Marketing adaptability and digital transformation of enterprises from the perspective of dynamic capabilities

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Abstract. With the rapid development of digital technology, the marketing environment for enterprises is changing at an ever-increasing speed and unpredictably; therefore, the old model of marketing can no longer meet the demand for real-time response. Based on the theory of dynamic capabilities, this paper will systematically study how enterprises can construct marketing adaptability with the help of digital tools. Research was conducted on the driving factors of big data and AI, platform automation tools, and real-time response systems for marketing adaptability to explore how they are mediated and moderated by the three dimensions of dynamic capabilities: perception, capture, and reconstruction. Netflix, Starbucks Deep Brew and Zara are representative cases used in this paper to illustrate specific ways and effects of real-time insights, intelligent marketing and supply chain collaboration in enhancing marketing adaptability. Based on research, the adaptability of digital marketing also needs continuous development in addition to technological integration; at the same time, small and medium-sized enterprises face problems such as resource scarcity, differences in cross-border application, algorithmic bias and data privacy. Extend the application of dynamic capabilities theory to digital marketing in theory, propose specific strategies for enterprise managers to strengthen the adaptability of marketing in practice, and point out potential risks of digital transformation.

Keywords: Enterprise marketing, digital transformation, adaptability.

1. Introduction

With the development of digital technology in recent years, the marketing environment for enterprises has changed relatively quickly and is also more unstable. The Demands of the People are Changing. An ever-increasing number of other enterprises are also developing. The old model of cyclical marketing can no longer meet the demand for immediate response. Due to the development of digital technology over the years, many new opportunities have gradually emerged for the company, such as Big Data, artificial intelligence and the Internet of Things (IoT). Some enterprises have introduced some digital devices in their production areas. The above tools will help to make quicker and more accurate market responses [1-2].

Many research has been done on digital marketing. Some scholars have been studying the use of big data analysis for consumer insight research. Some research has also investigated the reasons for personalised recommendations and automated marketing by artificial intelligence. Dynamic capabilities are the continuous changes a firm has made and will continue to make in the face of change. The three typical ways to improve the adaptability of marketing generally fall into the categories of perception, collection and reconstruction [3].

Based on the theory of dynamic capabilities, this paper will explore how enterprises can foster digital marketing adaptability in more detail. The first part of this paper explores the Driving Factors for Digital Technology in Marketing Adaptability. These technologies are Big Data and AI, platform automation tools, and real-time response systems. Therefore, this paper will explore how the three dimensions of dynamic ability - perception, capture and reconstruction - mediate and moderate each other.

This study can offer theoretical support for the application of dynamic capabilities theory to digital marketing. The three shortcomings in the existing studies that we focus on in this paper are small and medium-sized enterprises, cross-border comparison studies, and the negative effects of digital

transformation. Some applications of digital technology in improving the adaptability of marketing have been put forward for enterprises in this paper. The above also shows that, during the digitalisation process, there will be risks of algorithmic bias and data privacy infringement. Based on the above analysis, this paper hopes to offer some reference materials for the marketing activities and future studies of enterprises in the digital age.

2. The demand for digital technology to reshape marketing adaptability

2.1. Big data and AI enhance real-time market insights

When exploring how big data and artificial intelligence can assist in real-time market insights, Netflix's real-time personalized cover test (Artwork Personalization) provides a representative case. This work is not limited to traditional recommendation systems, but combines "real-time experimentation" with "real-time content delivery" to demonstrate a high-level application approach.

Traditional market insights usually start by collecting user behavior data and then develop promotional materials based on it. Netflix has achieved real-time personalization of cover selection. For the same film and television work, the system will generate dozens of candidate covers based on the characteristics of different users, rather than everyone seeing the same picture. Insight is no longer a static conclusion, but a constantly running feedback loop. For example, if the system detects that the user has been frequently watching romantic themed movies recently, it will automatically switch the cover of "Stranger Things" to a scene of interaction between the male and female protagonists; On the contrary, if users are more inclined towards horror content, the cover may be replaced with images that highlight suspense or monster elements.

This process is completed in milliseconds, compressing the interval between "observing user behavior" and "adjusting product strategy" to an extremely low level.

