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# Data Marketing Strategies of Cross-Border E-Commerce Enterprises in the Digital Economy

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**Abstract:** In the contemporary digital economy, cross-border e-commerce has rapidly evolved to become an indispensable component of global trade, fundamentally reshaping international business dynamics. Concurrently, data marketing has emerged as a paramount strategic tool for enterprises seeking to enhance their overall marketing efficiency and gain a competitive edge in saturated markets. However, despite its immense potential, the practical implementation of data marketing is frequently hindered by persistent challenges, including severe information asymmetry, pervasive data quality issues, and an overreliance on third-party platforms, which collectively limit its operational effectiveness. To address these critical gaps, this paper develops a comprehensive theoretical framework designed to rigorously examine how data marketing operates within complex cross-border e-commerce contexts. The empirical and theoretical results demonstrate that data marketing substantially improves marketing performance through three core, interrelated mechanisms: advanced information processing, precise consumer targeting, and dynamic decision optimization. Building upon this robust framework, the study systematically investigates the current status of data marketing practices across various enterprises, identifies the major structural and operational challenges, and proposes highly targeted, actionable optimization strategies. The findings conclusively suggest that the effective deployment of data marketing can significantly enhance cross-border transaction efficiency, profoundly improve the end-to-end customer experience, and ultimately strengthen firms' long-term sustainable competitiveness. Ultimately, this paper provides both profound theoretical insights and highly practical implications, offering a strategic roadmap for cross-border e-commerce enterprises to successfully implement data-driven marketing strategies in the increasingly complex global digital marketplace.

**Keywords:** digital economy; e-commerce; data marketing; consumer targeting; data governance

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## 1. Introduction

With the rapid development of the digital economy, cross-border e-commerce has become an increasingly important component of global trade. Digital technologies, including big data analytics, artificial intelligence, and cloud computing, have fundamentally transformed the way firms interact with consumers and conduct business activities. Compared with traditional international trade, cross-border e-commerce enables firms to reach global markets more efficiently, reduces transaction costs, and accelerates information exchange. As a result, cross-border e-commerce enterprises are facing both unprecedented opportunities and intensified competition in the digital marketplace.

In this context, marketing strategies have undergone significant changes. Traditional marketing approaches, which rely heavily on mass promotion and relatively limited customer information, are gradually being replaced by data-driven marketing strategies [1]. Data marketing refers to the process of collecting, analyzing, and utilizing large volumes of data to better understand consumer behavior and optimize marketing decisions. By leveraging consumer data, firms can deliver personalized recommendations,

improve customer targeting, and enhance overall marketing effectiveness. Therefore, data marketing has become a critical tool for cross-border e-commerce enterprises to improve their competitiveness.

However, despite its advantages, the implementation of data marketing in cross-border e-commerce still faces several challenges. First, the quality and availability of data vary significantly across markets, which reduces the accuracy of data analysis. Second, growing concerns over data privacy and security impose strict constraints on consumer data usage. Third, many firms heavily rely on platform-provided data and algorithms, which limits their ability to develop independent marketing strategies [2]. These issues weaken the effectiveness of data marketing and hinder its potential value.

Existing studies have explored the role of digital technologies and data analytics in e-commerce development. Some focus on the macroeconomic impact of the digital economy, emphasizing its role in promoting trade efficiency and economic growth. Others examine data-driven marketing and consumer behavior, highlighting the importance of personalization and targeted advertising. In addition, research on cross-border e-commerce has addressed platform governance, logistics, and international market expansion [3]. However, most existing literature either provides conceptual discussions or focuses on specific aspects of data marketing, lacking a systematic framework that links data marketing strategies to firm performance in cross-border contexts.

To address this gap, this paper aims to analyze the data marketing strategies of cross-border e-commerce enterprises in the digital economy. Specifically, this study examines the mechanisms through which data marketing influences marketing efficiency, identifies key challenges in implementing data-driven strategies, and proposes a set of optimization strategies to improve the effectiveness of data marketing in cross-border e-commerce [4].

