established to foster the core of new media training in the tourist destination. These abilities provide relevant suggestions.*

Keywords: New media enterprises, Key success factors, Big data

1. **Introduction.** Based on the rapid development of Web 2.0 and mobile Internet technology, new communication channels, such as digital network media and mobile terminals, are deeply affecting people's lives. The characteristics of interaction, immediacy, diversity, sharing and others have gradually broken the pattern of communication of traditional media and enable users to actively participate in the creation and dissemination of information. Before discussing the image of the destination image in the new media era, the word "new media" should be defined first. Several scholars have proposed the concept of "new new media" and think that the most important feature of the new media is that the consumers of information become producers. According to this explanation, tourism destination websites, virtual reality and augmented reality will not belong to the new new media category. The term "new media" is still used in this paper to refer to all media forms born in computers. In the study of the existing destination image literature, the research on the use of the tourist destination website research, blogs and other new media has not made a substantial difference in the method and path to date. Second, the new media concept can also be included in virtual reality, augmented reality and other new technology platforms in the discussion. The new media provides a platform for information communication for tourist destinations, provides valuable information for the

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research of destination images, and expands the path of the research of destination images. However, conversely, there are some controversies in the study of destination images under the new media, which has triggered the opportunity for theoretical innovations in destination images.

New media has become the fastest-growing Internet application in China. However, there are very few studies on new media in tourism destinations, and there is no in-depth analysis on the promotional factors of new media in tourism destinations. Based on the actual situation of the promotional factors of new media in tourism destinations, this paper uses the ISM method to study new media in tourism destinations and conducts empirical analysis and research.

2. **Research on Tourism Destination in New Media Era.** Foreign research on tourist destinations began in the 1970s and China started in the 1990s. This type of literature was first seen abroad in 1995, and the scholars focused on the new changes in destination marketing. Domestic research on this field started later. In the work of [1-3], it is still in the stage of establishing the specific method of concrete analysis. Most research stays in the introductory and illustration levels. The tourist destination operation mechanism of the new media marketing has not been established to date and remains for further in-depth study.

The abundance of research has also brought about the development of the research path. The destination image research is not limited to data collection using questionnaires, but it has expanded to all aspects of data acquisition research methods and results and has formed a new research path. In the work of [4,5], the research of the destination image in the new era depends on network data. Data acquisition can be done by manually collecting or grasping software, such as network text and images. According to the data analysis method, the new media of destination image can be divided into 3 stages. In the first stage, the destination image researcher extracts the information from tourism websites, search engines, blogs and platforms and quantitatively analyzes the keywords in the textual data. In the second stage, the researcher applies artificial text encoding and uses the image content to quantitatively assess the relationship between the research theme or topic based on the destination image's connotation and interpretation. In the third stage, the study of the destination image based on computer software or algorithms is presented. Tseng et al. [7] used the Leximancer with China as the destination and conducted textual analysis on 630 travel blogs. Deng et al. [8] used machine learning on Flickr images and conducted textual data modeling and simulations to assess the relation between the destination image and its cognitive and emotional associations. Finally, in terms of the results, the new media era destination image research and destination image theoretical discussions can also offer advice on destination marketing, and even provide advice for the development of marketing tools.

3. **Key Success Factors of New Media.** The key success factors of the industry (KSFs) are the key factors affecting the management and the competitive position of the tourist destination. Only by surpassing their competitor(s) on the KSFs can the tourist destination maintain the leading position among the tourist destinations. In the present situation, most tourist destinations cannot effectively identify the KSFs of its new media marketing. Although domestic and foreign scholars have analyzed the basic characteristics of KSFs and studied the basic identification methods of KSFs, there is no further discussion of the relationships between the various KSFs. This finding results in the related tourism destinations being unable to clearly identify and treat the relationships between the various KSFs in the process of new media marketing. Based on the above problems, this paper takes the tourist destination as an example and uses the interpretive structural modeling (ISM) analysis method to study the relationship between KSFs and

form its KSFs identification scheme to provide a theoretical basis for the identification of its new media KSFs and the key links of its marketing for the tourist destination.

