The Structure and Measurement of a High-Tech Venture Enterprise Business Model

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Abstract: This study, based on a cross-case coding analysis among the five typical high-tech venture enterprises, has built a high-tech venture enterprise business model structure system that contains three constructs, nine dimensions and twenty-seven attributes and has carried an empirical test based on 314 questionnaires. The results showed that the system had good reliability and validity. The results of this study will provide an effective tool for the analysis and prediction of the business model of high-tech venture enterprises.

1. Introduction

High-tech venture enterprises are start-ups engaged in the research, development, production and service of high-tech products that are closely related to major issues, such as the economic restructuring of a country, the development of strategic emerging industries and the construction of an innovative country. This type of enterprise is an important core force for promoting the transformation of the economies of all countries from exogenous growth to endogenous growth[1][2]. The business model adopted by high-tech venture enterprises makes it difficult for the core technology of the enterprises to be recognized by consumers and the market in the promotion process and eventually leads to the failure of the core technology market-oriented process[3]. Both theoretical research and actual business activities show that effective business models have an important impact on high-tech venture enterprises.

Many researchers have tended to classify business models first and then examine the impact of different types of business models on start-ups. In the past few years, some scholars also have started to research the relationship between high-tech venture enterprises and business models from the perspective of the constituent elements of models. The idea of "Business Model Canvas" makes a difference by classifying the business models into nine factors dominated by value propositions and two elements that include profit models and business systems[4][5]. These studies have been initially recognized by academia. Some scholars considered transaction content, structure and management as elements of business models from the perspective of a business trading mechanism. Meanwhile, they defined the basic characteristics of a business model and discussed the innovative design of business models from the aspects of novelty and efficiency[6]-[10]. Among the existing research into high-tech venture enterprise business models, most researchers believed that the start-up business model, because the value chain reflected by the business model is short, is unable to be deeply studied down to its components. Therefore, it is necessary to condense the composition of the business model of entrepreneurial enterprise through means of case study to determine the elements but not to reflect the nature of the business model-the logic of value creation and acquisition[11]-[15]. Studying the high-tech venture enterprise business model is becoming a hot topic. However, there remains some problems. First, scholars still have many ambiguities in recognizing the constituent elements of business models of venture enterprises, and there is still no consensus on the research perspectives between them. The components of business models for venture enterprises still need to be further explored. Second, at present, the research on the business model structure system of venture enterprises is still in the stage of theoretical analysis, lacking the support of empirical research results.

Because high-tech venture enterprises have the characteristics of high knowledge-intensiveness, seeking high value added of products and services, absorbing high capital and so on, the components of these enterprise business models may be different from other kinds of venture enterprises. Thus, what are their components? How can the structural levels of these elements be divided? How can structure systems be measured? Accurate answers to these questions will provide more powerful theoretical support for the design of business models and the innovation of business models for venture enterprises.

This paper used Xiaoling and others' research for reference[16], using a method of combing qualitative research and empirical analysis of large samples, regarding Chinese high-tech venture enterprises as research objects, choosing some of them that have successful business models as typical cases, and generalizing their constituent elements according to grounded theory to contribute to a high-tech venture enterprise business model system. Furthermore, based on the data from 314 questionnaires, adopting the exploratory factor analysis method and confirmatory factor analysis method, this paper did empirical tests on this system. The results of the study can provide an effective tool for the analysis and prediction of the business model of high-tech venture enterprises.

