

# Coupling Analysis of Online Marketing and Industrial Brand Development under the Background of E – commerce

Guoguang Liu

School of Economics and Management, Binzhou University, Binzhou, 256600, China

**Abstract:** In order to better understand the brand attack trend and market development prospect, this paper analyzes the coupling degree between online marketing mode and industrial brand development based on the background of e - commerce, calculates the impact dimension of online marketing on industrial brand development, analyzes the impact dimension of online marketing effect and marketing impact approach, and thus assumes the relationship between online marketing and industrial brand impact dimension, so as to make hypothesis analysis on the relationship between the two. According to the analysis results, this paper studies the moderating effect of network marketing involvement on brand development, and sets up a coupling degree relationship analysis equation model according to the research results, thus completing the coupling analysis of network marketing and industrial brand development. Finally, through experiments, it is confirmed that the coupling analysis of online marketing and industrial brand development under the background of e-commerce is basically consistent with the actual market research results, thus confirming that the method is accurate and efficient, and meets the research requirements.

**Keywords:** E-commerce background; Internet marketing; Industrial brand; Coupling development

## 1. Introduction

In order to better accurately analyze the coupling effect of online marketing and industrial brand development under the background of e-commerce environment, through the analysis of the main contents and methods of online marketing, to understand the key impact degree of e-commerce online marketing on brand development factors, in the course of investigation and research, it is found that under the background of e-commerce environment, no matter the corporate brand's responsible image and the corporate's own social ability and other related factors have certain impact on the market audience of products, which will have certain guiding effect on the development direction and product brand[1]. With the development of the times and technology, the current network technology is developed, and all major related enterprises have also started to use network means to establish product image and brand development marketing respectively. Therefore, e-commerce network is also gradually carrying out the mainstream media of current product marketing. In order to better build enterprise brand image in the process of network marketing, improve the social image and market share of industrial brands, and analyze the positive impact of network marketing. So as to understand the coupling relationship between the two, so as to better select a reasonable online

marketing method and to stabilize and expand the brand market.

## 2. Coupling Analysis of Online Marketing and Industrial Brand Development under the Background of E - commerce

### 2.1. Research on the impact dimension of internet marketing on industrial brand development

In the process of analyzing the coupling between online marketing and industrial brand development under the background of e - commerce, it is necessary to analyze the impact dimension of online marketing on industrial brand development and the moderating effect of online marketing involvement on brand development[2]. In order to facilitate the analysis of the influence dimension of online marketing on the development of industrial brands, this paper puts forward the hypothesis of dimensional relationship algorithm between e-commerce background online marketing and the development of industrial brands, as follows:

Analysis Assumption 1: Under the e-commerce environment, online marketing has a certain positive impact on brand market value awareness;

Analysis Assumption 2: Online marketing has a positive impact on corporate image reputation in the e-commerce environment;

Analysis Assumption 3: E - commerce environment, network marketing has a very obvious positive impact on enterprise asset promotion;

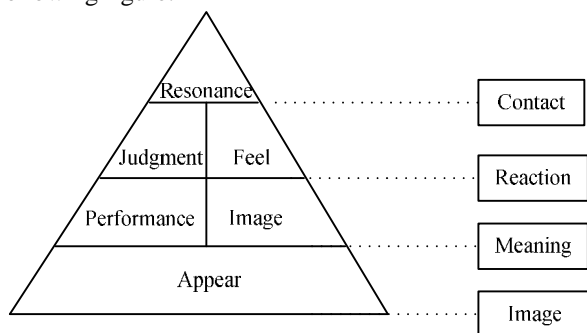
Analysis Assumption 4: Online marketing has significant positive impact on market ( consumer ) loyalty under e-commerce environment;

Analysis Assumption 5: Online marketing has a positive guiding effect on brand price adjustment ability under the e-commerce environment;

Analysis Assumption 6: Online Marketing in E - commerce Environment Has Guiding Positive Impact on Brand Development Prospect;

Analysis Assumption 7: Online marketing has a significant positive impact on brand market expansion under the e-commerce environment;

