Input-Output Model and Decision Path Analysis of Tourism Social Media Marketing

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Abstract: *As social media's role in tourism decision-making becomes increasingly prominent, the field of tourism marketing urgently requires a scientific input-output evaluation framework and decision support system. Focusing on the core characteristics of tourism social media marketing, this study systematically constructs an input-output model incorporating a multidimensional indicator system and dynamic functional relationships. By defining quantitative dimensions for core elements such as content, interaction, data, and technology, it proposes a comprehensive theoretical framework covering resource input, value conversion, and feedback optimization. Building upon this foundation, the study further designs a situational diagnosis method based on model outputs, a resource adaptation strategy generation mechanism, and a data-driven closed-loop decision path, forming a complete methodological system from theoretical construction to practical application. This provides a theoretical basis and practical guide for tourism enterprises to achieve optimal allocation and dynamic adjustment of marketing resources in complex social environments.*

Keywords: *Tourism Social Media Marketing; Input-Output Model; Decision Path; Dynamic Optimization; Data-Driven*

Introduction

The deep integration of the tourism industry and social media has reconstructed the traditional marketing paradigm; however, a systematic theoretical framework for the quantitative relationship between marketing resource input and output benefits has not yet been established. The intangible and experiential characteristics of tourism products, coupled with the dynamic complexity of the social media ecosystem, make traditional marketing evaluation models difficult to adapt effectively to the emerging environment. Constructing an input-output model specifically for tourism social media marketing is not only an inherent requirement for theoretical development but also a practical prerequisite for the industry to optimize resource allocation and enhance marketing effectiveness. By analyzing the theoretical evolution and value logic of tourism social media marketing, this study establishes a multidimensional indicator system and a dynamic model architecture, and further explores decision paths based on model outputs. It aims to address the existing research gaps in systematicness, dynamism, and operability, thereby providing methodological support for scientific decision-making in the digital marketing field for tourism enterprises.

1. Tourism Social Media Marketing Theory and Model Construction Foundation

1.1 Theoretical Evolution and Connotation Definition of Tourism Social Media Marketing

The theoretical foundation of tourism social media marketing has undergone an evolutionary process from one-way communication to interactive co-creation. Its early development drew on the core ideas of traditional marketing theory, focusing on information diffusion and brand display. With the maturation of Web 2.0 technology, user-generated content theory and social exchange theory were introduced, emphasizing users' initiative in content creation and value transmission. Recently, this field has further integrated perspectives from relationship marketing and experiential marketing, shifting the focus to how to build stable customer relationships through continuous interaction, and how to create immersive travel experience expectations through narrative and multi-sensory content.

Based on this evolutionary context, the connotation of tourism social media marketing can be defined as an organizational function and strategic process that uses social media platforms as an

interactive field, through strategic content creation, community operation, and data insights, aiming to co-create tourism experience value with users, build long-term relationships, and achieve specific marketing goals. This definition transcends the instrumental perception of social media as a simple channel, highlighting its core characteristic as a value co-creation platform[1].

1.2 Core Elements and Value Logic of Tourism Social Media Marketing

The effective operation of tourism social media marketing relies on the systematic integration of several core elements. The content element serves as the foundation for attracting user attention and stimulating resonance, with its forms including visual imagery, narrative texts, and practical information; its core lies in creating and transmitting value capable of evoking travel aspirations. The interaction element constitutes the vitality source of the platform ecosystem, manifesting as two-way dialogues and community participation between brands and users, as well as among users themselves, whose quality directly influences the construction of relationship strength. The data element provides support for precise and intelligent decision-making, offering basis for strategy optimization through the analysis and interpretation of user behavior data, content performance data, and market trend data.

The technology element supplies the underlying architecture for functional implementation, encompassing platform algorithms, data analysis tools, and emerging immersive technology applications. These elements interact collectively to form its unique value logic: attracting potential tourists through high-quality content, establishing trust and a sense of belonging through deep interaction, enhancing marketing efficiency by utilizing data analysis, and ultimately converting social platform attention into destination awareness, positive impressions, and concrete pre-trip decisions and consumption behaviors, thereby achieving the transformation of social capital into economic capital.

1.3 Construction Paradigm for Social Media Marketing Models in the Tourism Sector

Constructing social media marketing models applicable to the tourism sector requires following a specific construction paradigm to reflect the industry's uniqueness. This paradigm first demands that models be capable of characterizing the intangibility and experiential nature of tourism products and services, which implies that models must incorporate the measurement and correlation of abstract constructs such as destination image perception and emotional association.