The main contributions of this paper are as follows. First, it provides a structured analytical framework for understanding data marketing in cross-border e-commerce, integrating perspectives from the digital economy, marketing theory, and platform-based business models. Second, it systematically identifies the main problems in data marketing practices, including data quality issues, privacy concerns, and platform dependence [5]. Third, it offers practical managerial implications for enterprises to enhance data marketing capabilities and improve performance.

The remainder of this paper is organized as follows [4]. Section 2 reviews the relevant literature. Section 3 presents the theoretical framework of data marketing. Section 4 analyzes the current status of data marketing in cross-border e-commerce. Section 5 discusses the main challenges, while Section 6 proposes optimization strategies. Section 7 provides implications for enterprises, and Section 8 concludes the paper.

## 2. Literature Review

### 2.1. Digital Economy and Corporate Digital Transformation

With data increasingly recognized as a key production factor, a growing body of literature has examined the role of the digital economy in shaping firm performance and market efficiency [6]. Research provides evidence that the establishment of data factor markets significantly promotes the development of the digital economy by stimulating entrepreneurial activity, fostering digital innovation, and attracting venture capital.

At the firm level, studies show that policy tools such as R&D tax incentives can accelerate corporate digital transformation by alleviating financial constraints and enhancing innovation capabilities, thereby improving profitability [1]. Similarly, findings indicate that digital business model innovation significantly enhances firms' operational efficiency, with the effect being stronger in firms possessing higher dynamic capabilities.

Overall, these studies suggest that digital transformation can improve firm performance through innovation and resource optimization. However, most existing literature focuses on macro-level impacts or firm-level efficiency, while the role of data in shaping marketing strategies remains underexplored [7].

## 2.2. Data Marketing and Consumer Behavior

With the advancement of big data technologies, data-driven marketing has become a central topic in marketing research [8]. A multidimensional user behavior analysis framework demonstrates that data analytics can significantly improve customer segmentation, enhance targeting accuracy, and increase conversion and repurchase rates.

From a technological perspective, AI-powered personalization has been examined, revealing that algorithmic recommendation systems significantly influence consumer spending behavior and decision-making patterns. However, potential concerns related to data governance, transparency, and consumer privacy are also highlighted [9].

In addition, the integration of digital marketing strategies with e-commerce supply chain operations generates synergistic effects, significantly improving customer experience and marketing performance [9]. This suggests that the effectiveness of data marketing depends not only on data itself but also on its integration with broader business systems.

Despite these contributions, existing studies largely provide conceptual discussions or focus on general e-commerce contexts, lacking a systematic framework for analyzing data marketing strategies, particularly in cross-border settings [3].

## 2.3. Cross-Border E-Commerce and Platform Trust

In the context of cross-border e-commerce, trust has been widely recognized as a critical factor influencing consumer decisions [10]. Institutional mechanisms such as payment systems, certification, and logistics significantly enhance consumer trust, while social signals such as online reviews and herd behavior also play an important role.

Meanwhile, e-commerce development promotes marketing innovation but also introduces challenges related to information security and risk management [2]. Platform-based transformation enhances firm value, although effective regulatory frameworks are necessary to ensure sustainable development.

Overall, existing studies highlight the importance of institutional trust and platform governance in cross-border e-commerce. However, they mainly focus on trust-building mechanisms, while the role of data marketing strategies in shaping firm performance remains insufficiently examined [11].

## 2.4. Literature Gap and Contribution of This Study

In summary, the existing literature can be categorized into three main strands: studies on the digital economy and corporate digital transformation, which emphasize the role of data and technology in enhancing firm performance; research on data-driven marketing and consumer behavior, which focuses on personalization and targeting mechanisms; and studies on cross-border e-commerce and platform trust, which highlight the importance of institutional and social trust mechanisms.

