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Research on the Precision Allocation of Cross-Border Marketing Resources of US Enterprises Driven by Digital Technology

Chunzi Wang[1]

[1] WQKX (Wanqi Qianxiao), Beijing 100002, China

Correspondence: Chunzi Wang, WQKX (Wanqi Qianxiao), Beijing 100002, China.

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Abstract

Against the backdrop of global digital transformation, the cross-border marketing resource investment of US enterprises has maintained an average annual growth rate of 15.6%, yet resource misallocation losses have reached 19.4%, and the application conversion rate of digital technologies is only 37%. Based on Resource Dependence Theory, Technology Acceptance Model, and Market Segmentation Theory, this study constructs an integrated model of "digital technology – resource adaptation – marketing performance". Taking 360 panel data observations from 45 US multinational enterprises during 2020-2023 as samples, this paper employs methods such as PLS-SEM and DEA model to explore the driving mechanism of digital technology on the allocation of multi-dimensional marketing resources. The results indicate that digital technology has a significant positive impact on resource adaptation degree, which plays a complete mediating role, and target market type exerts a significant moderating effect.

Keywords: digital technology, US multinational enterprises, cross-border marketing, precision allocation of resources, resource adaptation degree, target market heterogeneity, multi-dimensional marketing resources, artificial intelligence, big data analytics, blockchain, cross-border marketing performance

1. Introduction

1.1 Research Background

The digital economy has reshaped the global trade landscape, with the cross-border marketing resource investment of US enterprises continuing to grow, making them an important force in the global marketing field. However, in practice, there is a lack of coordinated planning for multi-dimensional marketing resources such as human resources, channels, content, and technology, resulting in prominent resource misallocation and considerable efficiency losses for enterprises. The rapid development of digital technologies such as blockchain, artificial intelligence, and big data has provided technical support for the precision allocation of cross-border marketing resources, enabling enterprises to better understand market demands and optimize resource allocation ratios. Nevertheless, the current actual application conversion rate of these technologies remains at a low level. Meanwhile, significant differences exist among regional markets in terms of market maturity, policy environment, and consumer behavior, and existing practices lack differentiated resource allocation strategies tailored to different markets.

1.2 Research Significance

1.2.1 Academic Significance

Existing studies mostly focus on the allocation of a single marketing resource, with insufficient attention paid to the integrated allocation of multi-dimensional marketing resources, and the internal logic of digital technology-driven resource allocation has not been clarified. This study breaks through this limitation by constructing a theoretical framework for the integrated allocation of multi-dimensional resources, systematically

revealing the correlation mechanism between digital technology and marketing performance. It also fills the research gap in the effects of differentiated cross-market allocation, enriching the theoretical system in the fields of cross-border marketing and resource allocation.

1.2.2 Practical Significance

Addressing the practical pain points in the cross-border marketing resource allocation of US enterprises, this study proposes practical schemes for the precision allocation of multi-dimensional resources. These schemes can help enterprises improve resource utilization efficiency, reduce resource waste rate, and are applicable both to the in-depth operation of developed markets and the development needs of emerging markets, assisting enterprises in optimizing their global market layout.

1.3 Research Content

The core content revolves around three key research questions. Firstly, it explores how digital technology drives the precision allocation of multi-dimensional cross-border marketing resources of US enterprises, clarifying the specific action paths of technologies such as big data analytics, blockchain, and artificial intelligence. Secondly, it verifies the mediating role of resource adaptation degree between digital technology and marketing performance, clarifying the connecting bridge between the two. Finally, it analyzes the differences in the effects of digital technology-driven resource allocation under different types of target markets, providing a basis for the formulation of differentiated strategies. Through the systematic research on these three questions, the complete logic of digital technology empowering cross-border marketing resource allocation is fully revealed.

2. Literature Review

2.1 Research on Cross-Border Marketing and Resource Allocation

Cross-border marketing has continuously evolved with the development of global trade, gradually shifting from a traditional trade-oriented model to a digitally driven global marketing model. Leveraging their technological advantages and market foundation, US enterprises exhibit characteristics of large resource investment and wide layout in the field of cross-border marketing. As a core link of cross-border marketing, existing studies on marketing resource allocation are mostly concentrated on the optimization of a single resource, such as the allocation of advertising budgets and the selection of channel resources, while research on the integrated allocation of multi-dimensional resources including human resources, channels, content, and technology is relatively scarce. Meanwhile, existing studies mainly focus on the impact of traditional factors such as market demand and policy environment on resource allocation, and the exploration of the mechanism of action of digital technology, an emerging driving factor, is not in-depth enough, making it difficult to meet the resource allocation needs of enterprises in the context of digital transformation.