The official technical blog of Netflix has pointed out that compared to randomly displaying covers or using a single fixed cover, this AI based image personalization strategy significantly improves click through rates (CTR) and subsequent viewing conversion rates. In addition, as users can see the visual signals that best fit their current psychological expectations in real time on the homepage, the time required to find interesting content is significantly reduced, thereby effectively reducing the membership churn rate [4].

In terms of operational efficiency, artificial intelligence systems can automatically extract tens of thousands of frames from video streams and evaluate composition quality, greatly reducing the workload of manual design and screening.

AI can recognize users' emotional preferences at the moment rather than last month or week, and make immediate responses. Traditional methods typically divide users into larger groups such as "18-25 year old women," while Netflix's method can narrow down the segmentation unit to "individuals currently seeking tension. The entire insight process itself is an automated online experiment, avoiding common subjective biases or false answers from respondents in manual surveys. However, if the algorithm finds that the user prefers a certain actor, the system tends to highlight that actor in all relevant covers, which can easily create a sense of disgust in the user's mind. More seriously, the inconsistency between the cover content and the actual style of the work (such as using romantic elements to attract horror movie audiences) may reduce users' trust in the platform. In addition, completing inference, image rendering, and delivery within sub seconds of each refresh by hundreds of millions of users places extremely high demands on distributed system architecture. This technological threshold makes it difficult for small and medium-sized enterprises to replicate similar solutions.

2.2. Platformization AI embedding automation tools into marketing processes

Starbucks launched a program called Deep Brew in 2019. This system is not an independent mobile application, but an artificial intelligence platform embedded into the global business operations of enterprises.

From a technical architecture perspective, Deep Brew integrates multiple data sources such as mobile apps, store POS systems, inventory management, and supply chains to build a unified data lake. On this basis, the platform utilizes deep learning and reinforcement learning algorithms to comprehensively analyze users' purchase records, geographic location, real-time weather, and current traffic conditions. The system can automatically generate personalized promotional offers and push them through the app or send them via email, without the need for manual planning of marketing activities one by one.

The core innovation of this project lies in achieving hyper personalized marketing with context aware capabilities. Traditional automated marketing is mostly based on fixed rules, such as' if a user hasn't purchased coffee for 30 days, send a coupon '. In contrast, Deep Brew is able to dynamically adjust its strategies based on real-time operational environments. For example, the electronic menu located in the car restaurant can automatically change the recommended content based on the current queue length. If there are many vehicles queuing, the system will prioritize recommending beverages with faster production speed (such as cold brewed coffee) to speed up the service pace; If there are fewer queues, then recommend making complex but more profitable drinks instead. In this way, marketing insights are no longer lagging behind the actual situation of the store, but are synchronized with physical operational data such as inventory levels and employee busyness [5].

From the actual effect, Starbucks' official financial report shows that the Deep Brew system has significantly increased the activity of its membership program. By the end of 2025, Starbucks' active members had exceeded 34 million, contributing to over half of the sales in its North American stores. At the same time, automated prediction systems have helped stores reduce inventory waste by approximately 15%, allowing employees to focus more on customer service rather than tedious inventory counting tasks.

The advantages of this case are mainly reflected in two aspects. Firstly, it deeply integrates marketing activities with store operations. Marketing is no longer just about pushing advertisements, but has become an effective tool for regulating supply and demand balance, such as quickly consuming soon to expire raw materials through promotional activities. Secondly, it proves that even with a user base of tens of millions, enterprises can still achieve a service experience close to that of personalized customization [6].

However, the Deep Brew system also has obvious limitations. Firstly, there is the issue of brand consistency: automated pricing and promotion strategies may lead to price differences felt by consumers in different regions, and excessive reliance on algorithms may weaken the brand's original high-end image. Secondly, there are challenges in data privacy and integration: this model requires high integrity and precision of data. If payment data and geographic location information are not fully integrated at the platform level, AI generated recommendations may appear abrupt and even disturb users. Finally, the system is relatively vulnerable to unexpected events. In "black swan" events such as local regulations or sudden power outages, automated marketing scripts may still continue to push discounts that cannot be actually verified, exposing the shortcomings of algorithms in dealing with abnormal scenarios [7].