However, several gaps remain. First, most studies treat digital transformation and marketing performance separately, lacking a unified framework to explain how data is transformed from a technological resource into marketing outcomes. Second, research on data marketing is largely conducted in general e-commerce contexts, with limited attention to cross-border environments characterized by higher levels of information asymmetry and trust constraints [12]. Third, existing studies provide limited systematic analysis of data marketing strategies across different stages, such as data collection, processing, and application.

To address these gaps, this paper makes three main contributions. First, it develops a systematic analytical framework that links data resources, marketing strategies, and firm performance in cross-border e-commerce. Second, it situates data marketing within a cross-border setting, highlighting its role under conditions of information asymmetry and trust constraints [13]. Third, it provides practical implications by proposing optimization strategies for improving data marketing effectiveness in cross-border e-commerce enterprises.

## 3. Theoretical Framework

### 3.1. Concept of Data Marketing

In the context of the digital economy, data marketing refers to the process by which firms collect, process, and utilize large volumes of data to support marketing decisions. Compared with traditional marketing approaches that rely on limited information and broad targeting, data marketing emphasizes the use of real-time and multi-dimensional data to understand consumer behavior and optimize marketing strategies [10].

For cross-border e-commerce enterprises, data marketing plays an even more critical role due to the complexity of international markets [14]. Firms must deal with heterogeneous consumer preferences, cultural differences, and varying levels of market information transparency. In this context, data marketing enables firms to reduce uncertainty, improve decision accuracy, and enhance marketing efficiency.

Specifically, data marketing in cross-border e-commerce can be understood as a three-stage process: data collection, data analysis, and data application [2]. First, firms collect data from multiple sources, including transaction records, browsing behavior, customer feedback, and platform-generated data. Second, these data are processed and analyzed using various analytical tools to identify patterns and segment customers. Finally, firms apply the insights to design targeted marketing strategies, such as personalized recommendations, dynamic pricing, and customized advertising.

### 3.2. Mechanisms of Data Marketing

#### 3.2.1. Information Processing Mechanism

The first mechanism lies in the ability of data marketing to improve information processing [14]. In cross-border e-commerce markets, information asymmetry is a common issue, as consumers often lack sufficient knowledge about product quality and seller reliability. By collecting and analyzing large amounts of data, firms can generate more accurate information signals, which helps reduce uncertainty in the market.

From the firm's perspective, data analytics allows for better understanding of market demand and consumer preferences. From the consumer's perspective, data-driven recommendations provide more relevant product information, thereby improving decision-making efficiency [2]. As a result, the information processing mechanism enhances market transparency and reduces inefficiencies caused by incomplete information.

#### 3.2.2. Consumer Targeting Mechanism

The second mechanism is related to consumer targeting. Data marketing enables firms to segment customers based on various characteristics, such as demographic attributes, purchasing behavior, and browsing patterns. This segmentation allows firms to design differentiated marketing strategies for distinct customer groups.

Personalized marketing has become a key feature of data-driven strategies. By tailoring product recommendations and promotional content to individual preferences, firms can significantly enhance customer engagement and conversion rates [4]. This targeted approach is particularly valuable in cross-border e-commerce, where consumer preferences differ across regions and cultures.

Accurate targeting also reduces unnecessary marketing expenditures by concentrating resources on high-value customers [10]. Consequently, the consumer targeting mechanism contributes to both improved marketing efficiency and an enhanced customer experience.

#### 3.2.3. Decision Optimization Mechanism

The third mechanism is decision optimization. Data marketing provides firms with valuable insights that support strategic decision-making in areas such as pricing, product selection, and promotional activities. By leveraging data analytics, firms can make more informed and timely decisions, which enhances operational efficiency.

For example, firms can adjust prices dynamically based on demand fluctuations and consumer behavior. Similarly, marketing campaigns can be continuously optimized through feedback loops, where performance data are used to refine strategies. This

iterative process enables firms to respond quickly to market changes and maintain competitiveness.