Secondly, model construction must adopt a dynamic systems perspective, treating marketing activities as a continuous cyclical process encompassing resource input, activity execution, market response, and effect evaluation, rather than as isolated, one-off events. At the methodological level, Structural Equation Modeling is often used to examine causal relationships between observed variables like content quality and interaction frequency and latent variables like brand equity and booking intention; whereas System Dynamics models are suitable for simulating the dynamic impact of different marketing strategy portfolios on market share over the long term[2]. A complete model construction paradigm typically begins with a clear definition of tourism marketing objectives, followed by the identification of key endogenous and exogenous variables, the establishment of theoretical relationship hypotheses among variables, and the calibration and validation of the model through empirical data, ultimately forming a theoretical framework with both explanatory and predictive power.

2. Construction of the Input-Output Model for Tourism Social Media Marketing

2.1 Indicator System for Input and Output of Tourism Social Media Marketing

2.1.1 Multidimensional Structure of Input Indicators

The input indicator system for tourism social media marketing exhibits distinct multidimensional structural characteristics. The capital input dimension comprises direct financial expenditures, including dedicated content production budgets, expenditure on feed advertising and keyword bidding, subscription fees for social media management platforms, and human resource costs for specialized operational teams. The attention resource input dimension is reflected in the strategic time allocation by brands to maintain community activity and user relationships, encompassing response time to user-generated content, frequency of guiding topic discussions, and intervention speed in crisis public relations. The technical input dimension covers operational costs of data analysis tools, audience profiling systems, and automated publishing platforms adopted to enhance content performance. This

multidimensional structure ensures that input assessment transcends simple financial measurement, comprehensively reflecting the various strategic resources consumed by marketing activities.

2.1.2 Comprehensive Evaluation Framework for Output Indicators

The construction of the output indicator system requires adopting a comprehensive evaluation framework that balances short-term benefits and long-term value. The economic output dimension directly measures the economic effectiveness of marketing activities through key financial indicators such as conversion rate, customer acquisition cost, and return on investment. The brand equity output dimension reflects changes in brand health through indicators like the brand's share of voice within social networks, sentiment distribution characteristics, and sharing rate. The user relationship output dimension gauges the depth and quality of community relationships through interaction rate, net follower growth rate, user retention rate, and the volume of high-quality user-generated content. The market insight output dimension manifests as the strategic informational value obtained through social listening, including competitive intelligence, trend forecasting, and product improvement needs. This comprehensive framework ensures the output assessment can fully capture the multi-layered value created by marketing activities[3].

2.2 Variable Selection and Functional Relationship Specification in the Model

2.2.1 Operational Definitions of Core Variables

The selection of model variables must be based on clear operational definitions. The content quality variable can be quantified through objective indicators such as professional ratings, completion rates, and visual-textual complexity. The user participation variable should be differentiated into two levels: superficial participation and deep participation. The former includes low-threshold behaviors such as liking and viewing, while the latter encompasses high-engagement behaviors such as commenting, sharing, and saving. The brand impact variable is measured through social listening metrics including mention volume, sentiment polarity, and topic penetration rate. The conversion behavior variable requires establishing a complete tracking path from content exposure to final purchase, covering key nodes such as link clicks, lead submissions, and completed purchases. These operational definitions ensure the precise transformation of abstract constructs into measurable indicators.

2.2.2 Theoretical Construction of Functional Relationships Between Variables

The theoretical construction of functional relationships between variables must account for the dynamic characteristics of marketing activities. A nonlinear relationship exists between content quality and user participation, where the marginal effects on engagement significantly increase once content quality surpasses a specific threshold. The relationship between user participation and conversion behaviors is moderated by the complexity of the purchase decision, with the conversion effect being most pronounced in scenarios combining high participation and low decision complexity. Time lag effects manifest differently across variable relationships; the impact of content exposure on brand awareness typically materializes in the short term, while its influence on purchase decisions may span several user decision cycles. As a key moderating variable, platform algorithms continuously alter content distribution efficiency and user reach effectiveness, necessitating regular calibration of functional relationships to adapt to ecosystem changes.