Based on the above research contents, we can draw three hypotheses for the new media diffusion model of tourism destination.

The effect of new media marketing (net topic) on tourist destinations is positively related to the average number of new media releases per day, the number of tourist destinations and the average transmission of new media in tourist destinations.

The number of fans is positively correlated with the number of new media and emotional new media.

The average forwarding volume is positively correlated with the number of new media and emotional new media.

The three linear regression models are as follows:

$$y_i = \alpha_0 + \alpha_1 x_{1i} + \alpha_2 x_{2i} + \alpha_3 x_{3i} + \mu_i \tag{1}$$

$$z_i = \beta_0 + \beta_1 x_{4i} + \beta_2 x_{5i} + \mu_i \tag{2}$$

$$m_i = \gamma_0 + \gamma_1 x_{4i} + \gamma_2 x_{5i} + \mu_i \tag{3}$$

where y_i is the net word (that is, the effect of new media marketing in tourist destinations), x_{1i} is the average number of new media releases per day, x_{2i} is the average forwarding amount, x_{3i} is the number of fans, x_{4i} is a new tool type media number, and x_{5i} is the new emotional media number. μ_i is a regression error term, $i = 1, 2, \ldots, N$, and N is the number of new media in tourist destinations. α, β, γ are the coefficients of variation.

Based on the references in foreign related literature, and through communications with tourist destination managers and new media research experts, we confirmed the 9 main factors affecting the development of new media in tourist destinations. The elements are as shown in Table 1.

Table 1. Definitions of external and internal promotion factors

Code name	Factors
a1	(1) The proportion of active users is large.
a2	(2) The growth of mobile users is strong.
a3	(3) Social proliferation.
a4	(4) A highly anticipated information release platform.
a5	(5) A platform for enterprise data mining.
a6	(6) New media search opportunities are huge.
a7	(7) Mobile payments.
a8	(8) The number of users is still growing fast.
a9	(9) Dabbling in new business units.

4. **Explanation of the Establishment of the Structural Model.** The interpretive structural modeling (ISM), which is also known as ISM analysis, is a model for the qualitative representation of the system's elements and the inherent interdependence, mutual restrictions and correlations between them. This modeling provides a means to analyze the complex elements of the system, which can be used to structure the complex elements hierarchically. In this paper, the ISM method is adopted to classify and analyze the factors that promote the development of the tourism destination, and reveal the mutual relationships among driving factors and the degrees of influence. Based on the characteristics of the KSFs, this paper analyzes the relationships between the above 13 KSFs by establishing the interpretive structural modeling (ISM) and explores the KSFs that influence the successful operations of tourist destinations; if it has a direct impact, it is assigned a value of 1. Otherwise, the value is 0.

The adjacency matrix A describes the 22 causalities between factors, namely, the direct relationships. This is based on mathematical law and the Boolean algebra operation rule, which can describe the factors between the direct and indirect effects of r. The reachable matrix of the relationship is established between the operational method to establish the matrix for the unit, $A2 = (A + I)2$. If $A1$ is not equal to $A2$ and An minus 1 is equal to An, then $R = An - 1 = (A + I)n - 1$.

Among these notations, I is the identity matrix, and n is the order number of the matrix. The matrix calculation is obtained by Matlab. Therefore, the accessibility matrix $R = A2 = (A + I)2$ indicates that the longest indirect influence path between each factor is not more than 2, as shown in Table 2.

$$A = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 & 1 \\ 1 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 & 0 \end{bmatrix}$$

We can solve for the accessibility matrix.

$$R = A + I = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 1 \\ 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & 1 & 0 & 0 & 1 & 0 & 0 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 1 & 1 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 & 0 & 0 & 1 & 1 & 0 \\ 1 & 0 & 1 & 0 & 1 & 0 & 1 & 0 & 1 \end{bmatrix}$$

In the accessibility matrix R, if the element is an element, the row factor has direct or indirect effects on the column factors (including autocorrelation). In other words, the row factor affects the column factor, and if the element is not an element, the row factor has no effect on the column factor. According to the ISM method, we grade matrix using A division and establish the A reordering of the matrix. First, according to the list of the matrix of each factor of set R (Si), first set A (Si) and common set C (Si), we use the highest factors to calculate level 1, including the reachable matrix row to the rows and columns of all of the factors that are the highest. The second highest level factor is

