



Research article

New marketing strategy model of E-commerce enterprises in the era of digital economy

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ABSTRACT

With the continuous development of technology, traditional marketing methods no longer meet the needs of the main forces of social consumption, and people urgently need more innovative and personalized marketing strategies. E-commerce companies must develop a comprehensive customer-oriented marketing strategy based on big data and multi-channel to achieve their long-term healthy development. This paper first investigated the impact of the digital economy on e-commerce enterprises, focused on the transformation of the digital economy on the marketing model, expounded the development analysis of e-commerce in the digital economy era, and described the development trend of e-commerce marketing in the digital economy era. Then, this paper expounded the current problems faced by e-commerce enterprises, and discussed the lack of integrity, homogeneity, large-scale marketing strategies, and the lack of analysis and application of big data. After that, this paper put forward the marketing strategy of e-commerce enterprises in the digital economy era, and studied it from three aspects, namely, building a reasonable product management structure, marketing strategy based on customized marketing content, and social media marketing strategy based on information sharing. Then this paper proposed to use genetic algorithm to strengthen the marketing strategy of e-commerce enterprises. Finally, based on experiments and surveys, this paper used genetic algorithms to strengthen the construction of e-commerce enterprise marketing strategy in the digital economy, and concluded that the new e-commerce enterprise marketing strategy was 21% more satisfactory than the traditional new e-commerce enterprise marketing strategy. Through comparison, it can see that the integrity of the marketing plan of the new e-commerce enterprise's marketing strategy was 0.33 higher than that of the traditional e-commerce enterprise's marketing strategy, and the integrity of the promotion strategy was 0.34 higher than that of the traditional e-commerce enterprise's marketing strategy. After using the new e-commerce enterprise marketing strategy, the improved management structure was 0.29 higher than that of the traditional monitoring system, and the high quality of products was 0.18 higher than that of the traditional system.

1. Introduction

Electronic commerce is the combination of Internet information technology and traditional offline business activities. With the

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development and maturity of Internet technology, e-commerce continues to grow. Its concept, connotation and meaning evolve gradually with the evolution of technology and actual e-commerce activities. From a historical perspective and combined with the development of information technology, the evolution of the concept of e-commerce can provide a new perspective for observing the development of new forms of e-commerce. In 2023, the Ministry of Commerce implemented the decisions and deployments of the Party Central Committee and the State Council to accelerate the development of the digital economy, promote the important role of e-commerce in restoring and expanding consumption, promoting the integration of data and reality, and deepening international cooperation, and achieve positive results in high-quality development. With the rapid development of the digital economy, e-commerce enterprises have also experienced a golden age of development. Through the analysis and research of relevant industry data, it is not difficult to find that e-commerce business cannot be separated from a large number of consumers. E-commerce enterprises can develop normally with enough consumers. In order to survive in the highly competitive market, e-commerce enterprises must make full use of advanced big data analysis technology and formulate marketing strategies suitable for the development of e-commerce enterprises. **Main contribution:** This article mainly focuses on the research of marketing strategies related to e-commerce enterprises in the context of big data, and proposes corresponding improvement strategies. **Objective:** This article aims to promote the healthy and long-term development of e-commerce enterprises in the context of big data through improved marketing strategies based on this foundation.

Enterprise marketing strategies are widely used in e-commerce. This article specifically introduced warehousing systems that were particularly suitable for e-commerce retailers. It discussed appropriate systems, and identified future research needs through surveys of relevant literature [1]. The purpose is to introduce the results of surveys conducted in the field of e-commerce service quality levels, determine the standards for e-commerce service quality, and on this basis, propose the importance level of the adopted e-commerce service quality standards [2]. The aim is to develop a consumer decision-making framework based on social business trust, conceptualizing social business trust from a multidimensional perspective based on social technology theory [3]. A blockchain was created to inspect and record every transaction that occurs in an e-commerce application. Blockchain protected users' privacy from external personnel [4]. The impact of perceived brand leadership on satisfaction and repurchase intention on e-commerce websites was studied. In addition, the different roles of gender and age were explored in the proposed model [5]. Scholars have developed and tested a comprehensive conceptual framework that combines various relationships, emotional commitments, and consumer engagement, using real-time consumer responses and software to evaluate measurement and structural models [6]. The purpose is to understand the comprehensive impact of application identity theft protection measures on consumers' collaborative perceptions of trust, product, service costs, and operational performance [7]. The above studies have all covered e-commerce, but there are still some shortcomings in enterprise marketing strategies.

Many scholars have conducted analysis and research on enterprise marketing strategies. The survey found that many enterprises adopt green marketing strategies to enhance their corporate image and business performance [8]. The purpose is to analyze the antecedents of social media adoption and their impact on marketing performance mediated by social media marketing capabilities through a technical organizational environment framework [9]. Scholars have reviewed important developments in marketing strategy, consumer behavior, and marketing analysis in the past, and elucidated new research areas in marketing strategy, consumer behavior, and market analysis [10]. Research has found that digital marketing has not been widely used in the small, medium, and micro enterprise sectors, with obstacles including lack of technical literacy and insufficient support facilities for geographical conditions [11]. People believed that the business model of enterprise innovation is not only the foundation of its management, but also a systematic description of business transparency, simplicity, and usability [12]. The main purpose is to identify key strategies and resources that may be beneficial to the implementation of SMEs [13]. The purpose is to explore the opportunities and challenges faced by enterprises in this new digital era regarding their international marketing strategies, and to study how to re-examine international marketing practices based on these developments [14]. Nonlinear phenomena are of fundamental importance in various fields of science, engineering, and other disciplines, as most phenomena in our world are essentially nonlinear and described by nonlinear equations [15]. The continuous genetic algorithm is introduced as an effective solver for second-order boundary value problem systems, where a smooth solution curve is used throughout the entire evolution process of the algorithm to obtain the required node values for unknown variables [16]. The above studies have all described enterprise marketing strategies, but there are still some shortcomings in the research of the digital economy.