2.3 Overall Architecture of the Tourism Social Media Marketing Input-Output Model

2.3.1 Core Components and Operational Mechanism of the Model

The architecture of the input-output model forms an organic whole composed of four core components: input, processing, output, and feedback. The input component is responsible for receiving various types of resource investment data and standardizing them into parameter forms processable by the model. The processing component contains a content distribution engine, a user response simulator, and an effectiveness evaluation module, which simulate the conversion path of marketing resources within the social ecosystem through preset algorithmic rules. The output component generates multidimensional result data, including brand indicators, user indicators, and commercial indicators. The feedback component generates optimization suggestions and reconfigures input parameters by comparing the differences between expected goals and actual results. The synergistic operation of these components constitutes the model's complete operational mechanism[4].

2.3.2 Dynamic Adaptation and Optimization Cycle of the Model

The most innovative feature of this architecture lies in the dynamic adaptation and optimization cycle mechanism it establishes. The short-term optimization cycle operates on a weekly or monthly basis, making tactical adjustments to content strategy and advertising bids based on the real-time monitoring of output data. The medium-term learning cycle analyzes historical campaign data to identify high-efficiency content patterns and optimal interaction timings, thereby optimizing the formulation of marketing strategies for the next phase. The long-term evolution cycle focuses on structural changes in the social platform ecosystem, including macro factors such as the emergence of new features, shifts in user behavior, and algorithm updates, leading to fundamental revisions of the model's core parameters and relational assumptions. This multi-tiered cyclical system ensures the model maintains predictive accuracy and decision-support value under conditions of continuous external environmental change.

3. Research on Tourism Social Media Marketing Decision Paths Based on the Input-Output Model

3.1 Marketing Situation Identification and Diagnosis Based on Model Outputs

3.1.1 Integration of Multi-dimensional Performance Data and Situation Classification

The multi-dimensional performance data output by the input-output model forms the foundation for situation identification. Through the joint analysis of brand indicators, user behavior indicators, and commercial conversion indicators, several marketing situations with typical characteristics can be identified. The high interaction-low conversion scenario is characterized by active user participation in content interaction but a scarcity of actual booking behaviors. The low interaction-high conversion scenario reflects precise but narrow audience reach. The balanced development scenario shows healthy synchronous growth across all indicators, whereas the growth stagnation scenario indicates a decline in overall marketing effectiveness. This situational classification is based on the systematic identification of key indicator combination patterns, providing clear direction for subsequent diagnosis[5].

3.1.2 Quantitative Localization Method for Key Performance Bottlenecks

The core of situational diagnosis lies in the quantitative localization of key performance bottlenecks. Funnel analysis technology can precisely identify at which stage significant user drop-off occurs along the path from content exposure to final conversion. Attribution analysis can assess the contribution of different content types, interaction methods, and advertising channels to the final outcome, revealing structural issues in resource allocation. Benchmark comparison analysis contrasts current performance with that of industry leaders or the organization's own historical best practices, identifying existing gaps and areas for improvement. These quantitative methods collectively form the technical system for diagnosing the root causes of marketing situations.

3.1.3 Multi-factor Correlation Analysis of Situational Root Causes

A single factor rarely fully explains the formation of complex marketing situations; therefore, multi-factor correlation analysis is necessary. The correlation between content quality and audience relevance determines the effectiveness of user participation. The alignment between interaction strategies and platform algorithm characteristics influences the breadth of content distribution. The fit between brand positioning and user needs affects conversion efficiency. Using multivariate analysis methods such as structural equation modeling, the interaction mechanisms between these factors and how they collectively lead to the emergence of specific marketing situations can be revealed, providing a deep theoretical basis for strategy adjustment.

3.2 Marketing Strategy Plan Generation Under Different Resource Constraints

3.2.1 Comprehensive Optimization Strategy Under Ample Resource Conditions

In situations with relatively ample resources, strategy generation focuses on achieving synergistic effects through comprehensive optimization. The content strategy adopts a pyramid structure: the base layer consists of substantial routine content to maintain basic activity levels; the middle layer comprises serialized thematic content to deepen user cognition; the top layer features refined flagship content to establish industry authority. The channel strategy implements cross-platform integration, allocating differentiated content and interaction resources according to the characteristics of each platform. The

advertising strategy combines remarketing with lookalike audience expansion to systematically enlarge the high-quality user base. This comprehensive optimization strategy aims to build a comprehensive marketing advantage that is difficult to imitate[6].