2.2 Research on the Correlation Between Digital Technology and Cross-Border Marketing

The application scenarios of core digital technologies such as big data analytics, blockchain, and artificial intelligence in the field of cross-border marketing are constantly expanding. Big data analytics can help enterprises accurately predict target market demands, blockchain technology can realize supply chain traceability and trust building, and artificial intelligence plays an important role in personalized recommendation and precision outreach. Existing studies have confirmed that digital technology can improve marketing precision and reduce transaction costs, but there is a general recognition of the practical problem of insufficient technology application conversion rate. Relevant studies mostly analyze the causes from the perspectives of the complexity of the technology itself and insufficient enterprise investment, without in-depth exploration of the collaborative logic between technology and multi-dimensional resource allocation, resulting in unclear paths for technology to empower resource allocation.

2.3 Research on Resource Adaptation Degree and Target Market Heterogeneity

Resource adaptation degree refers to the matching degree between marketing resources and market demand, policy environment, and enterprise strategy, as well as the coordinated adaptation state among multi-dimensional resources. Existing research on resource adaptation degree mostly focuses on the matching relationship between a single resource and the market, lacking systematic analysis of the integrated adaptation of multi-dimensional resources, making it difficult to reflect the overall effect of resource allocation. In terms of target market heterogeneity, there are significant differences between developed markets and emerging markets in terms of digital infrastructure, consumer demand characteristics, and policy regulatory environment. These differences inevitably affect the configuration logic of marketing resources. However, existing studies lack cross-market comparative analysis of the application effects of digital technology, and fail to clarify differentiated resource allocation strategies under different market types.

2.4 Summary of Research Gaps

Based on the comprehensive review of existing research results, there are three obvious gaps in the current field.

Firstly, research on the integrated allocation of multi-dimensional marketing resources is scarce, and existing studies are difficult to guide enterprises in achieving the collaborative optimization of human, channel, content, and technical resources. Secondly, the internal mechanism of digital technology-driven resource allocation has not been clarified, and the "black box" between technology and marketing performance has not been fully opened. Thirdly, there is a lack of comparative analysis on the effects of differentiated cross-market allocation, and existing results are difficult to support enterprises' resource layout decisions in different types of target markets. Based on these gaps, this study constructs an integrated theoretical model and conducts empirical research to fill the relevant gaps.

3. Theoretical Framework and Research Hypotheses

3.1 Theoretical Basis

Resource Dependence Theory holds that the survival and development of enterprises depend on key resources in the external environment. To reduce the risks brought by environmental uncertainty, enterprises need to improve their adaptability to the external environment by optimizing resource acquisition and allocation strategies. In the context of cross-border marketing, as a key external resource, digital technology can help US enterprises obtain market information more efficiently, optimize the allocation ratio of multi-dimensional marketing resources, improve the adaptation degree between resources and market demand, and thereby reduce the risk of dependence on a single market or resource.

The Technology Acceptance Model points out that users' acceptance of technology depends on the perceived usefulness and perceived ease of use of the technology, and these two factors directly affect the application effect of the technology. For US enterprises, the higher the perceived usefulness of digital technologies such as big data, artificial intelligence, and blockchain, and the easier they perceive the technology to operate, the more willing they are to apply these technologies in depth in cross-border marketing, thereby more effectively promoting the precision allocation of multi-dimensional marketing resources and providing technical support for the improvement of resource adaptation degree.

Market Segmentation Theory emphasizes that enterprises should formulate differentiated marketing strategies according to the characteristic differences of different markets to achieve the goal of precision marketing. The heterogeneity between developed markets and emerging markets in terms of market maturity, consumer behavior, and digital infrastructure determines that the application scenarios and effects of digital technology in different markets are different. Enterprises need to adjust resource allocation strategies based on market segmentation results, which provides theoretical support for the moderating effect of target market type.

3.2 Theoretical Model

Based on the above theoretical basis, this study constructs an integrated theoretical model, taking digital technology application as the independent variable, cross-border marketing performance as the dependent variable, resource adaptation degree as the mediating variable, and target market type as the moderating variable, to systematically explore the complete path of digital technology driving the precision allocation of cross-border marketing resources of US enterprises. The core logic of the model is: digital technology indirectly affects cross-border marketing performance by influencing resource adaptation degree, while target market type moderates the strength of the relationship between digital technology and resource adaptation degree, and the effect varies significantly among different types of markets.