According to the above assumptions, the impact degree of online marketing on the market under the e-commerce environment is analyzed and studied, and the impact structure of its specific marketing effect is shown in the following figure:



**Figure 1. Influence dimension structure of online marketing effect**

From the above figure, we can see the influence of online marketing on the thinking and cognition of market consumers. On the other hand, in the process of online marketing, the popularity of the marketing media also has a great impact on the product marketing effect. Similarly, if the brand's marketing channel itself has certain negative emotions in the hearts of the masses, the identity and acceptance of the product brand will obviously decline[3]. Therefore, in the process of choosing the network marketing mode for the brand, in order to better promote and expand the brand market, it is necessary to make a reasonable choice of the power grid marketing mode. In the process of marketing, we should try our best to choose widely known online marketing methods, so as to make the products widely known and effectively improve the popularity and market acceptance of the products[4]. So as to better analyze and study the market development

channels and direction of product brands, to more effectively stabilize the market foundation and development direction of product brands, and to better promote brand image and enterprise assets. At present, the commonly used e-commerce marketing methods are mainly focused on the network media. Through the electronic sorting and analysis of the industrial brand development degree by using modern information network technology, the investigation and research found that the network marketing media has a great influence on the brand development, popularity influence, enterprise income and the constituent elements of brand influence degree[5]. In order to better demonstrate and study the development of enterprise brands, judge the brand awareness and the constituent elements of enterprise assets, and thus judge the relevance of online marketing to the development of industrial brands, the specific judgment steps for the relevance of the two are as follows:

Step 1: Under the background of e-commerce environment, analyze the impact of online marketing on brand awareness ( positive / negative ).

Step 2: Under the background of e-commerce environment, the impact of online marketing media popularity on brand value cognition is analyzed ( positive / negative ).

Step 3: Under the background of e-commerce environment, the impact of online marketing methods on the company's reputation image is analyzed ( positive / negative ) [6].

Step 4: Under the background of e-commerce environment, analyze the impact of network popularity on brand market share ( positive / negative ).

Step 5: Under the background of e-commerce environment, analyze the impact of network popularity on brand acceptance and popularity ( positive / negative ).

Step 6: Under the background of e-commerce environment, the impact analysis ( positive / negative ) of network popularity on regional changes in brand pricing space.

Step 7: Under the background of e-commerce environment, the impact analysis ( positive / negative ) of network popularity on brand market development and extension direction.

According to the above seven steps as a theoretical basis for step-by-step analysis, so as to make a more logical assumption judgment on the coupling relationship between e-commerce background environment and enterprise brand development. The judgment process is as follows:

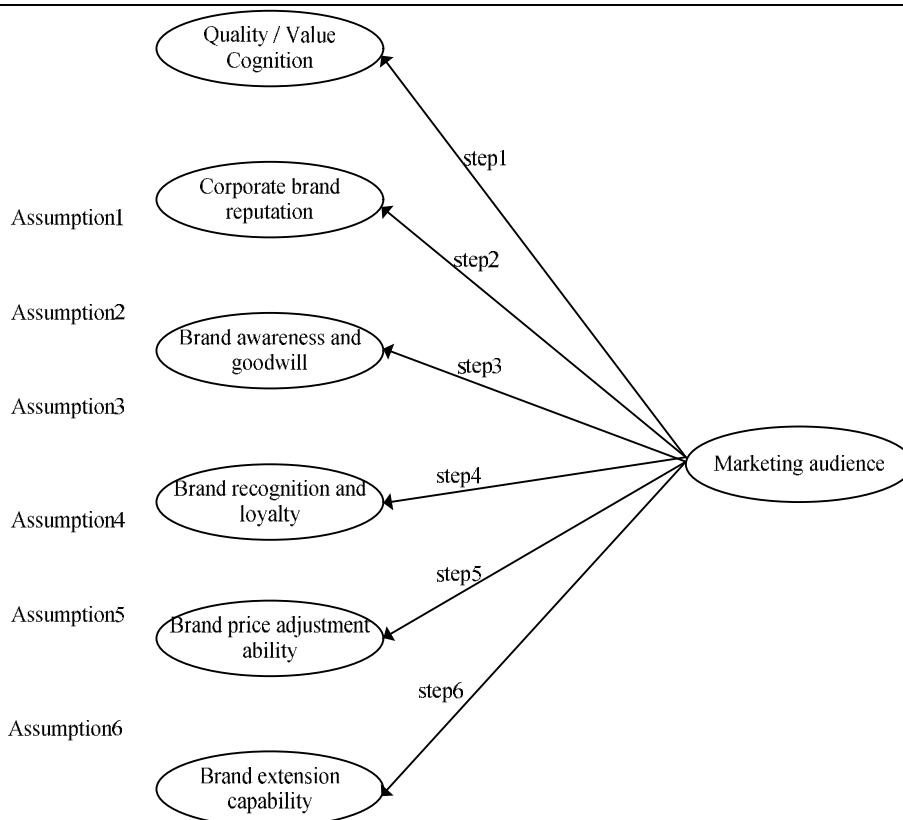


Figure 2. Assumption of dimension relationship of internet marketing impact on industrial brand

As shown in the figure, after the assumption of the relationship dimension of the influence of online marketing on industrial brands is completed, the coupling parameters of the relationship dimension of the two are calculated by combining the fuzzy algorithm. In the calculation process, due to the relatively large number of online marketing methods, different marketing methods have relatively large impact indicators on the development of product brands, and the magnitude of the data affecting the dimension is also different [7]. For the convenience of calculation, the dimensional differences between the data are eliminated to make the dimensional range fall within the range of [0,1]. Considering that the marketing indexes of network marketing to brand development have positive correlation indexes and negative correlation indexes, the dispersion standardization method is used to process the original data [8]. Positive correlation index  $x$  can promote the development of industry, so the bigger the value, the better. Negative correlation index  $y$  will reduce the brand image of the industry, and the greater the value, the greater the obstacle to the improvement of the score. By using the formula to express the dimension relation calculation method, we can obtain:

$$K = R * y - \sum a_{ij} \Delta d \frac{(x_{max} - y_{max})(x_{min} - y_{min})}{(y_{max} - y_{min})(x_{max} - x_{min})} \quad (1)$$

In the formula,  $r$  is the set that falls into the interval of [ 0,1 ] after standardization,  $a_{ij}$  represents the statistical evaluation value of the index.  $y$  and  $d$  represents the maximum value and minimum value of the same index respectively.  $I$  is the selected sample, and  $j$  is the index number. Considering the simplicity and objectivity of the calculation process, the mean square deviation method is adopted to determine the index weight of the relationship dimension[9]. The principle is: if all the sample data in the research process have the same value under a certain index, then the index is considered to have no effect on the scheme decision, and its weight is assigned to  $n$ . if all the sample data have a large gap under a certain index, then the index is considered to have an important effect on the sample sorting or scheme decision. if the average value  $P_{ij}$  of the index variable is a random variable, the average value of the index is calculated after standardization, and the calculation results are as follows.

