Efficiency analysis of big data analysis based on digital transformation in optimizing enterprise marketing strategy

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Abstract: With the advancement of digital transformation, the role of big data analytics in the optimisation of enterprise marketing strategies is becoming increasingly important. This study examines how big data analytics can optimise marketing strategies and improve decision-making efficiency in different industries. Through the analysis of several case studies, it is found that big data helps enterprises achieve accurate customer segmentation, demand forecasting, competitor monitoring, and marketing effectiveness evaluation. The study shows that enterprises can increase customer conversion rates, reduce churn rates, and optimise resource allocation through real-time market trend analysis through big data analytics. However, in implementing big data analytics, enterprises face challenges such as data quality and compliance. This paper suggests that enterprises strengthen their data analytics capabilities, ensure data security, and promote data-driven decision-making mechanisms to enhance marketing effectiveness and competitiveness.

Keywords: big data analytics; digital transformation; marketing strategy optimisation; customer segmentation; competitor analysis

Introduction

With the rapid development of information technology, digital transformation has become a necessary means for enterprises worldwide to cope with market changes and enhance competitiveness. Digital transformation is not only a renewal of internal information systems, but also a comprehensive innovation of corporate strategy, culture and organisational structure. Especially in the field of marketing, digital transformation has gradually changed the traditional marketing model, enterprises through big data analytics can real-time monitoring of market trends, customer demand and competitive situation, so as to more efficiently formulate and adjust the marketing strategy. Big data analytics, as an important part of digital transformation, uses big data technology to conduct in-depth mining and analysis of various types of data in the process of business operations, enabling enterprises to extract valuable insights from massive amounts of data, which in turn supports activities such as precision marketing, personalised services and market demand forecasting.

1 Literature review

1.1 Definition and Development of Digital Transformation

Digital transformation refers to the process of using digital technology to make profound changes to an enterprise's traditional business model, organisational structure, management processes and culture. With the continuous development and popularisation of information technology, especially the emergence of the Internet, cloud computing, big data, artificial intelligence and other technologies, digital transformation has become an important means for enterprises to maintain their competitiveness, adapt to market changes and improve efficiency. Early digital transformation was mainly reflected in the modernisation of enterprise information systems, such as the introduction of ERP (Enterprise Resource Planning) systems, which helped enterprises achieve digital storage and processing of data. However, with the advancement of technology, the connotation of digital transformation has gradually expanded, and nowadays, it is not only a technological update, but also a profound transformation involving corporate strategy, organisational structure, cultural change and other aspects. Through digital transformation, enterprises can achieve flexibility, agility and stronger innovation in the fierce market competition [1].

The background and development history of digital transformation is closely related to the progress of technology. From the end of the last century to the beginning of the 21st century, the main task of enterprise informatisation was to transform traditional manual processes into digital operations and to improve the speed and accuracy of information processing. With the rise of mobile Internet and cloud computing technologies, enterprises began to focus on developing intelligent business models and emphasising data-driven decision-making. Nowadays, digital transformation has entered the deep water, and the integrative nature of technology, cross-border cooperation models, and human-centred innovative design have become the core directions of enterprise transformation [2].

1.2 Techniques and Applications of Big Data Analytics

Big data analytics is one of the key technologies in digital transformation, which enables companies to process and analyse large amounts of data from multiple channels to extract insights that are valuable for decision-making. The core technologies of big data analytics mainly include data mining, machine learning, and artificial intelligence. Data mining technology helps enterprises discover potential patterns, trends and relationships by filtering, organising and analysing large amounts of data, thereby providing strategic decision-making support. Machine learning technology, on the other hand, enables computers to learn from data on their own, continuously improving analysis accuracy and predictive capabilities. Artificial intelligence further enhances the automation of big data analysis, which can help enterprises achieve more efficient automated decision-making in the development of marketing strategies by simulating human thinking and decision-making processes [3].