2. Data Acquisition

2.1 Case Collection

Referencing Jingqin and Jing to use text data as the basis for coding analysis[17], this paper chose cases, which are consistent with this article, from the China Management Case-sharing Center. Combined with the pre-set relevant screening principles and the selected cases that have to be universal, this article finally chose OMES Networks, Dalian Jing Rui Energy Saving Technology Service Co., Ltd., UuBridge Inc., MI and E City Limited Liability Company as samples to analyse by grounded theory. After the comparison of these five companies' materials, OMES Networks was chosen as a single case analysis, because its data were relatively more adequate and can better reflect the business model elements with a strong representation. The others were used for multi-case analysis. Among of them, the OMES was established in 2012, date of information written in 2013, belong to communications industry, main products are OPM technology as the core product line, including OPM15 and 11 modules, wireless lighting control devices, wireless location cards, sensors, ethernet base stations, etc. Dalian Jing Rui Energy Saving Technology Service Co., Ltd. Was established in 2007, data preparation in 2009, belong to energy-saving industry, main products are Energy-saving technology-based development, consulting, transfer and service; energy-saving product sales; Energy-saving environmental protection projects. UuBridge Inc. established in 2011, data preparation in 2014, belong to software development industry, main products are software development, internet application equipment supply. E City established in 2004 and date preparation in 2011, belong to internet application industry, main products are the world's first three-dimensional map, providing integrated city electronic map, three-dimensional electronic yellow pages, city E-commerce, virtual communities and other services. MI established in 2010, date of information writ.een in 2013, belong to mobile device software industry, the main products are mobile devices, TVs and software.

2.2 Coding Strategy

To avoid the influence of subjective bias of coders on the result of coding, to reduce the errors in case studies and to increase the theoretical sensitivity, according to the research of Miao and Jingqin[18], three co-coding groups of researchers in the field of entrepreneurship and business models were asked to label the five case companies separately, and then the research results of three researchers would be integrated and deleted. Differences in the coding process would be discussed together until an agreement was reached.

3. Data Coding

3.1 Single Case Coding Analysis

3.1.1 Open Coding

Through open coding of the case data of OMES Networks, a total of 22 valid concepts and 9 categories were obtained. To illustrate the open coding process, some examples of coding data are shown in Table 1. The nine areas are client subdivision, market segmentation, provide items, value network, core resources, core competence, profit, income and cost.

| Categorization | Conceptualization | Source Material |
|--------------------|----------------------|---|
| Client Subdivision | Target Customer | A1 Based on the market positioning of the staff to determine the |
| | _ | customer market groups. |
| | | A2 Song Liang and his team decided to aim at China's mining |
| | | market. |
| | Customer Value | A3 Song Liang and his team tapped into several potential |
| | | customers and created greater benefits for the company because of |
| | | this. |
| Market | Market Prospects | A4 China's market is vast, and high-tech industry in China has |
| Segmentation | | become an increasingly mature sunrise industry. |
| | | A5 The development of global smart cities indicates that the OPM |
| | | technology he studies has broad prospects in China with the largest |
| | | population in the world. |
| | | A6 China's wireless smart sensor network market has shown |
| | | explosive growth. |
| | | A7 OPM application market is large with fast growth. |
| | Market Coverage | A8 As the main domestic OPM clients are located in the Yangtze |
| | | River Delta region, Song Liang originally conceived the company's |
| | | location in the Yangtze River Delta. |
| | Market Share | A9 OMES Networks' main product, a wireless sensor |
| | | communication chip, could achieve more than 40% market share in |
| | | the domestic chip supply market. |
| Provide Items | Brand | A10 OMES Networks has already become the leading brand in this |
| | D. I. | |
| | Product | All OMES Networks used IC1 technology to promote the |
| | | development of intelligent life processes, while it strongly |
| | | supported the development of low-carbon economy. |
| | | A12 The business goal was to change people's lives by providing |
| | | A13 OMES Networks relied on innovation to make it possible for |
| | | companies to gain access to the Chinese market |
| Value Network | Network Resource | A14 Song Liang realized that he must transform the power of the |
| value retwork | Itelwork Resource | government into the advantages of entrepreneurship |
| | Chilzution | A15 OMES Networks used relational network resources to handle a |
| | | variety of public affairs. |
| | | A16 The network of contacts between enterprises, suppliers and |
| | | customers enabled Song Liang to keep abreast of developments in |
| | | the market and respond promptly. |
| | | A17 Song Liang shared resources and expanded network on the |
| | | platform that was offered by the pioneer park in the early days of |
| | | entrepreneurship. |
| | Partners | A18 OMES Networks was committed to integrating the industry |
| | | chain in this area while partnering with partner companies to |
| | | establish alliances. |
| | Value Network Status | A19 OMES Networks conducted two-way exchange of information |
| | | with the government. |
| | | A20 OMES Networks accurately positions itself with the main |
| | | force focus on technology research and development and product |
| | | development, while the main sales tasks were delivered to the |
| | | downstream retail companies |