$$F = K \sum_{i=1}^{j-1} \frac{1}{n} \sqrt{(p_{ij} - d)} \quad (2)$$

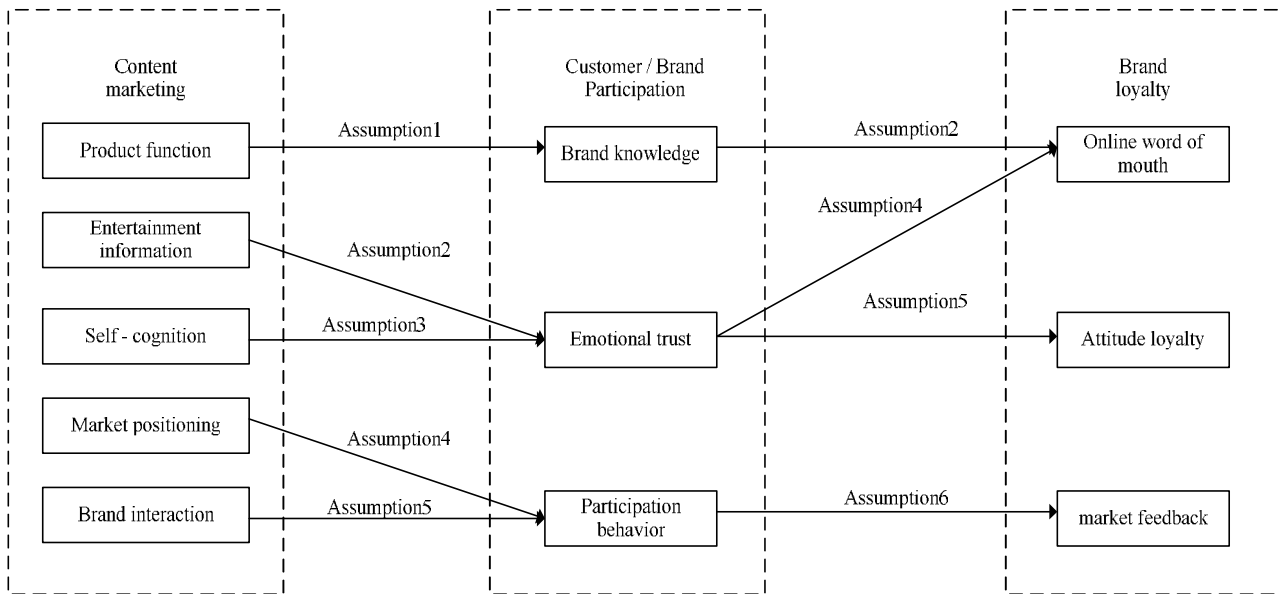
Combined with the above algorithm, the dimensional relationship between online marketing and product development can be more accurately understood, so as to analyze the moderating effect of online marketing involvement on brand market development according to

the calculation results in order to better understand and master the coupling relationship between the two [10].

**2.2. Analysis of the moderating effect of internet marketing involvement on brand development**

Through a comparative study of the advantages and disadvantages of online marketing methods, combined with the previous algorithm, the influencing factors and influencing indexes of brand development trend are calculated, thus establishing a coupling relationship structural equation model of the two. According to the relationship model, multivariate analysis is carried out, and changes

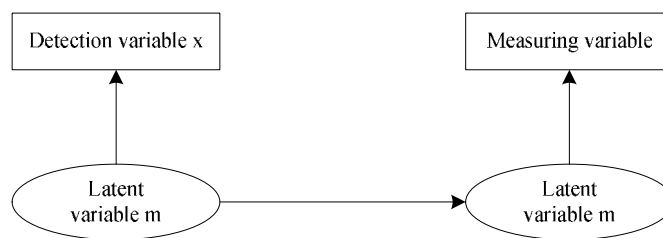
in relationship impact data are observed. It is worth noting that in the observation process, the observation data ≠ are directly measured variables of the theoretical model structural equation, and some variables of the observation data cannot be directly measured, so the above variables need to be set as variables called latent variables [11]. Compare content marketing data, market latent variables, and market recognition / loyalty to map the relationship between online marketing involvement and brand development moderating effect, as shown in the following figure.



**Figure 3. Relationship between internet marketing involvement and moderating effect of brand development**

By analyzing the relationship between the involvement of online marketing and the moderating effect of brand development, the structural equation of the moderating effect of the two is improved and calculated. Through the measurement and research of the coupling structure of the two, the influence degree of related variable indexes

such as corporate social image, marketing approach, corporate market expansion ability and other related variables, as well as the related variables in the process of online marketing are all measurement indexes, and the structural relationship analysis equation model of related variables is set up, as shown in the following figure.