Table 2. Interrelationships between factors

Factors	a1	a2	a3	a4	a5	a6	a7	a8	a9
a1	0	0	0	0	0	0	0	0	0
a2	1	0	0	0	0	0	0	0	1
a3	0	0	0	0	0	1	0	0	0
a4	0	0	0	0	0	0	1	0	0
a5	1	0	0	0	0	0	0	0	0
a6	0	0	0	0	1	0	0	0	1
a7	1	0	0	0	0	0	0	1	1
a8	1	0	0	1	0	0	1	0	0
a9	1	0	1	0	1	0	1	0	0

discovered from the remaining accessible matrix. This process repeats until we calculate each level that contains the subsequent highest factor. Then, according to the result of the division level, we reorder the matrix. There is a large workload, especially when there are very complicated factors.

In fact, R is highly correlated with matrices. In other words, the influence of the system's sum of each element indicates the dependency of the column factors, which is the extent of the influence of the other factors. The results of the rank order are as shown in the table.

$$\text{By } R^2 \neq R^3 = R^4 = \begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 & 0 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 1 & 1 & 1 & 1 & 1 & 1 \end{bmatrix} = M \text{ solve the connection point.}$$

Table 3. Assigning variables

α_i	$R(\alpha_i)$	$A(\alpha_i)$	$R(\alpha_i) \cap A(\alpha_i)$
1	1	1 2 3 4 5 6 7 8 9	1
2	1 2 3 4 5 6 7 8 9	2	2
3	1 3 4 5 6 7 8 9	2 3 4 6 7 8 9	3 4 6 7 8 9
4	1 3 4 5 6 7 8 9	2 3 4 6 7 8 9	3 4 6 7 8 9
5	1 5	2 3 4 5 6 7 8 9	5
6	1 3 4 5 6 7 8 9	2 3 4 6 7 8 9	3 4 6 7 8 9
7	1 3 4 5 6 7 8 9	2 3 4 6 7 8 9	3 4 6 7 8 9
8	1 3 4 5 6 7 8 9	2 3 4 6 7 8 9	3 4 6 7 8 9
9	1 3 4 5 6 7 8 9	2 3 4 6 7 8 9	3 4 6 7 8 9

Find the first node of $L(1) = [1]$.
Use the first row and first column to continue locating second nodes at $L(2) = [5]$.
The third stage node is $L(3) = [3\ 4\ 6\ 7\ 8\ 9]$.
The fourth stage node is $L(4) = [2]$.

5. **Explaining the Interpretive Structural Modeling (ISM) Analysis.** According to the reordering reachable matrix R^*, the factors that have the same driving forces are used as the same hierarchical structure level factors and expressed in the same horizontal position box. This approach is undertaken according to the factor box connected with the influence relation of Table 2 with the arrow line. Next, according to the factors that influence the relationship, the structure model diagram can be obtained, as shown in Figure 1. This step is taken according to the factor box connected with the influence relation of Table 2 with the arrow line.

From the figure, we can see that the relationship between RSFs of tourist destinations is 4 levels under the new media environment. Among these levels, the strong growth of mobile terminal users uses the basic KSFs in the industry, which is the basic level of the ISM. Under the guarantee of this basic ability, social diffusion, high expectations of the information publishing platform, huge opportunities for new media research, mobile payments, the speed of the user number development are still too fast, and new business units are involved. With the combined support of these associated capabilities, the ability of the project selection and destination is formed. Under the support and guarantee of the above related capabilities, the new media data mining platform is formed, which is the