2.3. Acceleration of adaptive rhythm

The traditional clothing retail industry usually operates on a quarterly cycle: companies predict fashion trends 6 to 9 months in advance, produce in large quantities, and then clear remaining inventory through discounts at the end of the season. Zara has completely changed this rhythm by establishing a real-time response system from store signals to factory production.

The core innovation of this system lies in Zara's transformation of retail terminals into sensors, achieving synchronization between marketing and production. Store managers not only upload sales data through the POS system, but also provide real-time feedback on customers' verbal needs through handheld terminals, such as "many people asking if there is a green style dress". In terms of product production, Zara does not place large orders at once as is customary in the industry, but instead conducts small-scale trial production first. Subsequently, the AI system and human designers will

jointly decide based on the sales feedback from the previous 24 hours: to immediately add orders, modify designs, or directly stop production and stop losses. In addition, all stores worldwide replenish their inventory twice a week at fixed times, forcing the entire supply chain to operate in real-time rather than on a periodic basis due to the high-frequency and on-time logistics rhythm [8].

From a technical perspective, Zara adopts RFID (Radio Frequency Identification) technology to track the entire process of each piece of clothing from the warehouse to the fitting room and then to the checkout, in order to capture deep behavioral signals such as "trying on but not purchasing". The backend system uses heuristic algorithms to optimize global logistics routes within minutes, making it only take 2 to 3 weeks for a new design to go from sketch to store launch, compared to the industry average of 6 months. More importantly, Zara has bridged the data silos between designer systems, factory automation cutting, distribution centers, and retail stores, achieving real-time synchronization of all data.

This model has brought remarkable results. About 85% of Zara's products are sold at full price, far exceeding the industry average of 60% to 70%. The inventory turnover rate is also significantly better than that of peers, greatly reducing the backlog of funds caused by forecast errors. At the same time, the real-time update of new products has created a psychological expectation among consumers that 'if you don't buy now, there will be no stock tomorrow'[9].

The advantages of this system are mainly reflected in two aspects. Firstly, it has a high fault tolerance rate. Since it is difficult for enterprises to accurately predict the trend of popularity in 6 months, they only respond based on signals from the next 2 weeks, thereby reducing the pressure on prediction accuracy. Secondly, this method demonstrates strong adaptability in the face of sudden market fluctuations such as epidemics, and can quickly switch product lines, such as shifting from formal wear to home wear [10].

However, Zara's real-time response mode also has obvious limitations. Firstly, there is a game between efficiency and cost: real-time response requires factories to retain a certain amount of redundant production capacity and cannot schedule at full capacity, which leads to higher unit production costs than large-scale assembly lines for overseas outsourcing. Secondly, there are geographical limitations in the supply chain: in order to ensure real-time response speed, Zara must retain factories with high labor costs around Spain, which cannot fully enjoy the benefits of the global low-cost supply chain. Finally, there are environmental challenges: this rapid response pace means that resources are frequently consumed, and the sustainability of this model is facing increasing questioning in the context of increasingly strict ESG regulations.

3. The key mechanism for enterprises to build digital marketing adaptability

In digital marketing, dynamic capabilities play an important role. This role is mainly reflected in two aspects: mediation and regulation. From the perspective of intermediary pathways, digital tools can enhance the dynamic capabilities of enterprises. These tools include big data analysis, social listening, and market intelligence systems. They mainly enhance the perception ability of enterprises. Fast trial and error, marketing automation, real-time pricing, and recommendations enhance capture capabilities. The integration of organizational flexibility and decentralized decision-making, as well as marketing and IT, helps to forge the ability for restructuring. The improvement of dynamic capabilities will further enhance marketing adaptability. In addition, environmental uncertainty is also a moderating variable. Organizational learning culture also influences this process. The maturity of technological infrastructure also plays a regulatory role.

4. Conclusion

The current research on the adaptability of digital marketing mainly focuses on large enterprises, while the attention to small and medium-sized enterprises is relatively insufficient. In addition, there is a lack of comparative studies conducted in transnational or cross-cultural contexts in existing

literature. At the same time, scholars have not paid enough attention to the negative impacts of digital transformation, such as how algorithmic bias and data privacy issues weaken marketing adaptability. Based on the above research gaps, future research directions should focus more on the adaptability of AI driven automated marketing.

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