| Table 1 | the Results | Of Open | Coding |
|---------|-------------|---------|--------|
|---------|-------------|---------|--------|

| Core Resources | Technical Resources | A21 Song Liang owned the company's core OPM technology and |
|-----------------|--------------------------|--|
| | | natents |
| | | A22 Song Liang and his team used the research funding introduced |
| | | to conduct an in-depth study of OPM technology |
| | | A23 OPM technology in the transmission of data nodes is still able |
| | | A25 OF WI technology in the transmission of data houses is sum able |
| | | to optimize the choice of the next set of data transmission paths |
| | | and, to avoid interference signals, can also complete timely transfer |
| | | of transmission channels. |
| | | A24 OPM technology has strong anti-interference ability and more |
| | | advantages for emergency response. |
| | | A25 As the company invests in science and technology, its |
| | | investment in OPM technology continues to maintain its leading |
| | | position at home and abroad. |
| | | A26 The fundamental advantages of OPM technology are high |
| | | handwidth low power consumption and low cost |
| | Channel Resources | A27 In the early stages of entrepreneurship OMES Networks used |
| | Channel Resources | A27 in the early stages of entrepreneurship, ONES Networks used |
| | | advertising and other channels to pass the value of the user |
| | | positioning. |
| | | A28 When Huzhou was constructed to become a smart city, Song |
| | | Liang, recommended OPM technology to the director of the local |
| | | personnel bureau, Tang. |
| | | A29 Because of its well-maintained customer channels, OMES has |
| | | won many smart city projects. |
| | Human Resources | A30 His new team combines advanced overseas technologies with |
| | | domestic market development. |
| | | A31 At the invitation of Song Liang the native Dr Chen Lijun first |
| | | joined the team and became vice president of engineering Other |
| | | local alitas also joined in succession |
| Coro Compotonoo | Marketing Canabilities | A22 Song Liong found the company's marketing staff ability was |
| Core Competence | Marketing Capabilities | A52 Song Liang found the company's marketing start admity was |
| | | very prominent, so that it can vigorously develop the Chinese |
| | | market. |
| | | A33 OMES focuses on building a marketing team and takes a |
| | | "customer first" strategy to open up the market for the company. |
| | Application Ability of | A34 OMES enables OPM technology at 10 times the broadband |
| | Science and Technology | transmission under the condition of low cost, and on this basis, it |
| | | has guaranteed the transmission stability. |
| | | A35 Song Liang and his team decided to use OPM technology for |
| | | an indoor wireless positioning system and decided to enter this |
| | | field |
| | | A36 Song Liang applied the OPM technology to achieve a |
| | | high-handwidth low power and low-cost network |
| | Manufacturing Canability | A37 OPM15 and OPM11 are two cartified wireless products |
| | Manufacturing Capability | AS/ OFMIS and OFMIT are two certified whereas products. |
| | | OPWITS has achieved mass production. |
| | | A38 worksnop pipeline design is reasonable with high efficiency |
| | | and easy manual operation, and its production capacity reached the |
| | | country's leading level. |
| Profit | Profit Level | A39 When at the OMES year-end summary of the annual operating |
| | | performance, it found that the market profit margin increased |
| | | significantly. |
| | Profit Growth | A40 OMES communications profit grew significantly in just three |
| | | years. |
| Income | Liquidity of Assets | A41 OMES products are widely used in smart city projects. That is |
| | | to turn patent assets into profits and then to discover new business |
| | | opportunities |
| | | $\Delta 42$ In the 2014 annual report that was on the performance of the |
| | | workforce. Song Liang pointed out that the company funde |
| | | workforce, song Liang pointed out that the company lunds |
| | The second second | achieved a hearing turnover and figurate can be realized. |
| | Income Level | A45 Expected within three to five years, the market size of these |
| | | markets could reach 1 billion US dollars. |
| | | A44 He estimated that in about three years or so, the company can |
| | | achieve more than 30% market share. To each positioning card of |
| | | 250 dollars, a single (mining positioning card) annual turnover of |