In order to study the application and construction of e-commerce enterprise marketing strategy, this paper analyzed the impact of digital economy on e-commerce enterprises. This paper studied the transformation of digital economy to marketing mode, so as to further deepen the reform of e-commerce enterprise marketing strategy, and improve e-commerce enterprise marketing strategy in digital economy by using genetic algorithm. Compared with the current e-commerce enterprise marketing strategy, the e-commerce enterprise marketing strategy constructed by genetic algorithm was more perfect.

The structural framework of this article is as follows: the second part is an introduction to the impact of the digital economy on e-commerce enterprises. The third part describes the problems currently faced by e-commerce enterprises. The fourth part discusses the marketing strategies of e-commerce enterprises in the digital economy era. The fifth part uses genetic algorithms to strengthen the marketing strategies of e-commerce enterprises. The sixth part is an experimental study on the marketing strategy of e-commerce enterprises based on genetic algorithms.

2. Impact of digital economy on E-commerce enterprises

2.1. Transformation of digital economy to marketing mode

The digital economy, as a broad concept, can be included in the scope of any economic form that directly or indirectly uses data to guide resources and promote productivity development. At the technical level, it includes emerging technologies such as big data, cloud computing, the Internet of Things, blockchain, artificial intelligence, and 5G communication. At the application level, “new retail” and “new manufacturing” are typical representatives. The traditional marketing model is usually limited by space. Manufacturing companies sell products through local distributors who sell products at terminals through specific stores, which greatly limits the flow of goods. With the high popularity of the digital economy, products can be sold in a more open form in different regions, and e-commerce has also removed the traditional man-hour limit, allowing stores to trade with customers anytime and anywhere. Shops often bully customers, and the weak are often forced to engage in public relations because of unequal business relations. This not only increases the cost of consumers, but also destroys the fair and fair business environment. Consumers are difficult to find the most reasonable products because of information inequality, and often buy inferior products at high prices. These situations can be avoided to some extent on the digital economy platform. These platforms are open platforms. Anyone can participate in business, provide more choices for consumers, and greatly reduce the gray area of raw material supply. In the current business environment, traders usually take more risks, but with the emergence of new electronic payment methods, both parties have the ability to reduce risks, thus significantly improving efficiency and business environment.

2.2. Development of E-commerce in the era of digital economy

In recent years, with the maturity of the development of network information technology and the deepening integration of traditional business models, e-commerce, as a product of the combination of network information technology and e-commerce, has become an important trend of economic development in the new era. The promotion and marketing of products by enterprises is an important means for the development of enterprises, and also the vertical expansion of traditional business transactions in the enterprise market. The transactions between enterprises and consumers are conducted through electronic transaction mode.

Big data is a necessary tool for the development of enterprises. With the development of e-commerce, it plays an increasingly important role in enterprises, and has an increasing impact on the development of enterprises. With the emergence of new e-commerce marketing strategies, integrated e-commerce marketing strategies involve manufacturing enterprises. Effective integration of consumers and supply chain management has formed a system that integrates sales economic standards into the new market. Therefore, as an important means to improve the economic efficiency and productivity of enterprises in the Internet era, big data is an important engine of economic development under the new economic conditions, as shown in Fig. 1.

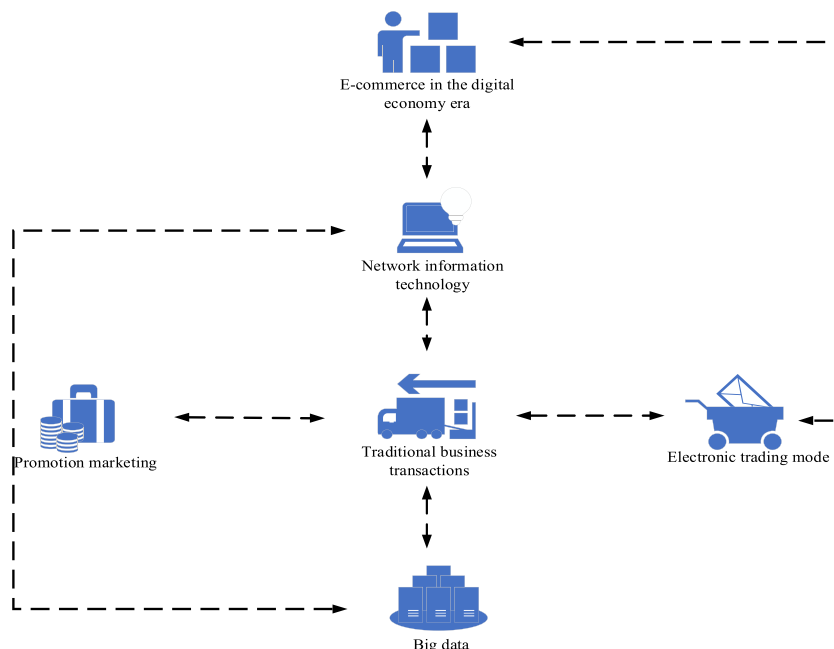


Fig. 1. Analysis of the development of e-commerce in the digital economy era.