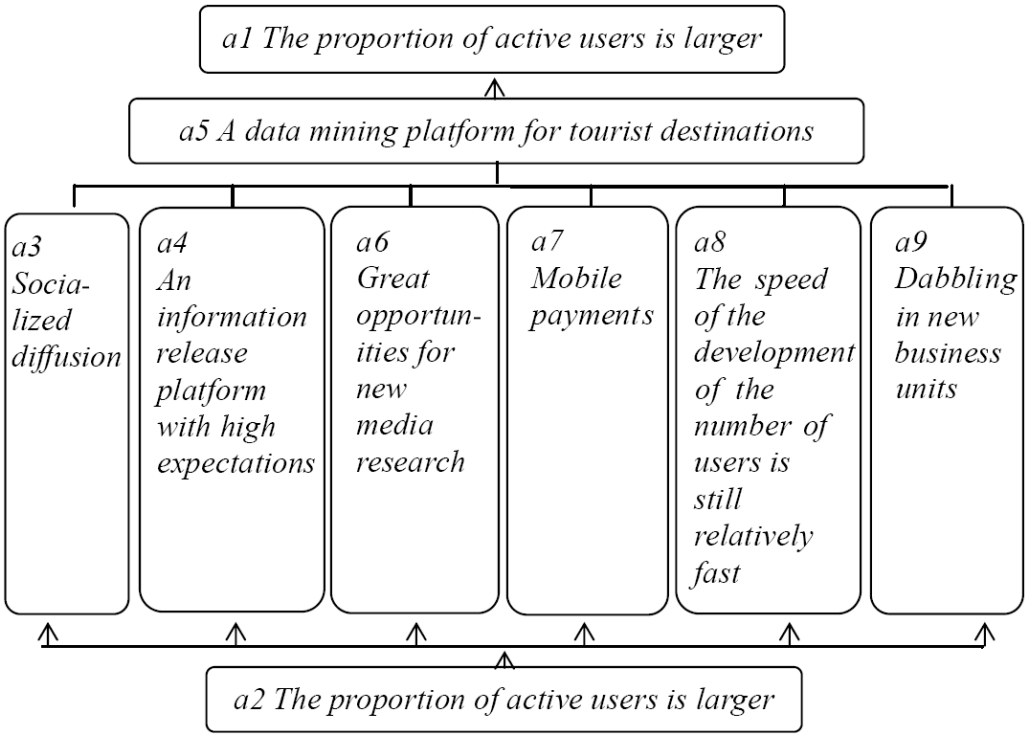

FIGURE 1. Explanation of the structure model diagram

third basic layer of KSFs. Finally, the above 4 level factors take the related capabilities that directly support and guarantee the proportion of active users.

6. **Conclusions.** This paper first uses the Delphi method and system evaluation method to propose the industry KSF identification scheme. Second, through the establishment of interpretive structural modeling (ISM), the method of determining the correlations of KSFs is discussed, and the identification and determination methods of KSFs are proposed based on the above two methods. Through empirical research, the paper determines that the KSFs of tourist destination should include social diffusion, a high expectation of an information publishing platform, great opportunities for new media search, mobile payments, the rapid development of the number of users, new business units, new media data mining platform, and a large proportion of active users. We can see that these elements have obvious hierarchical characteristics. It is suggested that the new media in tourism destinations should focus on the users of the mobile terminal in the management of KSFs. Only after a certain guarantee of the basic KSFs related capabilities can the other 6 KSFs be further strengthened. Otherwise, the promotion of high level KSFs when the KSFs are not strong enough at the grass-roots level will often result in the enhancement of the developmental direction of the enterprise, but the costs and effects of new media have little effects. Furthermore, this marketing strategy will also bring greater business risks.

In the new media era, the updating and replacement of the online visual content are more rapid, which makes the destination image operate in a state of continuous social reconstruction. Researchers can collect the visual representation in a certain period of time, and use a longitudinal study to explore the dynamic construction of the destination image. This approach will allow tourism operators to turn to the visual representation of the destination, which can arouse the emotional resonance of the market and the trust in the brand.

Currently, new media is moving towards high speed development. To better develop and expand tourist destinations, it is an inevitable choice to stimulate users' activity. This

method has great significance for guiding tourism destinations' top managers, helping them to prioritize and identifying how to address the critical success factors. In future research, we should also do some analysis and prediction in terms of constraints. This will make new media's research on tourism more comprehensive.

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