| | | up to 375 million yuan could be achieved. | | | | | | |
|------|---------------------|---|--|--|--|--|--|--|
| | Diversity of Income | A45 OMES decides its strategic positioning as a multifaceted | | | | | | |
| | Sources | development. | | | | | | |
| | | A46 OMES uses OPM technology in many aspects, and customers | | | | | | |
| | | can put forward their own customized services. | | | | | | |
| Cost | Cost Control Method | A47 The fiscal and taxation of enterprises depends on the policy | | | | | | |
| | | support given by the government. The cost in both aspects can be | | | | | | |
| | | reduced, and it is more effective for the cost control. | | | | | | |
| | | A48 OMES owned past overseas capital accumulation and Huzhou | | | | | | |
| | | government funding, which means the more abundant the funds | | | | | | |
| | | are, the more flexible cost-expenditure will be, so that cost control | | | | | | |
| | | pressure is relatively small. | | | | | | |

3.1.2 Axial Coding

The 22 valid concepts and 9 categories of open coding were repeatedly considered and analysed in detail. Table 2 shows the main categories and their corresponding sub-categories.

| Main Category | Sub-category | Concept Extracted by Open Coding | | | | | |
|-----------------------|---------------------|---|--|--|--|--|--|
| Value Positioning | Client Subdivision | Target Customers, Customer Value | | | | | |
| | Market Segmentation | Market Coverage, Market Share, Market Prospects | | | | | |
| | Provide Items | Product, Brand | | | | | |
| Value Creation | Value Network | Network Resource Utilization, Partner, Value Network Status | | | | | |
| | Core Resources | Technical Resources, Channel Resources, Human Resources | | | | | |
| | Core Competence | Marketing Ability, Technical Application Capability, | | | | | |
| | | Manufacturing Capacity | | | | | |
| Value Acquisition and | Profit | Profit Level, Profit Growth | | | | | |
| Distribution Income | | Liquidity of Assets, Income Levels, Diversity of Income | | | | | |
| | | Sources | | | | | |
| | Cost | Cost Control Method | | | | | |

Table 2 the Results Of Axial Coding

3.1.3 Selective Coding

Through repeated thinking, questioning and comparison of the three main categories and nine sub-categories, it was found that the "business model" was highly concise at a certain level of the abovementioned main categories and sub-categories and a core position, as well as a core category. According to the results of the single case coding, the high-tech venture enterprise business model structure is shown in figure 1.



Fig.1 Single Case Encoding Results

3.2 Multi-Case Coding Analysis

To validate and supplement the conclusion of the above single case study, multi-case coding analysis was conducted based on data from 4 other high-tech venture enterprises. Data are mainly from China Management Case-sharing Center but also from the official website, news reports, newspapers, magazines and other means. The more abundant concepts of the weakness of the single-case analysis' results and the new concepts of multi-case coding as well as the related evidence are shown in Table 3.