2.3. Development trend of E-commerce marketing in the era of digital economy

In recent years, with the maturity of network information technology, the development of digital economy has achieved a great leap, and the development of e-commerce marketing strategy in the era of digital economy also has many new trends and characteristics. With the development of modern digital economy and technology, the main form of social communication is traditional television, which is changing from radio and paper media to modern social media and other new media. In the new media era, the development of e-commerce marketing also presents a social development trend. This is mainly manifested in the form of e-commerce online marketing, which effectively integrates these information through various search engines, and constantly develops and transforms them into social marketing [17]. With the development of network information technology, the popularity of smart phones among consumers and the rapid development of mobile networks, e-commerce has also been widely used. The development of e-commerce marketing has fully utilized the popularity of mobile networks and feature phones. It continuously innovates marketing strategies and content to attract consumer attention, and on this basis, stimulates consumer purchasing needs by utilizing the convenience of software purchases.

3. Current problems faced by E-commerce enterprises

3.1. Lacking integrity

At present, the economic development is still in the stage of crazy growth. Due to the low threshold of Internet operation, a large number of companies with mixed qualities would enter the e-commerce field. At the same time, the formulation of laws and regulations lags behind, the reality of the digital economy is difficult to monitor, and many e-commerce companies have the problem of dishonesty. Because online advertising can be verified by a third party, the information they publish is usually very incompatible with real-time. Although these companies are not many, they have played a key role in the destruction of a few, leading to the fact that the actual advertisements of most companies are often suspected by consumers. The after-sales service of some enterprises is difficult to meet the needs of consumers. The foundation of e-commerce depends largely on the efficiency of logistics companies. Because the responsibilities of logistics companies often lead to the extension of delivery time, it is difficult for consumers to communicate directly with logistics companies when facing these problems.

3.2. Homogeneous and large-scale marketing strategy

The strong development of e-commerce companies has driven the gradual expansion of the consumer market. With the continuous reform and development of e-commerce marketing strategies, e-commerce companies have engaged in interactive and rapid marketing activities with consumers through online platforms. It has broken the traditional product-driven marketing model of the company, but there are also many e-commerce companies that are not good at marketing, and the marketing strategy is homogeneous and large-scale. The homogenization marketing strategy includes two aspects: the first is the homogenization of marketing methods. Following the successful marketing methods of one e-commerce company, other e-commerce companies have followed suit. Ignoring the needs of customer groups and blindly following the trend can lead to the decline of marketing efficiency and marketing failure. In order to rapidly increase market share, e-commerce companies usually use the entire category of marketing strategies. However, while

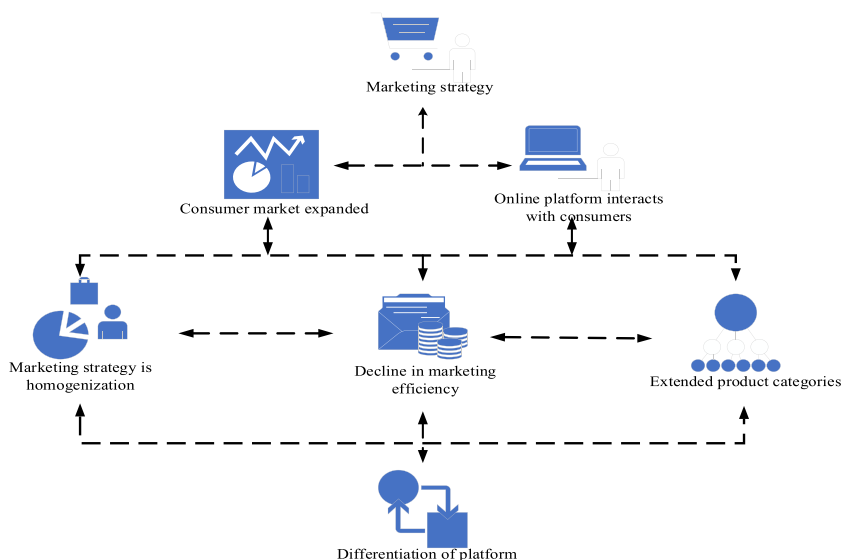


Fig. 2. Marketing strategy of homogeneity and scale.

blindly following the product type and scale, they ignored the characteristics of their own platforms and differentiation, leading some e-commerce platforms to take the marketing path of scale and homogeneity, as shown in Fig. 2.

Firstly, homogenization refers to the phenomenon where products from different brands within the same category imitate each other in terms of performance, appearance, and even marketing methods, gradually converging. The market competition behavior based on homogenization of goods is called “homogenization competition”, which can refer to the phenomenon of various types of information with similar types, production methods, production processes, and transmission content in a certain field. Secondly, marketing strategy is for enterprises to take customer needs as the starting point, obtain information on customer demand and purchasing power based on experience, and the expectations of the business community, and organize various business activities in a planned manner. The homogenization of products intensifies competition among enterprises, facing limited market capacity. Enterprises within the cluster often compete to cut corners and produce fake products to reduce production costs and gain competitive advantages. These behaviors will ultimately form a huge “lemon market” within the regional brand’s original production area, seriously damaging the regional brand image and gradually leading to decline.

3.3. Lacking application of big data

The current e-commerce companies are too focused on expanding the market and do not clearly recognize the importance of big data for business growth. People with big data may be at the forefront of business in the future. On the one hand, they would collect and analyze big data and accurately predict customers’ consumption trends. By understanding the consumer psychology of customers, they can formulate appropriate marketing strategies based on these predictions to achieve greater cost savings and product inventory reduction. On the other hand, e-commerce companies that master big data can establish their own logistics platform, greatly reducing the logistics delivery time and cost of products. Through big data, e-commerce platforms can predict the number of specific products in a city in the near future. E-commerce companies can transport the products that customers need to their cities, which greatly accelerates logistics and reduces logistics costs.