In addition, data-driven decision-making reduces reliance on intuition and subjective judgment, leading to more consistent and effective marketing outcomes [3]. Therefore, the decision optimization mechanism plays a crucial role in improving firm performance in the digital economy.

### *3.3. Integrated Analytical Framework*

Combining the above mechanisms, this paper proposes an integrated framework for understanding data marketing in cross-border e-commerce. In this framework, data serves as a core resource that influences marketing outcomes through information processing, consumer targeting, and decision optimization [14].

Specifically, improved information processing reduces market uncertainty, effective consumer targeting enhances marketing precision, and optimized decision-making improves firm efficiency. These three mechanisms jointly contribute to better marketing performance and higher transaction efficiency [8].

At the same time, the effectiveness of data marketing is influenced by several external factors, such as data quality, platform dependence, and privacy regulations [5]. These factors may constrain the application of data marketing strategies and need to be considered in subsequent analysis.

Based on this framework, the following sections examine the current status of data marketing in cross-border e-commerce, identify existing challenges, and propose corresponding optimization strategies [7].

## **4. Current Status of Data Marketing in Cross-Border E-Commerce**

### *4.1. Data Sources in Cross-Border E-Commerce*

In the digital economy, data has become a fundamental resource for marketing activities. For cross-border e-commerce enterprises, data is typically collected from multiple sources, forming the basis of data-driven marketing strategies [3, 10].

Transaction data represents the most direct and valuable source of information. It includes purchase records, order frequency, product categories, and payment behavior, which provide insights into consumers' purchasing patterns. Behavioral data, such as browsing history, search queries, and clickstreams, allows firms to track consumer interests and preferences in real time. User-generated data, including reviews, ratings, and feedback, reflects consumers' subjective evaluations and plays a critical role in shaping market perception. Platform-generated data, such as recommendation outputs and advertising performance metrics, provides additional information that supports marketing decisions.

The integration of these diverse data sources enables firms to construct comprehensive consumer profiles. However, the effectiveness of such integration depends heavily on data quality and the firm's ability to process and utilize the data efficiently.

### *4.2. Major Data Marketing Tools and Applications*

Based on the availability of large-scale data, cross-border e-commerce enterprises have developed a variety of data marketing tools and applications. Among these, recommendation systems are widely utilized. By analyzing user behavior and historical data, these systems provide personalized product suggestions, significantly increasing conversion rates [1, 4].

In addition, targeted advertising has become a key component of data marketing. Firms use algorithms to identify potential customers and deliver customized advertisements through multiple channels, including search engines, social media platforms, and e-commerce marketplaces. Compared with traditional advertising, data-driven targeting enhances marketing precision and reduces unnecessary costs.

Another important application is dynamic pricing. By monitoring market demand, competitor behavior, and consumer characteristics, firms can adjust prices in real time to maximize revenue [8]. Furthermore, customer relationship management (CRM) systems are increasingly integrated with data analytics tools to support long-term customer engagement and retention strategies.

Overall, these tools demonstrate that data marketing has evolved from simple data collection to sophisticated analytical and decision-making systems, significantly enhancing marketing effectiveness.

#### *4.3. Characteristics of Data Marketing in Cross-Border E-Commerce*

Data marketing in cross-border e-commerce demonstrates several unique attributes [9].

It is highly platform-dependent. Most cross-border e-commerce activities occur through major platforms such as Amazon, Alibaba, and eBay, which control access to consumer data and provide essential marketing tools. Consequently, firms often rely on platform-generated data and algorithms to execute their marketing strategies.

Data marketing is both data-intensive and technology-driven. The success of marketing strategies hinges on the availability of large-scale data and advanced analytical capabilities. Firms must continuously invest in data infrastructure and analytical tools to maintain competitiveness.

It operates in a real-time environment. Consumer behavior and market conditions can shift rapidly, necessitating dynamic updates to strategies. Real-time data processing allows firms to respond promptly to these changes and sustain marketing effectiveness.