| Table 3 the Original Weak | Concept, New Concept | pt and the Related Evidence |
|---------------------------|----------------------|-----------------------------|
|---------------------------|----------------------|-----------------------------|

| Case Number | Concept | Evidence |
|----------------|----------------------------|---|
| A | Service | Jing Rui Energy Saving Technology Service Co., Ltd., can not only design and |
| | (New Refinement | analyse energy-saving issues but also provide energy-saving products and |
| | Customer Loyalty | related services. Vu Ping added "I have been in the market for so many years, and I have lots of |
| | (New Refinement | loval customer resources. I'm so excited about the launch of new products" |
| | Concept) | Toyar customer resources. I in so excited about the numer of new products. |
| | Cost Management | Despite its revenue, which was only to maintain the liquidity of the company, |
| | Consciousness | Fang Yu did not forget the cost savings in all aspects of the company. |
| | (New Refinement | |
| | Concept) | |
| | Asset Oriented | The company's expenditures focus on water-saving equipment, R & D and |
| | (New Refinement | sales. Other aspects of the company's business extension do not have to invest |
| | Concept) | too much. |
| | Profitability | The company's water-saving services in the market maintain a lead, achieving a |
| | (New Refinement | sustainable profit growth. |
| | Concept) | |
| В | Asset Oriented | In the early stage of the business, UuBridge Inc. implemented the strategy of |
| | Investment | gradually transitioning to whole products. |
| | (New Kermemeni Concept) | |
| | Service | UuBridge Inc. provides users with a platform named UuBridge to meet the |
| | (New Refinement | needs of live broadcasting around the world. |
| | Concept) | |
| | Profit Level | The profit level of audio-visual products produced by UuBridge Inc. catches up |
| | (Original Concept) | with that of professional audio-visual products manufacturing enterprises. |
| | Value Network Status | During the secondary development of the UuBridge platform, independent |
| | (Original Concept) | self-developed audio-visual system software was introduced into the market with the help of UnionPow and Alinew |
| | Liquidity of Assets | UuBridge Inc. proposed that it should charge someone the use of fees, such as |
| | (Original Concept) | other companies and individuals who use the software for the purpose of |
| | | making profit in order to improve the economic efficiency of UuBridge. |
| | Cost Management | UuBridge Inc. proposed that the profit of the subsidiary will be used to support |
| | Consciousness | the construction of UuBridge to reduce costs until it becomes profitable. |
| | (New Refinement | |
| C | Concept) | MI's sales ross 125% from 2011 to 2014. In those 4 years, its income level has |
| C | (Original Concept) | areatly improved and the company has become the leader of the high-tech |
| | (onginal concept) | industry. |
| | Service | MI optimized and upgraded the system used by the company to enhance the |
| | (New Refinement | customer experience. |
| | Concept) | |
| | Customer Loyalty | MI's fans, which are called "MIUI", have already supported up to 29 different |
| | (New Refinement | language versions and have established fan stations in 31 countries. |
| | Concept) | MI focuses on only one and a half mobile phones each year to sweld each |
| | Investment | diversification |
| | (New Refinement | |
| | Concept) | |

| | Profit Growth | MI obtains adequate room for price adjustment to maintain profit growth |
|---|--------------------|--|
| | (Original Concept) | through cost control. |
| | Cost Management | "On-demand customization to sales of fixed assets" achieved zero inventory and |
| | Consciousness | weakened the risk of unsalable products. |
| | (New Refinement | |
| | Concept) | |
| D | Income Levels | E City is transformed into a three-dimensional data-based and support |
| | (Original Concept) | e-commerce company. |
| | Customer Value | The government has made many demands to E City: it is hoped that the existing |
| | (Original Concept) | part of the application will be equipped with 3D maps to provide more direct |
| | | services to the government affairs. |
| | Profit Growth | E City collects the cost of 3D map OEM for customers from all over the country |
| | (Original Concept) | and the annual maintenance fees through the agent franchise mode, and the |
| | | profit growth is considerable. |

Note: Case A is Dalian Jing Rui Energy Saving Technology Service Co., Ltd.; Case B is UuBridge Inc.; Case C is MI; Case D is E City Limited Liability Company.