4. Marketing strategy of E-commerce enterprises in the era of digital economy

4.1. Establishing reasonable product operation and management structure

Establishing an appropriate product management structure for e-commerce enterprises means that they classify products based on specific product types, fully utilize big data technology, and develop product marketing strategies to meet different consumer needs. Due to the convenience of design management, e-commerce enterprises can optimize the design of the web structure, plan the operation and management structure, and make it easier for consumers to choose. On the other hand, in product design, e-commerce companies focus on how products can bring good experience to consumers and provide good consumer experience. This can improve the product quality and make it more popular in the market, as shown in Fig. 3.

The architecture route of a product is a gradual evolution process. In the early stages of informatization, enterprises basically do not talk about product architecture, or product architecture only exists in separate systems. The management of the product department strictly distinguishes business lines, and business lines are relatively closed and develop independently. The principles of product architecture are as follows:

- (1) Ensure the scalability of the product architecture;
- (2) The product architecture needs to be highly abstract and standardized;

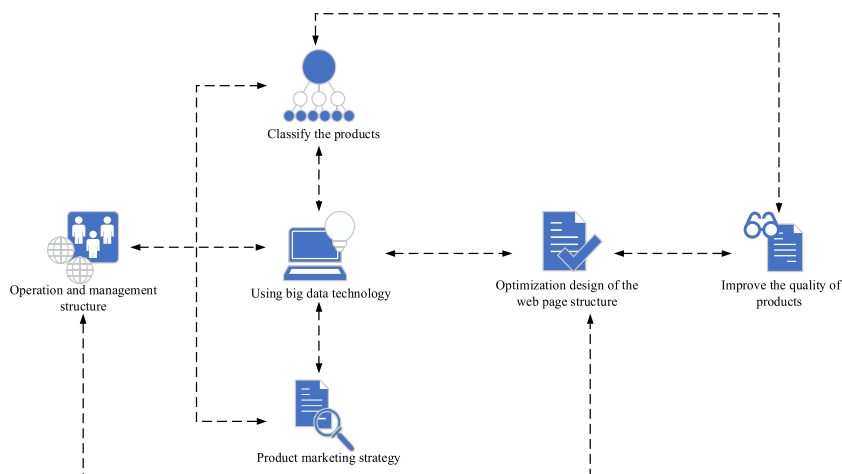


Fig. 3. Construction of reasonable product management structure.

- (3) Clear boundaries need to be defined within the product architecture;
- (4) The product architecture needs to consider the product matrix relationship network.

With the help of information and transaction models, a complete product architecture can be basically constructed. Both traffic model and user model can be considered simultaneously. The core of traffic model is the closed loop of traffic, which is the processing of increment and stock, and can serve as a logical reference for the front-end part of product architecture.

4.2. Marketing strategy based on customized marketing content

Personalized marketing content is the premise for users to accept in the marketing process. If the marketing object is not accurate, any good marketing method can not touch the hearts of consumers. In the past, correct marketing proved to be elusive for advertisers. Fortunately, in the network era of digital economy, using data mining and personalized marketing content is no longer a problem. The inherent accuracy of smart phone humanization includes goods and services. It can be said that marketing content such as information can be concentrated in one place, and the target audience of advertising can be more accurately reflected on the mobile phones of people who need advertising.

4.3. Social media marketing strategy based on information sharing

Social media marketing expands the offline and online relationships between people through new media and social media. Users identify products through relationships, including the ability to identify and subscribe. At present, the most common types are software marketing and online community marketing. Powerful information sharing, due to its rich content and extensive participation, can bring amazing marketing results to enterprises if it is successfully applied to the marketing work of enterprises. For example, e-commerce companies can create public software platforms through advertising, turn customers into friends, and then send product news, latest events and other relevant information to fans. Products can be sold online through user groups and circle of friends.

4.4. E-commerce enterprises carry out promotional activities

The promotion strategy refers to the efforts of e-commerce companies to improve their popularity through the activities of reducing prices. This method transmits product information to specific consumer groups through the use of advanced communication means. At present, consumers have many choices on the network, the scope of e-commerce enterprises is also expanding, and the competition of e-commerce companies is becoming increasingly fierce. This requires e-commerce enterprises to take appropriate promotional measures according to the characteristics of their products to realize the rapid development of e-commerce enterprises. So far, it is difficult for e-commerce companies to formulate effective sales strategies. Faced with this situation, e-commerce enterprises should fully integrate the characteristics of e-commerce, develop relevant network questionnaires with network data as the core, understand the actual needs of consumers, and develop advertising strategies suitable for e-commerce enterprise positioning, as shown in Fig. 4.

Next, this article lists another several promotional activities carried out by e-commerce enterprises and explains their respective advantages and disadvantages.