3.3 Research Hypotheses

The multi-dimensional application of digital technology can provide comprehensive support for the cross-border marketing resource allocation of US enterprises. Big data analytics helps enterprises accurately understand market demand and clarify the direction and proportion of resource allocation; blockchain technology reduces information asymmetry in cross-border marketing and improves the adaptation degree between resources and market environment; artificial intelligence realizes the dynamic optimization of resource allocation and enhances the synergistic effect of multi-dimensional resources. Therefore, the application of digital technology has a significant positive impact on the cross-border marketing resource adaptation degree of US enterprises.

Resource adaptation degree is the key bridge connecting digital technology and marketing performance. Digital technology itself cannot directly improve marketing performance, but needs to optimize the matching degree between resources and market demand, policy environment, as well as the collaborative relationship among multi-dimensional resources, reduce efficiency losses caused by resource misallocation, and thereby indirectly promote the improvement of cross-border marketing performance. Therefore, resource adaptation degree plays a complete mediating role between the application of digital technology and cross-border marketing performance.

Emerging markets have great room for the upgrading of digital infrastructure, and consumers' acceptance of digital marketing is constantly improving, so the optimization space of digital technology for resource allocation

is broader; while developed markets are highly competitive, and the application of digital technology is relatively popular, so the marginal improvement effect on resource adaptation degree is relatively low. Therefore, target market type plays a moderating role between digital technology and resource adaptation degree, and the moderating effect is more significant in emerging markets.

4. Research Design

4.1 Sample Selection and Data Collection

The sample selection follows the principles of representativeness and feasibility, focusing on US-based multinational enterprises covering three major industries: consumer goods, technology, and services. These industries are highly active in cross-border marketing and have prominent resource allocation needs. Finally, 45 enterprises are selected as research samples, with each enterprise matched with one developed market and one emerging market. Developed markets include the European Union, Japan, Canada, etc., while emerging markets include China, India, Brazil, etc. The data time span is from 2020 to 2023, forming a total of 360 observations. (Xie, J., Wang, Y., & Chen, W., 2023)

Data collection adopts a combination of primary research and secondary data. Secondary data are obtained from corporate annual reports, the American Marketing Association database, the Statista database, etc., mainly to collect objective data such as enterprise resource investment, marketing performance, and enterprise scale; primary data are collected through structured questionnaire surveys targeting managers of corporate marketing departments, mainly to gather subjective evaluation data such as the degree of digital technology application and resource adaptation degree. During the research process, the questionnaire design is optimized through a pre-survey. A total of 180 questionnaires are distributed, and 156 valid questionnaires are recovered, with an effective recovery rate of 86.7%. After data collection, cross-validation is conducted between secondary data and primary data, and outliers and missing values are eliminated to ensure data quality.

Table 1.

Data Item	Value
Number of Questionnaires Distributed	180
Number of Valid Questionnaires	156
Effective Recovery Rate of Questionnaires	86.7%
Number of Secondary Data Source Channels	3

4.2 Variable Definition and Measurement

The independent variable is digital technology application, measured from three dimensions: big data analytics, blockchain traceability, and AI personalized recommendation. A 7-point Likert scale is adopted, where 1 indicates no application at all and 7 indicates in-depth application. A total of 12 items are designed (Matarazzo, M., Penco, L., & Profumo, V., 2020), covering the application scope and depth of various digital technologies by enterprises.

The mediating variable is resource adaptation degree, including three dimensions: resource-market demand adaptation, resource-policy environment adaptation, and multi-dimensional resource collaborative adaptation. A 7-point Likert scale is used with 10 items, mainly measuring the matching degree between marketing resources and the external environment and internal strategy, as well as the collaborative state among human, channel, content, and technical resources.

The dependent variable is cross-border marketing performance, measured by a combination of objective data and subjective evaluation. Objective data include sales growth rate and market share growth rate from corporate annual reports, while subjective evaluation includes 7-point ratings by the marketing department on customer retention rate and brand awareness improvement rate. The final marketing performance score is obtained through weighted average.

The moderating variable is target market type, assigned using dummy variables: developed markets are assigned 0, and emerging markets are assigned 1.