3.3 High-Tech Venture Enterprise Business Model

Taking high-tech venture enterprises as the research objects, through the combination of the single-case and multi-case analysis of five high-tech venture enterprises, we finally obtained a high-tech venture enterprise model structure system with 3 constructs, 9 dimensions and 27 attributes, as shown in figure 2.



Fig.2 High-Tech Venture Enterprise Model Structure System

4. Empirical Test

4.1 Sample Selection and Description

In the process of sample selection, according to the years of establishment of enterprises and the proportion of technology as the selection criteria, enterprises that spent on technology development annually with the proportion of sales exceeding 2% and those who set up their businesses within 8 years were selected. The study received a total of 475 questionnaires. After removing invalid questionnaires, 314 valid questionnaires remained, and the effective rate was 66.11%.

4.2 Data Analysis

Referring to the verification steps of Churchill and Xiaoling et al[16][19], the empirical test of the business model structure system of high-tech venture enterprises was carried out. First, the sample was randomly assigned to two sub-samples, each with a number of 157. An exploratory factor analysis was conducted for one of the sub-samples to explore the main constructs of the business model structure system and their respective dimensions. Confirmatory factor analysis was performed on another sub-sample to verify and evaluate the robustness of three constructs, nine dimensions, and twenty-seven attributes of the business model structure system. Then, the reliability and validity of 314 samples were analysed to determine whether the business model structure system based on the coding analysis was effective and credible.

4.2.1 Exploratory Factor Analysis

One of the randomly selected sub-samples (N=157) was exploratory factor analysis using SPSS 18.0. First, 27 properties were analysed by exploratory factor. KMO and Bartlett Test of Sphericity results show that the KMO value is 0.795, higher than 0.7. The approximate chi-square value is 1737.216. The degree of freedom is 351. The significance value is 0.000, less than 0.001. The above results show that 27 attributes satisfy factor analysis conditions and are suitable for factor analysis. The principal component analysis method and the maximum variance method were used to rotate the factors. The 27 attributes were assigned to 9 factors, and the factor loading of each attribute was greater than 0.5.

Then, according to the dimension of ownership, the 27 attributes were average weighted to 9 dimensions, and named as value network, client subdivision, core resource, provide items, core competence, income, cost, profit and market segmentation. An exploratory factor analysis was performed on the weighted average of the 9 dimensions. KMO and Bartlett Test of Sphericity results show that the KMO value is 0.796, higher than 0.7. The approximate chi-square value is 316.994. The degree of freedom is 36. The significance value is 0.000, less than 0.001. The above results show that nine dimension indexes meet factor analysis conditions and are suitable for factor analysis. The principal component analysis method and the maximum variance method were used for factor rotation, the 9 dimension indexes were assigned to 3 factors, and the factor loading of each dimension index was greater than 0.5.

In conclusion, after exploratory factor analysis, the business model structure system of high-tech venture enterprise has been tentatively identified by three constructs (value positioning, value creation, and value acquisition and distribution), nine dimensions (client subdivision, market segmentation, provide items, value network, core resources, core competence, profit, income, and cost) and 27 attributes. This conclusion is consistent with the structure of the business model of high-tech venture enterprises based on coding analysis.

4.2.2 Confirmatory Factor Analysis

AMOS 21.0 was used for CFA of another sub-sample (N=157). The structural equation model was constructed according to the results of exploratory factor analysis, as shown in figure 1. The goodness-of-fit indexes of the model are as follows: CMIN/DF is 1.148, GFI is 0.887, RMR is 0.044, RMSEA is 0.031, AGFI is 0.879, NFI is 0.869, CFI is 0.977, and IFI is 0.978. Most GFI values are good, and the individual GFI is close to the threshold, indicating that the constructed model fits well with the sample data.