5. Price reduction

Advantages: Direct price reduction to stimulate user consumption. Offline supermarkets often use direct price reduction strategies

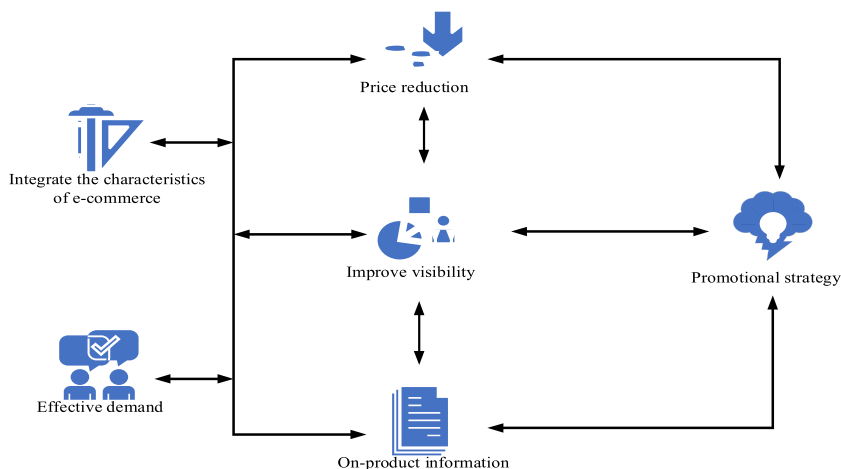


Fig. 4. Promotional activities carried out by e-commerce enterprises.

because their product prices are very transparent and the discount after price reduction is very intuitive. On the other hand, online stores usually combine price reduction activities with other activities.

Disadvantages: decreased profits; harmful to brand image, not suitable for products with controlled prices by big brands, and difficult to continue selling after price recovery.

6. Flash sale

The discount on flash sale products is greater, mainly focusing on low-priced items, usually including limited time flash sale, limited quantity flash sale, etc.

Advantages: easy to attract traffic, plan single item hot selling products, flash sale product waterfall flow is very suitable for creating hot selling products on online platforms.

Disadvantages: flash sale products usually have low prices and low profits.

7. Full discount/full item discount/full item discount

It can be divided into coupon full discount coupons/system automatic full discount coupons, and can be set to multiple levels and levels.

Advantages: full discount coupons have become a standard feature in online promotion activities, and large discount coupons can effectively stimulate user consumption visually and increase the average order value.

8. Full offer/full refund

Customers who consume a certain amount can receive physical goods or coupons, and can set multiple levels and levels.

Advantages: provide benefits to users (or WeChat agents) and stimulate consumption without any discount (without any impact on brand prices).

9. Genetic algorithm to strengthen the marketing strategy of E-commerce enterprises

As a part of the company’s activities, the production capacity, order quantity and production plan of the company’s decision-making department are designed according to the number of orders to be completed and the expected sales volume. For this problem, the planned order quantity and the planned export quantity are random variables, corresponding to a certain distribution, and their specific values are unpredictable in the test process. The production of products is order signature and unpredictable orders, and the sales process is earlier than this part of products, which means that the production plan of products does not match the generation of these random variables. Scholars have proposed a multi chain agricultural product transaction information blockchain application technology, which includes agricultural product transaction information chain, user information chain, and agricultural product information chain, using the design concept of alliance chain. The agricultural product information chain provides detailed information about agricultural products, ensuring their traceability and tamper resistance. It automatically divides transaction profits through smart contracts, improves execution efficiency, reduces transaction costs, and ultimately establishes a transparent, efficient, and applicable blockchain architecture for agricultural product transactions [18]. The basic idea of using genetic algorithms to solve optimization problems is to describe the problem to be solved as a global optimization problem of a certain objective function, and to interpret the objective function to be optimized as the adaptation of the biological population to the environment, as well as the optimization variables corresponding to individual biological populations. From the current population, it uses appropriate replication, hybridization, mutation, and selection operations to generate a new generation of population, and repeats this process until the desired population or specific evolutionary time frame is obtained. Due to the fact that single parent genetic algorithm does not use crossover operators, even if all individuals in the population are the same, the operation of the algorithm is not affected. This is a good way to break free from the traditional genetic algorithm’s requirement for population diversity and solve the problem of premature convergence in traditional genetic algorithms.

For different marketing schemes, p_{1ij} represents the sales volume of the j plan and q_{1ij} represents the actual sales volume of the i plan. p_{2ij} represents the sales volume of j actually signed intention orders, q_{2ij} represents the actual purchase intention of the goods in i , and the sum of the sales volume of all n marketing strategies k_c is:

$$k_c = \sum_{i=1}^n \left[\sum_{j=1}^{q_{1i}} k_i(p_{1ij}) + \sum_{j=1}^{q_{2i}} k_i(p_{2ij}) \right] \tag{1}$$

If the final sales volume of the marketing strategy is p_{3i} and the profit is f , then:

$$f = \sum_{i=1}^n f_i(p_{3i}) \tag{2}$$

If the production cost is h , there are:

$$h = \sum_{i=1}^n h_i(x_i) \tag{3}$$

If the operating expenses of marketing are w , there are:

$$w = \sum_{i=1}^n w_i(p_{1i} + p_{2i}) \tag{4}$$

p_{1ij} represents the actual sales volume of the i th, and p_{2ij} represents the sales volume of the actual signed intention order, namely:

$$p_{1i} = \sum_{j=1}^{p_{1i}} p_{1ij} \tag{5}$$

$$p_{2i} = \sum_{j=1}^{p_{2i}} p_{2ij} \tag{6}$$

10. Experimental investigation of E-commerce enterprise marketing strategy based on genetic algorithm

Genetic algorithm is a universal algorithm for solving search problems, which can be used for various general problems. The common features of search algorithms are as follows:

- ① Firstly, form a set of candidate solutions;
- ② Calculate the fitness of these candidate solutions based on certain adaptability conditions;
- ③ Preserve certain candidate solutions based on fitness and discard other candidate solutions;
- ④ Perform certain operations on the reserved candidate solutions to generate new candidate solutions.

