



The Study of Internet-Based Basic Business Model on Enterprise Business Model Innovation

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Abstract. In the context of globalization and internationalization, the Internet industry is profoundly changing the industrial structure of China and becoming one of the important driving forces of the national economy. However, at present, China's Internet companies are also facing many challenges such as product homogenization and fierce market competition, requiring Internet companies to have stronger innovation capabilities to meet the challenges of their competitors. Therefore, how to select the optimal innovation model scientifically and systematically to enhance the innovation capability of enterprises has become the key to the success or failure of Internet enterprises. This paper combines quantitative analysis with qualitative analysis from the actual situation of the Internet industry to construct a model for selecting the innovation model of Internet enterprises in China, aiming to help Internet enterprises select the optimal innovation model, improve their innovation performance and establish their core competitive advantages.

Keywords: Internet companies · Corporate Innovation Model · Corporate Innovation Capability · Evaluation index system

1 Introduction

At the end of the 20th century, with the sending of the first e-mail in China, the Internet began to enter the public eye in China. Along with the popularity of personal computers, the Internet quickly set off an economic wave in China. Thanks to this wave, China's Internet enterprises have developed at a high speed in the past two decades, with an expanding industry scale, an increasingly rich industrial structure, and an increasing degree of internationalization [1]. Chinese enterprises such as Tencent, Alibaba, and Baidu have started to appear on the international Internet stage, and today's Internet enterprises have become the backbone of China's enterprises and an important part of the national economy, providing a strong driving force for China's economic development [2]. However, with the arrival of a new round of information technology revolution, the speed of updating Internet technology is accelerating, and more and more new Internet enterprises are beginning to emerge, which makes the competition in the Internet market gradually intensify, and core competitiveness is increasingly becoming an important

influencing factor for Internet enterprises to successfully gain a foothold in the market. In order to establish business barriers and enhance core competitiveness in the market, China's Internet enterprises have started to implement various innovation strategies including independent innovation and imitation innovation in order to expand or protect market share and gain greater profits [3].

2 A Study on the Selection Model of Innovation Model of Internet Enterprises

2.1 Descriptive Statistical Analysis

A total of 110 questionnaires were distributed to 33 Internet companies, of which 88 questionnaires were collected, with a recovery rate of 80%, 19 of which were invalid due to incomplete information, and finally 64 valid questionnaires were obtained, with a valid recovery rate of 72.73%. As shown in Fig. 1, among the surveyed Internet enterprises, social enterprises accounted for 9.09%, e-commerce enterprises accounted for 9.09%, intelligent hardware enterprises accounted for 7.95%, cloud computing/big data enterprises accounted for 12.5%, finance/payment enterprises accounted for 3.41%, life service enterprises accounted for 10.23%, short video enterprises accounted for 5.68%, search/security enterprises accounted for 20.45%, 2.27% for game companies, 4.55% for film and TV companies, and 14.77% for other companies. The segmentation of the surveyed Internet companies covers a wide range of industries and meets the sample universality requirement (see Fig. 1 for the specific list of surveyed companies).

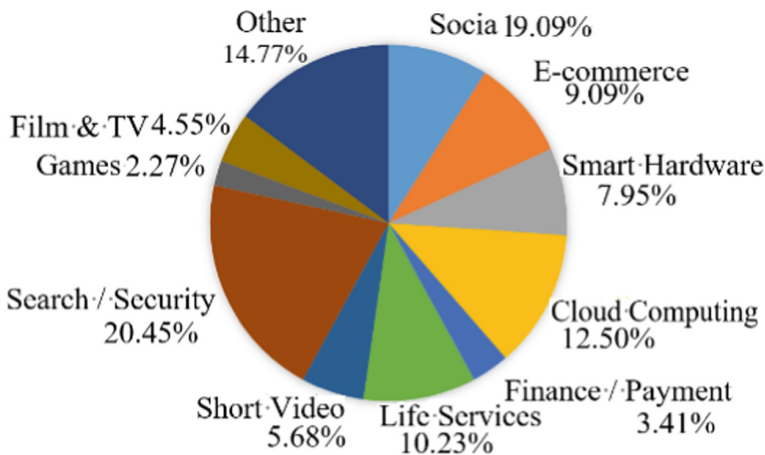


Fig. 1. The percentage of the researched companies in their industry segments

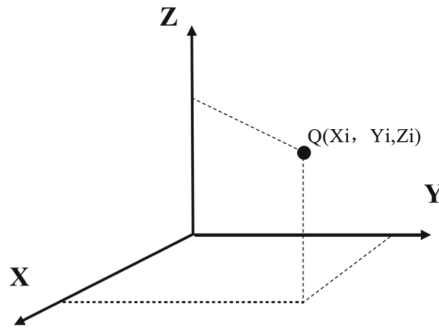


Fig. 2. Three-dimensional spatial model based on evaluation system

3 The Construction of Innovation Model Selection Model for Internet Companies

3.1 Constructing Selection Models

3.1.1 Build 3D Spatial Model

This paper adopts a static research approach to study the problem of selecting innovation models for Internet companies. Combined with the evaluation system established above, the internal environment of Internet enterprises is set as the X-axis, the external environment of Internet enterprises is set as the Y-axis, and the growth stage of Internet enterprises is set as the Z-axis to construct a three-dimensional spatial model (see Fig. 2).