**Figure 4. Structural relation analysis equation model of regulating effect variables**

In the process of calculating the coupling relationship of the single influence dimension of the relationship between the two, bilinear function can be combined for analysis, and the influence degree curve of the relationship between the two can be calculated and drawn by introducing bilinear pair, thus achieving the goal of reducing the encryption length [12]. In the calculation process of mixed two-way image relationship, due to the complexity of the network and market environment, there are more interference factors in the process of brand image construction and development. In order to avoid the influence of interference factors, the dimensionality parameter calculation method is defined in different environments.

Let F1 and F2 be cyclic addition groups of order z, and z is a prime number with large dimensions. P is a generator of F1. a ∈ G, b ∈ H, and a and b are two random numbers [13]. It is assumed that the discrete logarithm problem of the two parameters F1 and F2 are low dimensional relational parameters. The algorithm for mapping dimension e between F1 and F2 is:

$$e = \log \frac{P_{ij}}{z * |(a-b)|} * [F_1 - F_2]^2 \quad (3)$$

When any value in a and b is 1, the mapping function E will have bilinear characteristics. At this time, to ensure the accuracy of your authentication, you need to ensure that E meets the following two conditions:

Bilinear: For all P, Q ∈ G1, there are:

$$e_n' = e \rightarrow K |a-b|^2 e (G \cap H) ab \quad (4)$$

Non - degeneracy: the existence of p, Q ∈ G1 makes

$$e_m' = K * (G \in H) \neq 1 \quad (5)$$

According to the above algorithm, after calculating the market development of the brand, it can be judged whether the brand will leave a deep impression on consumers under the network marketing mode, which tends to be more positive or negative, thus judging the market prospect of the product[14]. In order to verify the accuracy of the analysis of the moderating effect of online marketing involvement on brand development, the marketing effect and industrial brand development trend of international well-known brands with relatively high awareness such as Apple and Coca - Cola are investigated and studied. So as to understand and master the coupling situation between online marketing and industrial brand development, thus effectively obtaining the brand development trend and market development direction.

### 2.3. Implementation of coupling analysis of online marketing and industrial brand development

In order to better analyze the coupling relationship between online marketing and industrial brand development, different online marketing channels are studied to understand the influencing factors of brand development [15]. In order to ensure the brand's market activity, marketing models are selected according to the functions of different products and consumers' preferences. Therefore, in order to further analyze and study money, it is necessary to list the current common online marketing methods and basic effects of products for analysis.

Search engine marketing methods. At present, the marketing method of search engine is the most convenient marketing method to meet the needs of consumers to search and understand targeted brand products. It is also the basic method of online marketing. However, this marketing method lacks popularization and is relatively passive.

The website platform link exchange marketing method. At present, major enterprises are distributing and setting up relevant official exhibitions, setting up brand LOGO on their website platforms to display brand commodities and their uses, and setting up hyperlinks on other websites to facilitate users to search and understand, so that users can quickly find and enter their websites from cooperative websites. Compared with the search engine marketing method, the initiative of this method is improved, but there is still some passivity, and the promotion effect is still difficult to meet the requirements of enterprises.

Viral network marketing. The main method of viral network marketing is to carry out word-of-mouth publicity on the brand through the network social media of users who use the product, so that the brand advantage information of the product can spread and spread rapidly in the media network like a virus, and tens of thousands of network audiences can understand and purchase the brand product by means of rapid online replication and publicity. This method has strong publicity. However, due to the complex network environment, there are certain uncontrollable factors in the publicity process and it is difficult to master the transmission trend of brand information.

Internet advertising marketing methods. In the current e-commerce environment, almost all industrial brands will independently choose to use network channels for product marketing, establish brand image and other related sensation, so as to improve the familiarity and goodwill of consumers to the brand, and thus more intuitively and quickly let consumers have trust. This method is currently the most direct method among all online marketing methods.