In genetic algorithms, the above features are combined in a special way: parallel search based on chromosome populations, selection operations with guessing properties, exchange operations, and mutation operations. This special combination distinguishes genetic algorithms from other search algorithms.

E-commerce marketing includes the methods and channels for enterprises to promote and sell their products or services on the Internet. It involves various actions to attract potential customers, increase the number of visitors to online stores, and ultimately turn these visitors into paying customers. In order to study the specific effect of genetic algorithm on the improvement of e-commerce enterprises' marketing strategy, this paper analyzes the integrity of the traditional e-commerce enterprises' marketing plan and the perfection of the promotion strategy. Finally, this paper compares and analyzes the integrity of the marketing plan and the perfection of the promotion strategy after the improvement of the marketing strategy of the e-commerce enterprises by genetic algorithm. First of all, this paper investigates and analyzes the integrity of the marketing plan and the perfection of the promotion strategy after the improvement of the marketing strategy of three e-commerce enterprises by the genetic algorithm, and compares it with the marketing strategy of traditional e-commerce enterprises. The three e-commerce enterprises are set as A, B and C, and the specific comparison is shown in Table 1 (Table 1 shows the data obtained from the China E-commerce Information Database).

According to the data described in Table 1, under the traditional e-commerce enterprise marketing strategy, the integrity of A's marketing plan is 0.51, and the integrity of the promotion strategy is 0.49. The integrity of B's marketing plan is 0.61, and the integrity of the promotion strategy is 0.58. The integrity of the marketing plan of C is 0.63, and the integrity of the promotion strategy is 0.51. After the improvement of the marketing strategy of e-commerce enterprises by genetic algorithm, the integrity of A's marketing plan is 0.87, and the perfection of the promotion strategy is 0.88. The integrity of B's marketing plan is 0.91, and the integrity of the promotion strategy is 0.83. The integrity of the marketing plan of C is 0.96, and the integrity of the promotion strategy is 0.91. From Table 1, it can be seen that the effectiveness of the marketing strategies of new e-commerce enterprises is much better than that of traditional e-commerce enterprises, both in terms of the completeness of marketing plans and the improvement of promotion strategies.

On the whole, the integrity of the marketing plan of the traditional e-commerce enterprise's marketing strategy is 0.58, and the integrity of the promotion strategy is 0.53. After the improvement of the marketing strategy of e-commerce enterprises by genetic algorithm, the integrity of the marketing plan is 0.91, and the perfection of the promotion strategy is 0.87. Through comparison, it can see that the integrity of the marketing plan of the new e-commerce enterprise's marketing strategy is 0.33 higher than that of the

Table 1
Comparison of the effects of the marketing strategies of traditional and new e-commerce enterprises.

	Marketing program integrity		Promotion strategy perfection	
	Traditional marketing strategy	New marketing strategy	Traditional marketing strategy	New marketing strategy
A	0.51	0.87	0.49	0.88
B	0.61	0.91	0.58	0.83
C	0.63	0.96	0.51	0.91

traditional e-commerce enterprise’s marketing strategy, and the integrity of the promotion strategy is 0.34 higher than that of the traditional e-commerce enterprise’s marketing strategy. The marketing strategy of e-commerce enterprises can optimize the marketing plan and promotion strategy of e-commerce enterprises. Then this paper analyzes the transaction risk and marketing information push of three e-commerce enterprises after the improvement of the enterprise marketing strategy by genetic algorithm. The specific investigation results are shown in Fig. 5.

Fig. 5A shows the transaction risk under different marketing strategies, and Fig. 5B shows the marketing information push under different marketing strategies. Under the traditional e-commerce enterprise marketing strategy, A’s transaction risk is 49.2%, and marketing information push is 59.6%. B’s transaction risk is 53.6%, and marketing information push is 63.5%. C’s transaction risk is 42.4%, and marketing information push is 68.1%. Under the new e-commerce enterprise marketing strategy, A’s transaction risk is 12.1%, and marketing information push is 90.1%. B’s transaction risk is 9.6%, and marketing information push is 92.6%. C’s transaction risk is 15.6%, and marketing information push is 89.4%. On the whole, under the traditional e-commerce enterprise marketing strategy, the transaction risk is 48.4%, and the marketing information push is 63.7%. In the new e-commerce enterprise, the transaction risk of marketing strategy is 12.4%, and marketing information push is 90.7%.

Through comparison, it can see that the transaction risk under the new e-commerce enterprise marketing strategy is 36.0% lower than the traditional e-commerce enterprise marketing strategy, and the marketing information push is 27.0% higher than the traditional e-commerce enterprise marketing strategy. This paper analyzes the customer group needs of three e-commerce enterprises after using the traditional and new e-commerce enterprise marketing strategies, and investigates the improvement of the management structure and the high quality of products. The specific results are shown in Fig. 6.

Fig. 6A shows the improvement of operation and management structure under different marketing strategies, and Fig. 6B shows the high quality of products under different marketing strategies. After using the traditional e-commerce enterprise marketing strategy, A’s perfect management structure is 0.71, and the product quality is 0.81. B’s perfect operation and management structure is 0.66, and the product quality is 0.78. C’s perfect management structure is 0.61, and the product quality is 0.76. After using the new e-commerce enterprise marketing strategy, A’s perfect management structure is 0.95, and the product quality is 0.96. B’s perfect management structure is 0.97, and the product quality is 0.98. C’s perfect management structure is 0.92, and the product quality is 0.94. Through comparison, it can be seen that the improved management structure after the use of the new e-commerce enterprise marketing strategy is 0.29 higher than that before the traditional monitoring system, and the product quality is 0.18 higher than that of the traditional system.