According to the data in figure 3, the factor loading of 27 attributes in each dimension is between 0.644 and 0.918, both greater than 0.5 and significant at p=0.001. The standardized coefficient of 9 dimensions in each construct is between 0.518 and 0.905 and is significant at p=0.001. The standardized coefficient of 3 constructs in the variable business model is between 0.730 and 0.898 and is significant at p=0.001. The structural relationships between the variable business model and the 3 constructs, the 3 constructs and 9 dimensions, and the 9 dimensions and 27 properties are explained.



Fig.3 Confirmatory Factor Analysis Model of the Business Model Structure System of High-Tech Venture Enterprise

4.2.3 Reliability and Validity Analysis

SPSS18.0 was used for reliability analysis of 314 samples. All 314 samples in 27 attributes on the overall reliability had Cronbach's α values of 0.889, and the nine dimensions and their corresponding properties of the reliability values had Cronbach's α values greater than 0.7, showing that the collected data have good internal consistency, with a good level of reliability. According to the results of the factor analysis of 27 properties belonging to 9 dimensions, which come from each attribute being weighted average relegated to three constructs, all 314 samples show the good external consistency of the data collected. Therefore, the structure model of the 3 constructs, 9 dimensions and 27 attributes obtained through exploratory and confirmatory factor analysis is ideal.

The validity of 314 samples was analysed using AMOS 21.0. According to the SEM analysis results, the average variance extracted (AVE) of each dimension and each construct was calculated, as shown in Table 4. The AVE values of 9 dimensions and 3 constructs are greater than 0.5, and the square root of AVE values in each dimension are larger than those coefficients of other dimensions. The AVE value's arithmetic square root of each construct is also larger than that of other constructs. That shows that the model has a good discriminant validity. To sum up, it is reasonable to conclude that the structure of the business model of a high-tech venture enterprise based on coding analysis has a good reliability and validity.

| | AVE va | AVE values and correlation coefficients of various dimensions | | | | | | | | | |
|------------------------|--------|---|-------|-------|-------|-------|-------|-------|-------|---|--|
| | AVE | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | |
| 1. Client subdivision | 0.597 | 0.773 | | | | | | | | | |
| 2. Market Segmentation | 0.512 | 0.566 | 0.716 | | | | | | | | |
| 3. Provide Items | 0.565 | 0.464 | 0.695 | 0.752 | | | | | | | |
| 4. Value Network | 0.685 | 0.266 | 0.398 | 0.326 | 0.828 | | | | | | |
| 5. Core Resources | 0.613 | 0.259 | 0.387 | 0.317 | 0.444 | 0.783 | | | | | |
| 6. Core Competence | 0.587 | 0.284 | 0.426 | 0.349 | 0.488 | 0.475 | 0.766 | | | | |
| 7. Profit | 0.559 | 0.274 | 0.411 | 0.337 | 0.280 | 0.272 | 0.299 | 0.748 | | | |
| 8. Income | 0.598 | 0.219 | 0.328 | 0.269 | 0.224 | 0.218 | 0.239 | 0.409 | 0.773 | | |

Table 4 Ave Values And Correlation Coefficients of Various Dimensions and Construct

| 9. Cost | 0.596 | 0.254 | 0.381 | 0.312 | 0.260 | 0.252 | 0.277 | 0.474 | 0.379 | 0.772 |
|----------------------|--------|------------|------------|-----------|------------|-----------|-------|-------|-------|-------|
| | AVE va | lues and c | orrelation | coefficie | nts of eac | h constru | ct | | | |
| 1. Value Positioning | AVE | 1 | 2 | 3 | | | | | | |
| | 0.599 | 0.774 | | | | | | | | |
| 2. Value Creation | 0.516 | 0.640 | 0.718 | | | | | | | |
| 3. Value Acquisition | 0.508 | 0.623 | 0.579 | 0.713 | | | | | | |
| and Distribution | | | | | | | | | | |

Note: The diagonal value is the arithmetic square root of the AVE value; The diagonal value is the arithmetic square root of the AVE value.