Online store marketing model. This method is a relatively popular marketing method in recent years. Through self-management and sales of products on the third-party e-commerce platform, consumers' shopping needs are

facilitated, thus better promoting the market development of products.  
The above is a relatively common and effective online marketing method. The coupling relationship is calculated for different marketing methods. In the calculation process, relevant variables in the analysis process need to

be taken into account and the parameter values need to be added or deleted in response. In order to standardize the processing standards and analyze the coupling relationship structure, the specific coupling analysis relationship diagram is shown in the following figure:

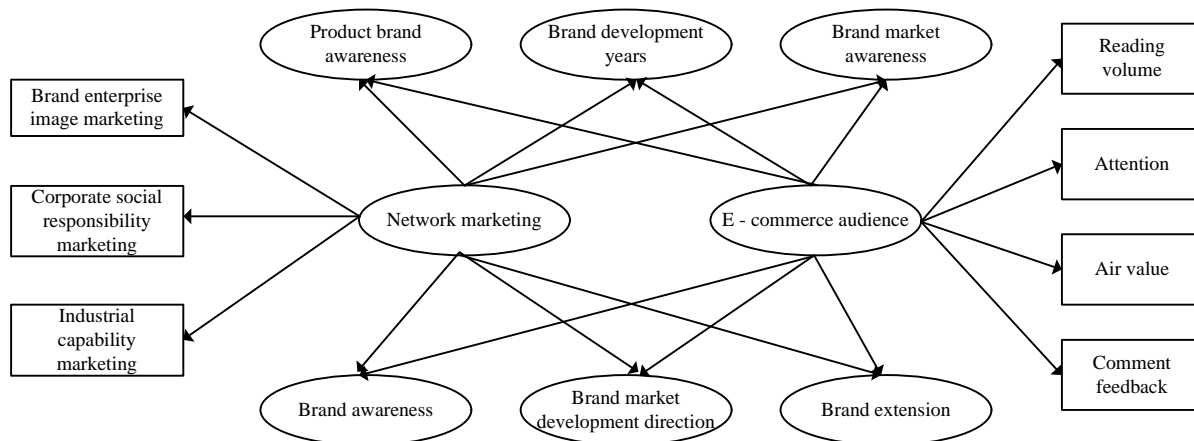


Figure 5. Structure of coupling relationship between online marketing and industrial brand development

The coupling relationship structural equation is set by judging the effect influence parameters of the above-mentioned different marketing channels on product development, and the coupling degree relationship correction processing is carried out by measuring and calculating a plurality of causal variable values and latent variable values checked by the relationship between the two. The coupling accuracy requirement is not met. In the analysis process, in order to better expand the market prospect, the customer group needs to be stably processed. Therefore, in the process of stabilizing the customer market, the brand quality and industrial innovation standards need to be continuously updated, so as to urge customers to make repeated purchases and avoid the phenomenon of customer loss to the greatest extent. If the model coupling analysis result does not meet the expected value standard, it needs to be revised and reset for many times until the satisfied optimal variable value position is reached. By analyzing the logical thinking of the structural relation analysis equation model for adjusting effect variables, the variance algorithm for product variable coupling in product online marketing can be obtained as follows:

$$AB = e_n \sum (a,b)K - F \tag{6}$$

Similarly, the coupling correlation equation of industrial brand development trend is:

$$z = \prod_{i=1}^m \Delta(AB - 1)^{m-1} * d / 2 \tag{7}$$

Through the above method, the coupling analysis of industrial brand development under the background of e-commerce can be effectively completed, the degree of influence on the product market prospect under different online marketing modes is fully considered, and the research requirements are finally completed.

### 3. Analysis of Experimental Results

In order to verify the effectiveness of the coupling analysis of online marketing and industrial brand development under the background of e-commerce, an investigation experiment was carried out. By comparing the actual investigation result parameters, it is necessary to set the detection parameters in the process of comparative detection. The specific parameter information is as follows:

Table 1. Coupling of experimental measurement items and k value

| Analysis factor    | Policy factor | coupling coefficient | K value |
|--------------------|---------------|----------------------|---------|
| Cognitive effect   | F1            | 0.812                | 12.84   |
|                    | F2            | 0.847                | 13.45   |
|                    | F3            | 0.815                | 12.78   |
| Market competition | F4            | 0.715                | 14.15   |

|                       |     |       |       |
|-----------------------|-----|-------|-------|
|                       | F5  | 0.764 | 13.54 |
|                       | F6  | 0.742 | 13.62 |
| Customer satisfaction | F7  | 0.814 | 14.57 |
|                       | F8  | 0.826 | 15.78 |
| Product involvement   | F9  | 0.791 | 15.61 |
|                       | F10 | 0.798 | 15.74 |