3.1.2 Illustration of 3D Model Based on TOPSIS Method

In the following, the ideal solution and the negative ideal solution of the innovation model selection of Internet enterprises are determined according to the TOPSIS method, and the application of the three-dimensional model is illustrated (see Fig. 3 for details). According to the innovation status of Internet enterprises, this paper sets point A (6, 6, 2) as the ideal solution, which represents that Internet enterprises are in the mature stage, and when they adopt this innovation mode, the status of internal and external environment of Internet enterprises has greater advantages. When the enterprise adopts this innovation mode, the current situation of the internal and external environment of the Internet enterprise has greater disadvantages, and X, Y and Z are in the worst state at this time, which is extremely unfavorable to the implementation of this innovation mode.

Let the distance between a point $Q(X_i, Y_i, Z_i)$ in the space and the ideal solution A be S_{i1} and the distance from the negative ideal solution be S_{i2} . The proximity of the point Q to the ideal solution is called the applicable value and is set to F_i , $F_i \in [0, 1]$, $F_i = 0$ indicates that Q is the inferior solution and $F_i = 1$ indicates that Q is the optimal solution, and the formula is calculated as follows.

$$S_{i1} = \sqrt{(X_i - 6)^2 + (Y_i - 6)^2 + (Z_i - 2)^2} \quad (1)$$

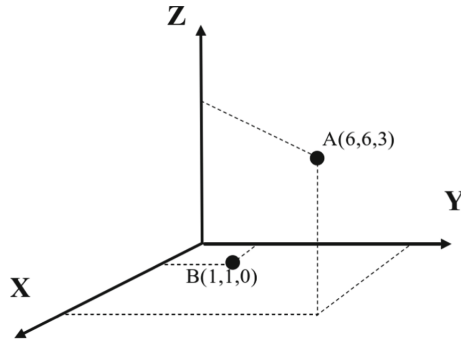


Fig. 3. Location diagram of ideal solution A and negative ideal solution B of TOPSIS method

$$S_{i2} = \sqrt{(X_i - 1)^2 + (Y_i - 1)^2 + (Z_i - 0)^2} \tag{2}$$

$$F_i = 1 - \frac{S_{i1}}{S_{i1} + S_{i2}} \tag{3}$$

where $i = 1, 2, 3, 4$, i stands for independent-autonomous innovation, independent-imitation innovation, joint-autonomous innovation, and joint-imitation innovation, respectively.

3.2 Application Steps for Selecting a Model

Since the application process of the selection model is tedious, this paper further enhances the operability of the selection model by making the application process step-by-step (see Fig. 4 for details), so that large and small Internet enterprises can understand and use the model for innovation model selection in a short period of time [4].

- (1) Step 1: Selection of impact factor indicators
- (2) Step 2: Calculation of secondary index weights

Different indicators have different degrees of influence on the innovation activities of Internet companies, so before assigning values to the indicators, the weights of the indicators need to be calculated [5]. In this paper, we use the hierarchical analysis method and invite experts of Internet enterprises to make a two-by-two comparison of each secondary index to calculate the weight of each index, and the sum of the weights of the secondary indexes under each primary index is 1, that is, the sum of the weights of the internal (external) indexes of Internet enterprises is 1, as follows.

According to the nine-level scale method (Table 1), experts were invited to fill in the index importance judgment matrix (Table 2) to make a two-by-two comparison of each secondary index. Subsequently, the importance degree judgment matrix filled by each expert was tested for consistency with the help of yapp software to ensure that the importance degree among the indicators was judged correctly. For example, if $U1 > U2$ and $U2 > U3$, then it must be ensured that $U1 > U3$. When the consistency ratio of