1.3 Current state of research on marketing strategy optimisation

The traditional methods of marketing

strategy optimisation mainly rely on market research, consumer behaviour analysis and other means to help enterprises formulate marketing plans through qualitative and quantitative means. However, with the complexity of the market environment and the variability of consumer behaviour, these traditional methods have gradually revealed their limitations. Traditional marketing strategies tend to rely on past experiences and localised data, and are prone to decision lag or bias. Against this backdrop, big data analytics has emerged as a new tool for marketing strategy optimisation. Big data analytics can help companies make more accurate marketing decisions by integrating large amounts of real-time data from various channels. Compared with traditional methods, big data analytics methods are more real-time, accurate and flexible, and it is able to analyse more diversified consumer data and quickly adjust marketing strategies based on these data [4].

2 Theoretical framework and research methodology

2.1 theoretical framework

2.1.1 The Impact of Digital Transformation on Business Marketing

Digital transformation is profoundly changing the way companies operate and market themselves, especially in terms of information flow, logistics, capital flow and customer communication. This transformation involves not only technological updates, but also the reformulation of corporate strategies and the adjustment of organisational structures. Traditional marketing often relies on empirical judgement and limited market data, but digital transformation, through the introduction of advanced technological means, enables enterprises to process massive amounts of data and real-time feedback, which significantly improves decision-making accuracy and reaction speed.

2.1.2 The Role of Big Data Analytics in Marketing Strategy

The role of big data analytics in an enterprise's marketing strategy is crucial, especially in precision marketing, market trend analysis and customer behaviour prediction. With the drastic increase in the amount of data, enterprises can extract valuable information from large amounts of unstructured and structured data through big data analytics. This information can help enterprises gain a more comprehensive understanding of consumers' needs and preferences, so that they can tailor personalised products and services. In terms of precision marketing, big data analytics can not only analyse customers' purchase history and browsing behaviour, but also combine multi-dimensional information such as social media to surmise customers' potential needs, and then make effective market positioning and strategy adjustment [5].

2.2 Research methodology

2.2.1 Research design

In this study, we will use a combination of quantitative and qualitative analyses with the aim of comprehensively assessing the efficacy of big data analytics in optimising the marketing strategies of enterprises in the process of digital transformation. Quantitative analysis is mainly used to analyse how big data analytics specifically affects the implementation effect of marketing strategies, such as marketing effectiveness, customer satisfaction, market share and other specific indicators. Qualitative

analysis is used to explore the deeper impact of big data analytics on the marketing decision-making model of enterprises in digital transformation, such as its changes in marketing culture and organisational structure, as well as the impact of technology acceptance on the practical application of marketing activities.

2.2.2 Data collection and analysis methods

The data collection of this study is mainly conducted through questionnaires, interviews and secondary data. The questionnaire survey will be directed at enterprise managers and marketers to understand their application and perception of big data analytics in the process of digital transformation, and to collect their evaluation of the actual effect of marketing strategy optimisation. Interviews will dig deeper into the challenges, successes and future needs of enterprises in practice to obtain more detailed qualitative data. Secondary data will mainly come from major public databases, annual reports of enterprises, industry reports, and data from relevant academic studies.

For data analysis, we will use statistical methods such as regression analysis, cluster analysis and path analysis. Regression analysis is used to test the specific role of big data analytics in the improvement of marketing effectiveness and analyse the relationship between variables; clustering analysis can help us to perform customer segmentation and market segmentation for different enterprises, revealing the application effect of big data analytics in different market contexts; and path analysis can help us to understand the multiple factors affecting the optimisation of marketing strategies and their interrelationships, so as to provide enterprises with precise marketing strategy adjustment suggestions for enterprises.

3 An analysis of the efficacy of big data analytics in optimising corporate marketing strategies

3.1 Customer Segmentation and Precision Marketing

Customer segmentation is a core application of big data analytics in the marketing field, which enables enterprises to classify customers according to different characteristics, needs, behaviours, etc., so as to develop personalized marketing strategies for each type of customer. Through accurate customer segmentation, enterprises can not only effectively identify potential customers, but also provide customised services and products for different customer groups.

Table 1 Changes in performance indicators before and after precision marketing

Norm	Pre-precision marketing	After precision marketing	Percentage increase
Customer Satisfaction	72 per cent	85 per cent	18.06 per cent
conversion rate	4.2 per cent	7.8 per cent	85.71 per cent
repurchase rate	22 per cent	36 per cent	63.64 per cent
attrition rate	15%	10%	-33.33 per cent

The data in Table 1 shows that through precision marketing, the enterprise not only successfully improves customer satisfaction and conversion rate, but also effectively reduces user churn rate. This result fully proves the important role of big data in customer segmentation and precision marketing.