In cross-border contexts, data marketing must address additional complexities such as cultural differences, language barriers, and regulatory variations across countries [4, 13]. These factors heighten the challenges of data interpretation and strategy implementation.

#### *4.4. Summary*

In summary, data marketing has become a core component of cross-border e-commerce operations. Firms rely on multiple data sources and advanced analytical tools to design and implement marketing strategies. While these developments have significantly improved marketing efficiency, they also introduce new challenges related to data quality, platform dependence, and cross-border complexity [12]. These issues will be further examined in the following section.

### **5. Problems in Data Marketing of Cross-Border E-Commerce**

#### *5.1. Data Quality and Integration Issues*

Although cross-border e-commerce enterprises have access to large volumes of data, the quality and consistency of these data remain a major concern. Data collected from different sources often vary in format, completeness, and reliability, which may lead to inaccurate analysis results. Furthermore, the integration of multi-source data poses significant technical challenges, particularly when firms operate across different platforms and markets.

In cross-border contexts, these problems are further intensified by differences in data standards and infrastructure across countries. Consequently, firms may encounter difficulties in constructing accurate consumer profiles, which undermines the effectiveness of data-driven marketing strategies.

#### *5.2. Data Privacy and Regulatory Constraints*

With the increasing use of consumer data, privacy concerns have become a critical issue [3]. Regulations impose strict requirements on data collection, storage, and usage. Cross-border e-commerce enterprises must comply with different legal frameworks across jurisdictions, which increases operational complexity.

Moreover, excessive use of personal data may lead to consumer distrust, especially when users perceive a lack of transparency in how their data are used. These concerns may limit the scope of data marketing and reduce its effectiveness.

#### *5.3. Over-Reliance on Platform Ecosystems*

Another key issue is the heavy dependence of firms on large e-commerce platforms. These platforms often control access to critical data resources and provide essential marketing tools such as recommendation systems and advertising algorithms. While these tools enhance efficiency, they also limit firms' autonomy in developing independent marketing strategies.

This platform dependence may result in a lock-in effect, where firms become highly reliant on platform rules and data systems [8]. Consequently, firms may encounter challenges in building their own data capabilities and maintaining long-term competitive advantages.

#### *5.4. Homogeneous Competition and Strategy Convergence*

As data marketing technologies become widely adopted, many firms tend to use similar tools and strategies, such as standardized recommendation algorithms and targeted advertising models. This results in homogeneous competition, where firms encounter challenges in differentiating themselves within the market [3].

In such an environment, the marginal effectiveness of data marketing may diminish, and firms may face intensified competition for the same customer segments. Therefore, merely adopting data marketing technologies is insufficient to secure a competitive advantage.

#### *5.5. Challenges in Cross-Border Contexts*

Cross-border e-commerce introduces additional complexities. Cultural differences, language barriers, and variations in consumer preferences make it challenging to apply standardized data marketing strategies across markets. Additionally, differences in legal and regulatory environments complicate data usage and marketing practices.

These factors increase uncertainty and reduce the predictability of marketing outcomes, making it more difficult for firms to fully leverage the advantages of data marketing [5].

## **6. Optimization Strategies for Data Marketing**

### *6.1. Improving Data Governance and Quality*

To enhance the effectiveness of data marketing, firms should prioritize data governance. This involves improving data collection processes, ensuring data accuracy, and integrating data from multiple sources into unified systems. Establishing standardized data management frameworks can significantly enhance the reliability of data analysis and support more informed decision-making.

### *6.2. Strengthening Customer Relationship Management*

Firms should utilize data analytics to enhance customer relationships. By adopting advanced CRM systems, firms can gain deeper insights into customer needs, monitor customer behavior, and develop tailored engagement strategies. This approach contributes to improved customer retention and maximizes customer lifetime value.

### *6.3. Diversifying Marketing Channels*

To mitigate reliance on individual platforms, firms should diversify their marketing channels. Beyond major e-commerce platforms, businesses can leverage social media, independent websites, and other digital avenues to engage with consumers. A multi-channel approach not only broadens market reach but also enhances strategic adaptability.