3.2.2 Leveraged Focus Strategy Under Resource-Constrained Conditions

Resource-constrained situations require strategy generation to follow the principle of leverage, concentrating limited resources on the links with the highest output elasticity. Through sensitivity analysis derived from model outputs, key variables contributing the most to core objectives are identified, and a focused strategy is formulated accordingly. The content focus strategy may involve perfecting a single content format to achieve professional authority in a specific field. The channel focus strategy concentrates resources on the core platform where target users are most active, achieving deep penetration. The audience focus strategy clearly serves the most valuable key market segments, abandoning broad-spectrum coverage. This strategy maximizes resource utilization efficiency through strategic trade-offs.

3.2.3 Adaptive Adjustment Mechanism for Dynamic Resource Allocation

Changes in the marketing environment and resource conditions necessitate the establishment of an adaptive adjustment mechanism. Rolling budget planning breaks down annual budgets into quarterly or monthly allocations, dynamically adjusting resource distribution for the next phase based on the performance of the previous cycle. A flexible resource pool reserves a certain proportion of discretionary resources to capture sudden market opportunities or address unexpected challenges. Portfolio strategy testing continuously conducts small-scale experiments, using A/B testing and multivariate testing to validate the effectiveness of different strategy combinations, providing a decision basis for large-scale resource investment. This mechanism ensures that resource allocation remains highly responsive to market realities.

3.3 Dynamic Decision-Making and Feedback Optimization Path for Tourism Social Media Marketing

3.3.1 Design of Data-Driven Closed-Loop Decision Process

The core of the dynamic decision path lies in establishing a data-driven closed-loop management process. This process starts with the multi-dimensional indicators output by the model, converting data into specific action plans through preset decision rules. New data generated after plan execution is recollected and fed back into the model, forming a complete cycle of "monitoring-analysis-decision-execution-remonitoring." Decision threshold management sets warning lines and action lines for key indicators, automatically triggering corresponding decision processes when data reaches these thresholds. This closed-loop design ensures the systematic and continuous nature of decision-making, avoiding the uncertainties associated with reliance on intuition or ad-hoc decisions.

3.3.2 Strategy Iteration Optimization Mechanism Based on Reinforcement Learning

The optimization mechanism of the decision path draws on the core concepts of reinforcement learning. Positive and negative feedback generated after marketing strategy execution in specific environments is treated as reinforcement signals, based on which the system updates its estimation of the value of different strategies in corresponding contexts. The balance between exploration and exploitation is achieved by controlled experimentation with new strategies while concurrently maintaining proven effective ones. The multi-armed bandit algorithm provides a mathematical foundation for allocating trial resources among different strategies, ensuring learning efficiency. This mechanism enables the decision system to continuously improve its strategy selection through accumulated experience, gradually approaching optimal decisions.

3.3.3 Architecture and Functions of the Marketing Decision Support System

To realize the aforementioned dynamic decision-making and optimization, a specialized marketing decision support system needs to be constructed. The data integration layer is responsible for extracting and consolidating data from various social platforms, web analytics tools, and CRM systems. The analytics engine layer applies the input-output model and other analytical algorithms to transform raw data into decision insights. The visualization interface layer presents complex data in an easily understandable format to decision-makers through dashboards and reports. The strategy recommendation module, based on historical data and model predictions, provides validated strategy

options for different scenarios. This system architecture organically integrates data analysis, model computation, and decision processes, significantly enhancing the scientific nature and efficiency of marketing decisions.

Conclusion

This study establishes a methodological system spanning from theoretical framework to practical application by constructing an input-output model and decision path for tourism social media marketing. It systematically elaborates the theoretical foundation and value logic of tourism social media marketing, designs a model architecture encompassing multidimensional indicators and dynamic functional relationships, and proposes a decision path based on situation identification, strategy generation, and closed-loop optimization. This system not only achieves a quantitative characterization of the relationship between marketing inputs and outputs but also enhances the adaptability and sustainability of marketing strategies through a dynamic feedback mechanism. Future research could focus on the differentiated calibration of model parameters across cultural contexts, explore the deeper application of artificial intelligence technologies in improving prediction accuracy and automated decision-making, and investigate the reshaping effect of emerging technologies like virtual reality on the input-output structure of marketing, thereby continuously refining the theoretical system and practical methodology of tourism social media marketing.

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