In order to investigate the use of genetic algorithms to strengthen the construction of e-commerce enterprise marketing strategy in the digital economy, this paper constructs the effect of a new e-commerce enterprise marketing strategy. This paper surveys 100 employees of an e-commerce company, applies the new e-commerce enterprise marketing strategy to enterprise marketing, and adopts the form of questionnaire. This paper investigates the comparison of employees’ satisfaction with the marketing strategies of traditional and new e-commerce enterprises. It includes satisfied, average and dissatisfied, respectively. The specific effect is shown in

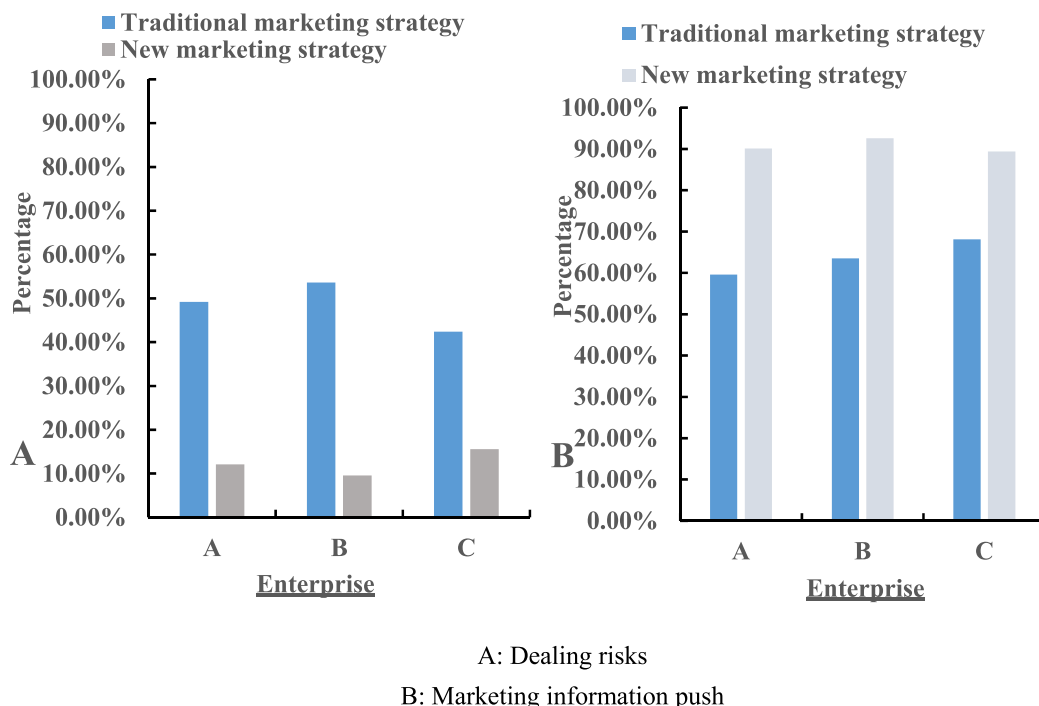


Fig. 5. Traditional and new e-commerce enterprise marketing strategy effect.

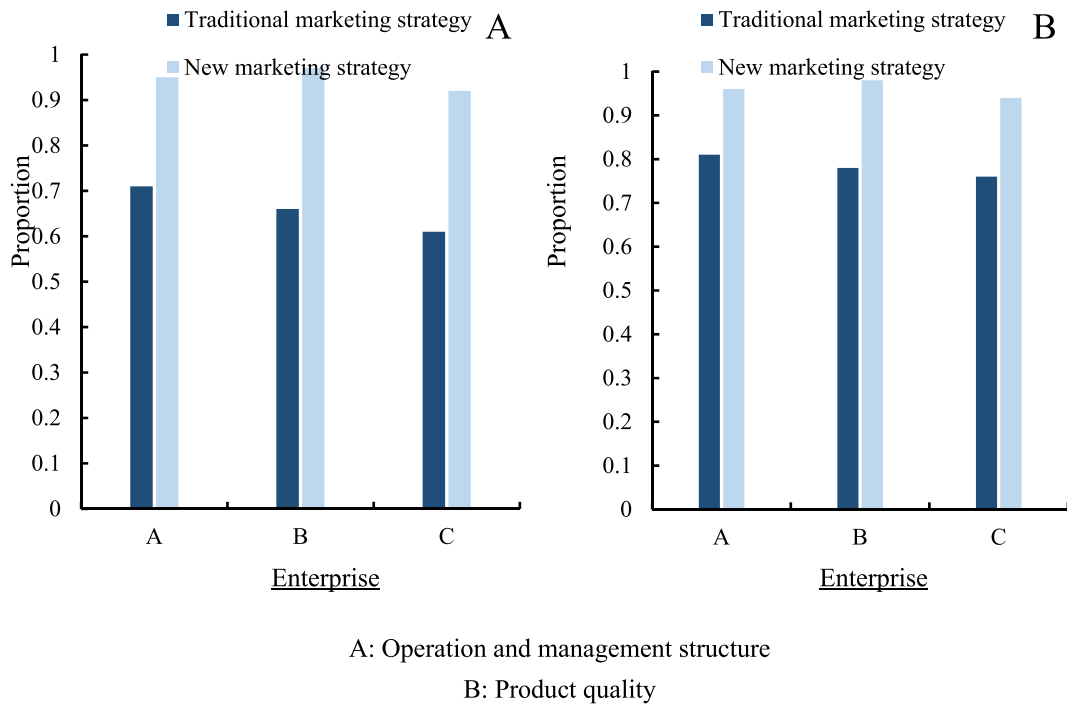


Fig. 6. Management structure and product quality under two strategies.