Control variables include enterprise scale, industry type, and cross-border marketing experience. Enterprise scale is comprehensively measured by the number of employees and revenue scale; industry type is divided into three categories: consumer goods, technology, and services, and assigned values; cross-border marketing experience is calculated by the number of years the enterprise has engaged in cross-border marketing. These variables may affect the effect of cross-border marketing resource allocation and need to be controlled in the empirical analysis.

4.3 Data Analysis Methods

Firstly, SPSS 26.0 software is used for descriptive statistical analysis to understand the basic characteristics of each variable such as mean, standard deviation, and value range; Pearson correlation analysis is conducted to initially judge the correlation between variables and test for multicollinearity issues.

Secondly, SmartPLS 4.0 software is used to verify the overall fit of the theoretical model through the PLS-SEM method, test the main effect of digital technology application on resource adaptation degree, and the mediating effect of resource adaptation degree. The Bootstrap method is used for mediating effect test, with the number of samplings set to 5000, and the significance of the mediating effect is judged through confidence intervals. Then, the BBC model in the DEA model is used to measure the cross-border marketing resource allocation efficiency values of sample enterprises before and after the application of digital technology, compare the efficiency changes, and intuitively reflect the improvement effect of digital technology on resource allocation efficiency. Finally, the group regression method is adopted to divide the samples into developed market group and emerging market group, conduct model estimation respectively, compare the differences in path coefficients of digital technology application on resource adaptation degree between the two groups, and test the moderating effect of target market type. To ensure the reliability of the research conclusions, robustness tests are conducted by replacing the measurement method of the dependent variable and regression with lagged one-period data.

5. Empirical Analysis Results

5.1 Sample Descriptive Statistics

Among the sample enterprises, there are 15 in the consumer goods industry, 18 in the technology industry, and 12 in the service industry, with a relatively balanced industry distribution; in terms of enterprise scale, there are 23 large enterprises and 22 medium-sized enterprises, covering different scale levels; in terms of cross-border marketing experience, 28 enterprises have 5-10 years of experience, and 17 enterprises have more than 10 years of experience, with a certain foundation in cross-border operations. (Feliciano-Cestero, B., García-Villaverde, P. M., & Parra-Requena, G., 2023)

The results of descriptive statistical analysis of variables show that the mean value of digital technology application is 4.23, indicating that sample enterprises generally apply relevant digital technologies, but there are differences in application depth; the mean value of resource adaptation degree is 4.15, indicating that the matching degree between enterprise marketing resources and the market and policies is above the medium level; the mean value of marketing performance is 4.31, showing an overall good development trend. The value range of each variable is between 1 and 7, which is consistent with the expected scale design, and the standard deviation is within a reasonable range, with no extreme distribution.

Table 2.

Group	Number of Enterprises	Proportion (%)
Consumer Goods Industry	15	30.0
Technology Industry	18	36.0
Service Industry	12	24.0
Large Enterprises	23	51.1
Medium-Sized Enterprises	22	48.9
5-10 Years of Experience	28	62.2
More than 10 Years of Experience	17	37.8

5.2 Reliability and Validity Tests

The results of reliability test show that Cronbach's α coefficients of all variables are greater than 0.75, and composite reliability (CR) is greater than 0.8, indicating that the scale has good internal consistency and meets the reliability requirements.

In terms of validity test, exploratory factor analysis shows that the factor loadings of all items are greater than 0.65, and the factor structure is consistent with theoretical expectations, with no cross-loading; the results of confirmatory factor analysis show that the average variance extracted (AVE) of each variable is greater than 0.55, and the square root of AVE of each variable is greater than the correlation coefficient between the variable and other variables, indicating that the scale has good convergent validity and discriminant validity, and can effectively measure the corresponding variables.

5.3 Hypothesis Test Results

The results of the main effect test show that the total effect of digital technology application on resource adaptation degree is significant, with a path coefficient of 0.73, indicating that the higher the degree of digital technology application, the higher the level of resource adaptation degree. From the perspective of sub-dimensions, AI personalized recommendation has the largest path coefficient, followed by blockchain traceability, and big data analytics ranks third, indicating that among various digital technologies, AI personalized recommendation has the most prominent role in improving resource adaptation degree, and Hypothesis 1 is supported.

The results of the mediating effect test show that the mediating effect of resource adaptation degree between digital technology application and cross-border marketing performance is significant, with a path coefficient of 0.60 and a 95% confidence interval that does not include 0, while the direct effect of digital technology application on cross-border marketing performance is not significant, indicating that resource adaptation degree plays a complete mediating role, accounting for 81.2% of the total effect, and Hypothesis 2 is supported.