According to the above survey results for comparative analysis, the coupling relationship between network marketing and industrial brand development is detected, and the analysis results of the coupling relationship between

the two proposed in this paper are compared and detected, and are plotted. The specific experimental detection results are shown in the following figure:

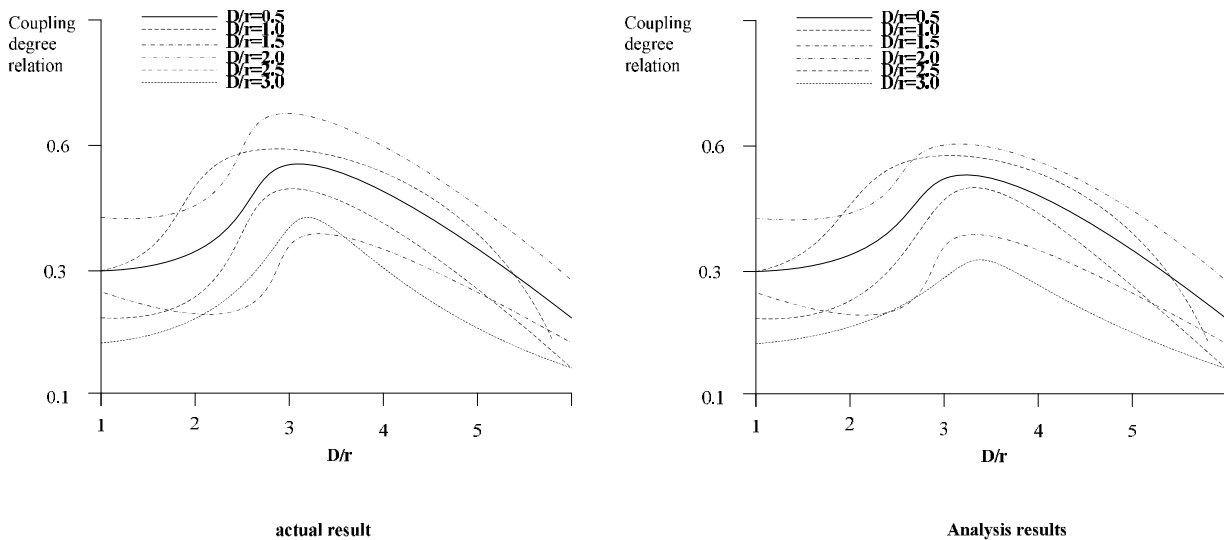


Figure 6. Comparison test results

It is not difficult to find out by observing the above experimental test results. Compared with the actual survey results, the coupling analysis curve based on the research in this paper is basically consistent with the actual survey curve, but there are still some differences. This is because the market is affected by many factors such as economy, politics, culture, environment and so on in the actual research process, so the survey results and the analysis results will inevitably have certain differences. However, as far as the current analysis methods are concerned, the coupling relationship analysis curve and the actual relationship curve proposed in this paper are closest to the results of other analysis methods and the actual results, and other coupling degree analysis methods are not described here. Through comparative research, it is proved that the coupling analysis method of online marketing and industrial brand development under the background of e-commerce proposed in this paper has high practicality and fully meets the research needs.

#### 4. Concluding Remarks

The current business environment is complex and changeable. In order to better protect the brand marketing effect of enterprises and expand the product market, the coupling relationship between online marketing and industrial brand development is analyzed and studied based on the background of e-commerce environment. By analyzing the coupling degree of the two, the market development prospect and the development of industrial brands can be judged.