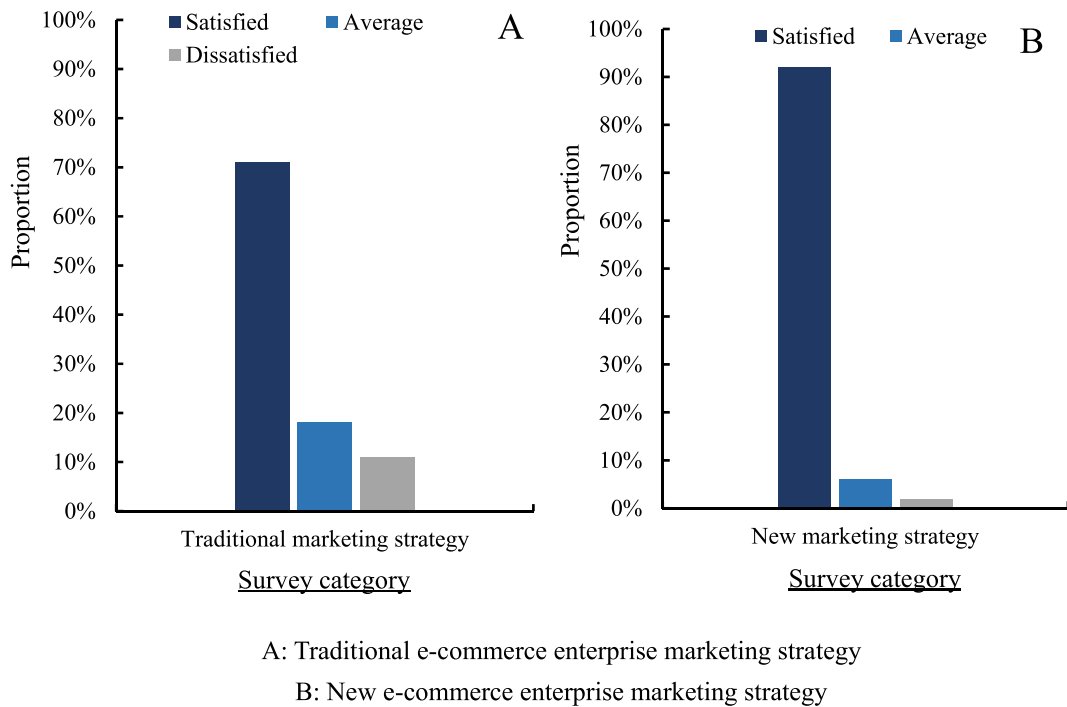


Fig. 7. Comparison of employee satisfaction with traditional and new e-commerce enterprise marketing strategies.

Fig. 7.

Fig. 7A shows employees' satisfaction with the marketing strategy of traditional e-commerce enterprises, and Fig. 7B shows employees' satisfaction with the marketing strategy of new e-commerce enterprises. According to Fig. 7A, the satisfaction of employees with the marketing strategies of traditional e-commerce companies is 71%, the average number of people is 18%, and the

dissatisfaction is 11%. It can be seen from Fig. 7B that 100 employees of an e-commerce company surveyed are 92% satisfied with the introduction of genetic algorithm into the marketing strategy framework of e-commerce enterprises, 6% in average, and 2% dissatisfied with the construction of a new e-commerce enterprise marketing strategy. According to the experiment and investigation, this paper uses genetic algorithm to strengthen the construction of e-commerce enterprise marketing strategy in the digital economy, and constructs a new e-commerce enterprise marketing strategy with 21% higher satisfaction than the traditional new e-commerce enterprise marketing strategy.

11. Conclusions

Currently, how to promote their own development through effective marketing strategies has become an important issue that e-commerce enterprises need to pay attention to in the context of big data. This article mainly studies the marketing strategy related issues of e-commerce enterprises with big data as the background, and proposes corresponding improvement strategies. This article aims to promote the healthy and long-term development of e-commerce enterprises in the context of big data through improved marketing strategies based on this foundation. To sum up, in the new economic era, the marketing strategy of enterprises is very important. The fierce competition between enterprises requires enterprises to constantly innovate, change marketing strategies and maximize market space. Therefore, every enterprise should strive to implement marketing strategies in an innovative spirit. Only by constantly changing marketing strategies and actively adapting to the needs of economic development can enterprises stand out from the competition. E-commerce companies are shifting from single and large-scale marketing strategies to homogeneous and diversified marketing strategies. E-commerce companies need to establish accurate integrated marketing based on big data, customer-oriented and multi-channel to survive and develop in the future competition. The development of genetic algorithms has led to exponential growth in the direct to consumer personal genetic testing industry (such as 23andMe, Ancestry, Microgenes, 23Rubik's Cube, etc.), resulting in the formation of a vast private genetic database. The author explores the potential impact of genetic algorithms on the field of e-commerce. Based on the results of behavioral GA research, the author proposes to incorporate the influence of genetic factors into the existing theoretical research framework of e-commerce, and use this to examine the potential market applications of genetic algorithms. Genetic research design can be used to test causal relationships, and consumer theory can be improved by revealing the biological mechanisms of behavior. In the future, the author will further evaluate the moral and ethical challenges related to corporate autonomy, privacy, and discrimination, and propose a future research agenda.

Data availability statement

Data will be made available on request from the corresponding author.

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CRedit authorship contribution statement

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Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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