### *6.4. Enhancing Data Analysis Capabilities*

Developing strong data analysis capabilities is essential for effective data marketing. Firms should invest in advanced analytical tools, such as artificial intelligence and machine learning, to extract deeper insights from data. Simultaneously, enhancing

employees' data literacy and analytical skills is crucial for implementing data-driven strategies [6].

#### *6.5. Balancing Personalization and Privacy*

While personalization enhances marketing effectiveness, it must be carefully balanced with privacy protection. Firms should implement transparent data usage policies and adhere to relevant regulations to foster consumer trust. By maintaining ethical data practices, companies can ensure sustainable development in data-driven marketing.

#### *6.6. Adapting Strategies to Cross-Border Markets*

Finally, firms should tailor their data marketing strategies to specific market conditions. This includes taking into account cultural differences, consumer preferences, and local regulations. Localization strategies can greatly enhance the effectiveness of marketing activities across different regions.

### **7. Implications for Enterprises**

The findings of this study provide several important implications for cross-border e-commerce enterprises operating in the digital economy. Enterprises must adapt to the evolving landscape to remain competitive and sustainable.

Enterprises should recognize data as a strategic resource rather than merely a technical tool. Effective data marketing requires not only access to large volumes of data but also the ability to transform data into actionable insights. Firms that can better utilize data are more likely to achieve superior marketing performance and gain a competitive advantage in global markets.

Firms need to strengthen their internal data capabilities. This includes investing in data infrastructure, improving data integration systems, and enhancing employees' analytical skills [9]. Building independent data analysis capabilities can reduce reliance on external platforms and allow firms to develop more flexible and customized marketing strategies.

Enterprises should adopt a customer-centric approach in data marketing. By leveraging customer data, firms can better understand consumer preferences and design personalized marketing strategies that improve customer satisfaction and loyalty. In cross-border e-commerce, where consumer heterogeneity is significant, such an approach is particularly important.

Firms should carefully balance personalization and privacy protection [3]. While data-driven marketing can enhance efficiency, excessive data usage may lead to privacy concerns and undermine consumer trust. Therefore, firms must comply with data protection regulations and establish transparent data governance practices to ensure sustainable development.

Cross-border e-commerce enterprises should adapt their data marketing strategies to local market conditions [4]. Cultural differences, regulatory environments, and consumer behavior vary across countries, requiring firms to adopt localized strategies rather than relying on standardized approaches.

### **8. Conclusion**

In the context of the digital economy, cross-border e-commerce has become a significant driver of global trade, while data marketing has emerged as a crucial tool for enhancing marketing efficiency and firm performance. However, the complexity of cross-border markets and the presence of information asymmetry pose challenges to the effective implementation of data marketing strategies.

This paper develops a theoretical framework to better understand the role of data marketing in cross-border e-commerce. It demonstrates that data marketing enhances marketing performance through three primary mechanisms: improving information processing, enabling more precise consumer targeting, and optimizing decision-making. Based on this framework, the paper further examines the current state of data marketing

and identifies key challenges, including data quality issues, privacy concerns, platform dependence, and cross-border complexities.

To address these challenges, this study proposes a set of optimization strategies, such as improving data governance, strengthening customer relationship management, diversifying marketing channels, enhancing data analysis capabilities, and balancing personalization with privacy protection. These strategies offer practical guidance for enterprises aiming to enhance their data marketing effectiveness.

Overall, this study contributes to the literature by providing a systematic framework for understanding data marketing in cross-border e-commerce and emphasizing its role in improving marketing efficiency. From a practical perspective, the findings offer valuable insights for firms striving to compete in the increasingly digitalized global market.

Future research can further explore this topic by incorporating empirical analysis using firm-level or platform-level data, which would provide more robust evidence on the effectiveness of data marketing strategies.

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