#### References

- [1] Wang Anmei, Wang Hongguo. Coupling Analysis of Hubei Tourism Industry and Network Marketing - Based on Red Tourism in 16 Counties ( Cities ) of Dabie Mountain District. Hubei Social Sciences. 2018, 376(4), 75-82.
- [2] Zhang Dezhi. Discussion on the Development Strategy of China's Traditional Retail Industry from the Perspective of Network Marketing - Taking Clothing Industry as an Example. Business Economics Research. 2016, 25( 12 ), 35 - 37.
- [3] Cui Jiandong, Jiang Dayong. Overall promotion of coordinated development, ingenuity, ingenuity and all-round development - thoughts on brand building and development of haiyouhou

- 
- cultural industry. journal of Jishou university ( social science edition ). 2018, v 39 ( S1 ), 84 - 89.
- [4] Yi Kaigang, Li Jieyu. Tea Tourism Integration and Interactive Development: Model Construction and Effect Measurement - Based on Empirical Research in Zhejiang Province. *Tea Science*. 2017, 25( 5 ), 532 - 540.
- [5] Quan Xi, Lin Jing. Research on Brand Network Promotion of Northwest Characteristic Agricultural Products under New Media Environment - Taking " Lanzhou Lily" as an Example. *Agricultural Network Information*. 2016,63 ( 8 ): 34 - 37.
- [6] Gu Guangsheng. Analysis on Brand Elements of Cultural and Creative Industry with Local Characteristics Based on Porter Diamond Model - Taking Meizhou, Guangdong Province as an Example. *Human Resources Management*. 2016, 54 ( 12 ), 283 - 285.
- [7] Mei Yaoyuan, Miao Kailin. Expansion and Marketing Breakthrough of Domestic Sports Brands - Taking the Remodeling of Classic Domestic Brands as an Example. *Global Market Information Guide*. 2017,24 ( 37 ), 6 - 7.
- [8] Lian Xiaowei. Brand - driven Rapid Development and Controversy Coexist - Notes on the Comfort Home Industry Development Forum of the 6th Annual Chinese Household Appliance Marketing Conference in 2016. *Modern Household Appliances*. 2016, 36 ( 24 ), 40 - 43.
- [9] Jiang Liang, Zou Juanhua, Li Hongjun, et al. Comparative Study on Brand Marketing of Top - tier Sports Goods at Home and Abroad - Taking Nike, Adidas, Li Ning and Anta as Examples. *Journal of Hebei Institute of Physical Education*. 2016,30 ( 6 ), 14 - 21.
- [10] Tu Fangping, Chen Jie. Exploration of the Co - creation of Community O2O Marketing Mode by Old Brand Enterprises and Jingdong - Taking Shenghui Lighting Factory as an Example. *Science and Technology Vision*. 2017, 46 ( 16 ), 130 - 131.
- [11] Li Jingjing. Research on the Impact of Brand Construction of Local Characteristic Industry on County Economic Development - Taking " Shucheng Xiaolanghua" Tea Industry as an Example. *Times Financ*. 2016, 12( 23 ), 66 - 67.
- [12] Wu zonglin. systematic thinking on the application of e-commerce marketing in e - commerce - taking e-commerce in e-commerce as an example. *modern commerce*. 2017,14 ( 9 ), 24 - 26.
- [13] Sun Linling, Dong Jiajia. Analysis and Solution of Agricultural Products Unsolicited Problem in Hainan Based on Internet - Taking Cold Chain + E - commerce Marketing Promotion Scheme in Lingshui Shengnguo Island as an Example. *China Market*. 2017,52 ( 34 ), 137 - 138.
- [14] Zhang Yijun. An Analysis of Polite Pragmatics and Corporate Identity Construction in Commercial Advertisements - Taking " Double Eleven" Shopping Carnival E - commerce Marketing Advertisements as an Example. *Overseas English*. 2016, 47( 3 ), 209 - 211.
- [15] Zhu Yan, Han Xiaoning. Research on E - commerce Marketing Mode of Agricultural Products under the " internet plus" Thinking - Taking 2015 Yantai Cherry Marketing as an Example. *Science and Technology Vision*. 2016, 35 ( 3 ), 24 - 25.
-