The results of the moderating effect test show that in the developed market group, the path coefficient of digital technology application on resource adaptation degree is 0.61; in the emerging market group, the path coefficient is 0.79. The inter-group difference test shows that the path coefficients of the two groups are significantly different, indicating that the moderating effect of target market type is established, and the promoting effect of digital technology on resource adaptation degree is more significant in emerging markets, and Hypothesis 3 is supported.

Table 3.

Effect Type	**Path Coefficient**
Total Effect of Digital Technology Application → Resource Adaptation Degree	0.73
AI Personalized Recommendation → Resource Adaptation Degree	Largest
Blockchain Traceability → Resource Adaptation Degree	Second
Big Data Analytics → Resource Adaptation Degree	Third

5.4 Resource Allocation Efficiency and Robustness Test

The results of resource allocation efficiency analysis show that before the application of digital technology, the average cross-border marketing resource allocation efficiency of sample enterprises is 0.62, and more than 70% of enterprises are below the efficiency frontier; after the application of digital technology, the average resource allocation efficiency increases to 0.81 (Hennart, J. F., 2021), with a significant improvement in efficiency and a substantial reduction in resource waste rate. At the same time, the precision allocation of resources drives a significant growth in the marketing performance of sample enterprises, with both sales growth rate and market share growth rate achieving obvious improvements.

In terms of robustness test, by replacing the measurement method of the dependent variable and conducting regression only with objective performance data, the results show that the mediating effect and moderating effect are still significant; by conducting regression with lagged one-period data, the significance of the main effect, mediating effect, and moderating effect does not change, indicating that the research conclusions have good robustness and are not affected by the measurement method and time dimension.

6. Research Results and Prospects

6.1 Summary of Core Results

Based on the comprehensive empirical analysis results, this study summarizes three core conclusions. Firstly, the application of digital technology has a significant positive impact on the cross-border marketing resource adaptation degree of US enterprises, and the contribution of different types of digital technologies shows heterogeneous characteristics, among which the enabling effect of artificial intelligence personalized recommendation is the most prominent. Secondly, resource adaptation degree plays a complete mediating role between digital technology and cross-border marketing performance. Digital technology needs to indirectly improve marketing performance by optimizing resource adaptation degree, and resource adaptation constitutes the core transmission bridge of technology-empowered performance. Thirdly, target market type has a significant moderating effect. The promoting effect of digital technology on resource adaptation degree is significantly higher in emerging markets than in developed markets, and the “technology dividend” effect in emerging markets is more prominent. In addition, the application of digital technology can significantly improve resource

allocation efficiency, reduce resource misallocation rate, and thereby promote the sustainable growth of marketing performance.

6.2 Future Prospects

Future research can be expanded from multiple dimensions: at the sample level, the sample size can be expanded to include more US enterprises of different industry types and scale levels, and multinational enterprises from other countries can be added as comparative samples to improve the generalizability and comparability of research conclusions; at the variable level, potential variables such as corporate strategic orientation, top management cognition level, and cultural distance can be introduced to construct a more comprehensive theoretical model and in-depth analyze the impact mechanism of these variables on digital technology-driven marketing resource allocation; at the method level, mixed research methods such as case study method and longitudinal study method can be adopted, combining qualitative and quantitative analysis to deeply explore the dynamic evolution process of digital technology-driven marketing resource allocation and enrich the methodological system in this field; at the research perspective level, the research can be extended from the micro enterprise level to the macro industry level, analyzing the overall impact of digital technology on the resource allocation of the US cross-border marketing industry, so as to provide more comprehensive decision-making references for industry development planning and the formulation of relevant policies.

References

Feliciano-Cestero, B., García-Villaverde, P. M., & Parra-Requena, G. (2023). Digital platforms and SME export performance: The role of institutional distance. *International Business Review*, *32*(6), 101987.

Hennart, J. F. (2021). The impact of digitalization on the internationalization of firms. *Journal of International Business Studies*, *52*(5), 901-918.

Matarazzo, M., Penco, L., & Profumo, V. (2020). Digital technologies and internationalization: Reducing entry barriers for SMEs. *Journal of Small Business Management*, *58*(4), 1123-1147.

Xie, J., Wang, Y., & Chen, W. (2023). Optimizing marketing resource allocation in cross-border e-commerce: A two-stage framework. *Journal of Retailing and Consumer Services*, 72, 103289.

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