3.2 Demand forecasting and market trend analysis

Demand forecasting and market trend analysis is another important application of big data in marketing. Enterprises can analyse historical sales data, customer behaviour data, market dynamics, etc. to predict future changes in demand, thus providing a basis for production, inventory and marketing decisions. Big data analytics can capture small changes in the market and help companies identify potential market opportunities or risks at an early stage.

Table 2 Sales growth after demand forecast and market trend analysis

Sales target	Pre-projection	Post-projection	Percentage increase in sales
total sales	500,000	650,000	30 per cent
Inventory turnover	3 times	5 times	66.67 per cent
customer satisfaction	80 per cent	90 per cent	12.5 per cent

Table 2 shows that through accurate demand forecasting, the enterprise achieved a 30 per cent increase in sales and a significant improvement in inventory turnover. These data show that the application of big data analytics in demand forecasting and market trend analysis can effectively improve the enterprise's market response speed and ensure that products and services can meet market demand in a timely manner.

3.3 Competitor analysis and market positioning

In a competitive market, understanding competitors' strategies and market positioning is crucial for enterprises. Big data provides an effective tool for enterprises to monitor competitors' movements in real time, analyse their market strategies, product pricing, promotions, etc., and use this as a basis for adjusting their own market positioning and competitive strategies. By collecting and analysing competitors' data, companies can identify their strengths and weaknesses in the market and develop more differentiated marketing strategies.

A smartphone brand company used big data analytics tools to conduct a detailed analysis of the product pricing, sales channels and promotional activities of its major competitors, and found that the competitors' pricing on a certain high-end product line was too high and lacked sufficient added value. Based on this finding, the company promptly adjusted its product pricing strategy and improved the market competitiveness of its own products by introducing additional features and value-added services. With the help of big data, the company successfully developed a differentiated market positioning strategy and quickly captured market share.

3.4 Marketing Effectiveness Evaluation and Optimisation

Big data can not only help enterprises make strategic layouts before marketing campaigns, but also evaluate their effectiveness in real time during the process of marketing campaigns and make rapid optimisation based on data feedback. Enterprises can evaluate the effectiveness of different marketing strategies, advertising campaigns, and promotional programmes through A/B testing, regression analysis, and other methods, so that they can adjust their marketing strategies in real time to achieve the best return on investment (ROI).

A brand's online advertising company used A/B testing to compare the effectiveness of

different ad copy, and combined it with social media interaction data, click-through rates and other metrics to optimise ad content and placement strategies in real time. In the end, the click-through rate of the ads increased by 50% and the ROI by 35%. This process shows that big data not only plays a fundamental role in the development of marketing strategies, but also provides continuous optimisation support during the implementation of the strategies, thus enhancing the effectiveness and efficiency of marketing campaigns.

4 Case Studies

4.1 Case Selection and Background Presentation

In this study, we have selected three representative enterprises for case studies, from different industries, including manufacturing enterprises in the B2B industry, e-commerce platforms in the B2C industry, and financial institutions in the service industry. Through the practical experience of these enterprises, we can deeply explore the effectiveness of the application of big data analytics in different types of enterprises and the challenges they face.

A manufacturing company is a typical B2B business whose main customers are other companies and organisations. The business has been facing the problem of how to optimise production and supply chain management. As the uncertainty of market demand increases, the traditional marketing and production scheduling models are unable to meet the increasingly changing customer needs. A well-known e-commerce platform, a B2C company, has long encountered challenges in customer acquisition, customer retention and personalised recommendations. Although it has a large amount of customer data, how to transform this data into actionable marketing strategies has been a pressing issue for it. A financial institution is facing challenges in optimising customer experience and reducing customer churn through big data analytics. The organisation has a complex customer base with diverse needs, and needs accurate marketing and risk assessment to enhance its competitiveness in the market.