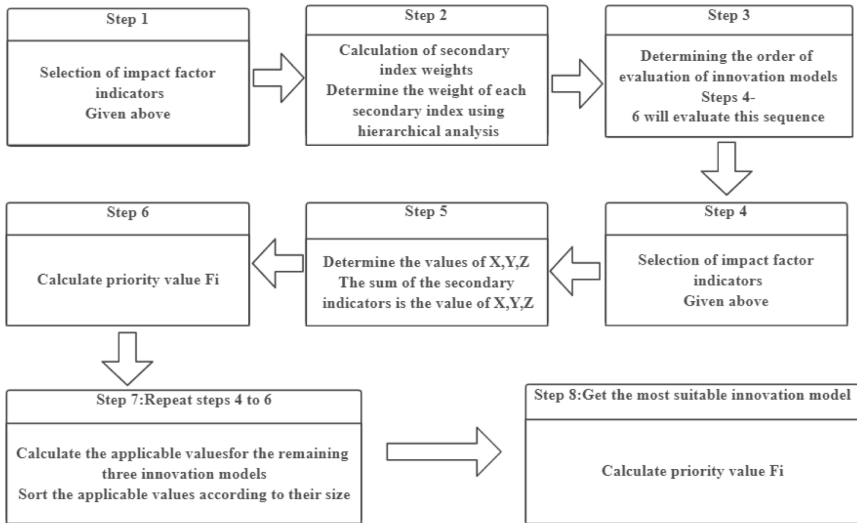


Fig. 4. Model application steps

Table 1. Nine-level scale method-meaning of each scale

Grade Indication	9	7	5	3	1	1/3	1/5	1/7	1/9
	Absolutely important	Very important	More important	Slightly more important	Equally important	Slightly unimportant	Comparatively unimportant	Very unimportant	Absolutely unimportant

8,6,4,2,1/2,1/4,1/6,1/8 Importance is between the two adjacent levels

the judgment matrix is less than or equal to 0.1, the test is passed. If the judgment matrix cannot pass the consistency test, experts are contacted to adjust the matrix until it passes the consistency test.

$$g_i = \sum_{j=1}^n u_{ij} \tag{4}$$

$$G = \sum_{j=1}^n g_i \tag{5}$$

Finally, the weighting results of each expert were recorded in Table 3, and the final weighting values of each indicator were obtained by summing up and averaging the weighting values of each indicator derived by the e experts respectively (see the notes of Table 3 for the specific formula).

$$A_i = \frac{1}{e} \sum_{i=1}^n a_i \tag{6}$$

(3) Step 3: Determine the order of innovation model assessment

Table 2. Matrix for determining the importance of indicators

Secondary indicators	U1	U2	.....	U _i	Summed scale value	Weights
U1	1	U12	.....	U1 _j	g1	d1 = g1/G
U2	U21	1	.....	U2 _j	g2	d2 = g2/G
.....	.....	.....	1	.....	.....	.....
U _i	U _{i1}	U _{i2}	U _{i3}	1	g _i	d _i = g _i /G
Total					G	1

Note: Let u_{ij} be the importance judgment value of two two indicators, g_i be the summation scale value, d_i be the weight value of the indicators, and G be the sum of the summation scale values of each indicator. u_{ij} is positive and $u_{ij} = 1/u_{ji}$, $u_{ij} = 1$ The calculation formula is as follows:

Table 3. Calculation of final indicator weights

Indicators	Experts 1	Experts 2	Experts 3	Experts e	Weighted average
Indicator 1						
Indicator 2						
Indicator 3						
.....						
Indicator n						

Note: Let the result of expert index weight be a_i , the final index weight be A_i , and the number of experts be e positions

The order of the four innovation models was determined, and the first innovation model was evaluated first in the order [6].

(4) Step 4: Secondary indicator assignment

Internet experts are invited to assign values to the secondary indicators [7], and the rating values range from 1 to 6. The scores indicate the degree of influence of the indicator on the innovation model adopted by Internet companies.

Note: Let the expert rating value be b_i , the expert mean be B_i , the weighted mean be J_i , and the weight value be A_i , The calculation formula is:

$$B_i = \frac{1}{e} \sum_{i=1}^n b_i \tag{7}$$

$$J_i = A_i * B_i \tag{8}$$

(5) Step 5: Determine the values of X, Y, and Z

The values of internal factors X and external factors Y of Internet companies are obtained by summing up the weighted averages of the secondary indicators determined

in the previous step, and the values of growth stage Z of Internet companies are assigned according to the method mentioned above (“0” represents the start-up period, “1” represents the growth period, “2” represents the maturity period, and “3” represents the decline period).

(6) Step 6: Calculate the applicable value F_i

Based on the values of X, Y and Z, the formula of the selection model is applied to calculate the applicable value F_i .

(7) Step 7: Repeat steps four through six

Following the order of innovation model evaluation determined in step 3, steps 4 to 6 are repeated, and the applicable values of F_i for the remaining four innovation models are calculated separately and ranked according to the magnitude of the values [8].

(8) Step 8: Select the most appropriate innovation model

According to the ranking of the applicable values of the four innovation models, the optimal innovation model of this Internet enterprise is selected, and the innovation activities of the enterprise are guided accordingly [9].

4 Conclusion

Based on previous research, this paper combines TOPSIS method and hierarchical analysis method to establish three-dimensional spatial coordinates according to the internal and external environment of Internet enterprises as well as the growth stage of Internet enterprises to construct a model for the selection of innovation model of Internet enterprises in China [10]. At the same time, in order to enhance the operability and practicality of the selected model, the application process of the model is step-by-step processed in this paper, so that large and small Internet enterprises in China can understand and use the model in a short time.

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