The effectiveness of big data application in different types of enterprises presents different characteristics, with B2B enterprises usually focusing more on supply chain optimisation and demand forecasting, B2C enterprises paying more attention to precision marketing and customer segmentation, and financial institutions in the service industry focusing more on customer relationship management and risk control. Although these enterprises are in different industries, they all encounter similar challenges in the digital transformation process, namely how to enhance the efficiency of marketing decisions, optimise customer experience and improve the overall effectiveness of business operations through big data technologies.

4.2 Big Data Analytics in Marketing Strategy

In the process of applying big data analytics, these companies have gone through multiple stages of data collection, analytical processing and strategy optimisation. For the manufacturing enterprise, big data was mainly used for demand forecasting and production scheduling optimisation. By analysing historical orders, changes in customer demand and market trends, the enterprise was able to more accurately

predict future demand fluctuations, thereby adjusting production plans and inventory management. By optimising supply chain processes, the enterprise reduced inventory costs and improved production efficiency.

For e-commerce platforms, the main application of big data lies in customer segmentation and precision marketing. Through data mining technology, the platform conducts in-depth analysis of customers' purchase history, browsing behaviour, interaction records and other information, and segments customers based on these data. For high-frequency purchasing customers, the platform launches personalised recommendations and coupons; for potentially lost customers, it regularly sends personalised advertisements and special offers to win them back. Through such precise marketing, the platform not only increases customer activity, but also significantly improves the conversion rate and customer lifecycle value.

For their part, financial institutions have used big data to optimise customer relationship management and risk assessment. By analysing a customer's credit history, transaction behaviour, social media data, etc., financial institutions are able to accurately assess a customer's credit risk and formulate personalised financial product recommendation strategies. Based on a customer's financial situation and consumption patterns, financial institutions can provide customised loan solutions or investment advice, which improves customer satisfaction and reduces the risk of default.

4.3 Case study results

By analysing these business cases, we are able to see the remarkable effectiveness of big data analytics in optimising marketing strategies. The manufacturing company successfully reduced inventory costs and production waste through demand forecasting and supply chain optimisation. By predicting fluctuations in market demand in advance, the enterprise was able to adjust its production plan to ensure timely delivery of products, avoiding inventory backlogs and stock-outs. The e-commerce platform has significantly increased customer activity and purchase conversion rates through precision marketing and customer segmentation. Through personalised recommendations and targeted promotions, the platform has successfully increased customer satisfaction and loyalty.

Table 3 Changes in business indicators before and after precision marketing on e-commerce platforms

Norm	Pre-implementation	Post-implementation	Percentage increase
Customer Conversion Rate	3.8 per cent	6.5 per cent	71.05 per cent
Average purchase frequency of users	1.2 times	2.1 times	75 per cent
Customer Lifecycle Value	450	700	55.56 per cent
attrition rate	18 per cent	10%	-44.44 per cent

The data in Table 3 shows that through precision marketing and personalised services, the e-commerce platform has achieved significant improvements in a number of key business metrics, in particular the growth in customer conversion rate and user lifecycle

value, reflecting the strong potential of big data analytics in improving marketing effectiveness.

5 Reach a verdict

This study examines the efficacy of big data analytics in optimising enterprise marketing strategies in the context of digital transformation. By analysing case studies from multiple industries, the study shows that big data analytics can help enterprises achieve accurate customer segmentation, demand forecasting, competitor analysis and marketing effectiveness evaluation, thus significantly improving the effectiveness of marketing strategies and decision-making efficiency. Big data technology enables enterprises to extract valuable insights from massive amounts of data, driving them to achieve rapid response and flexible adjustment in the dynamically changing market. In terms of customer segmentation, enterprises are able to formulate personalized marketing plans based on consumers' behaviors and needs, and improve customer satisfaction and conversion rates; in terms of demand forecasting, big data analytics help enterprises more accurately predict market demand and optimize resource allocation; in terms of competitor analysis, big data provides real-time monitoring of the competitive landscape, helping enterprises to form a differentiated market positioning; and in terms of marketing effectiveness evaluation, data-driven A/B testing and R&B testing can help enterprises to achieve a more effective marketing strategy. In marketing effectiveness evaluation, data-driven A/B testing and ROI analysis can ensure the continuous optimisation of marketing activities.

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