5. Conclusion and Discussion

5.1 Conclusion

According to the results of the grounded theory analysis and empirical test, we can draw the following conclusions:

First, the business model of the high-tech venture enterprise consists of three constructs of value positioning, value creation and value acquisition and distribution, as well as a structural system consisting of nine dimensions and 27 attributes that support the three constructs.

Second, value positioning includes three dimensions, client subdivision, market segmentation and provide items. Among them, the client subdivision is composed of three attributes: target customers, customer value and customer loyalty. The market segmentation consists of three attributes: market coverage, market share and market expectation. The dimension of provide items is composed of product, service, and brand.

Third, value creation has three dimensions, including value network, core resources, and core capabilities. Among them, the dimension of value network is composed of three attributes: network resource utilization, partners and value network core position; the dimension of core resources consists of three attributes: technical resources, channel resources and human resources; and the core competence consists of the three attributes of marketing abilities, technical application capabilities and manufacturing capacities.

Fourth, value acquisition and distribution consists of three dimensions, including profit, income and cost. Among them, the profit is composed of three attributes: profit level, profitability and profit growth. The income is composed of three attributes: realization of assets, income level and diversity of income sources. The cost is determined by the methods of cost control, asset-oriented investment, and cost management consciousness of the three attributes.

Fifth, the result of exploratory factor analysis and confirmatory factor analysis based on 314 questionnaires shows that the structure of the high-tech venture enterprise business model based on the grounded theory is stable, effective and reliable.

5.2 Discussion

According to business model theory, this study based on typical high-tech venture enterprise coding analysis of actual case in China's emerging markets, constructed a framework of value-based high-tech venture enterprise business model structure system, as well as further clearly defined and identified the elements of the high-tech venture enterprise business model and its dimensions and attributes, with large sample empirical tests carried out.

The conclusion of this study is the further development and deepening of the research achievements of Osterwalder et al. (2005), which provides a reliable basis for the scientific measurement of the high-tech enterprise business model, and provides a new tool for research with the scientific basis for many fields including the design, description, classification, innovation and others. As well as clearly defined and identified the elements of the high-tech venture enterprise business model and its dimensions and attributes.

The main limitation of this study is that the dimension of business model evaluation of high-tech venture enterprises based on the grounded theory coding still inevitably has a certain subjectivity. For other countries in emerging markets, how the experience based on Chinese contexts influences

their own country depends on how their enterprises absorb and learn from it, this also needs for further research. Therefore, in the future research, it is supposed to expand the scope of the empirical object and further optimize the evaluation scale. In addition, based on the conclusions of this paper, it is feasible to further carry out an international comparative study on the structure and measurement of high-tech venture enterprise business models.

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References

[1] Teece, D.J. "Business Models, Business Strategy and Innovation". Long Range Planning, vol.43, no.2-3, pp.172-194, 2010.

[2] Zott, C., Amit, R., Massa, L. "The Business Model: Recent Developments and Future Research". Journal of Management, vol.37, no.4, pp.126-137, 2011.

[3] Palo, T., Taehtinen, J. "Networked Business Model Development for Emerging Technology-Based Services". Industrial Marketing Management, vol.42, no.5, pp.773-782, 2013.

[4] Osterwalder, A., Pigneur, Y., Tucci, C.L. "Clarifying Business Models: Origins, Present, and Future of the Concept". Communications of the Association for Information Systems, vol.16, no.1, pp.1-25, 2005.

[5] Itami, H., Nishino, K. "Killing Two Birds with One Stone: Profit for Now and Learning for the Future". Long Range Planning, vol.43, no.2-3, pp.364-369, 2009.

[6] Zott, C., Amit, R. "Business Model Design: An Activity System Perspective". Long Range planning, vol.43, no.2-3, pp.216-226, 2010.

[7] Casadesus-Masanell, R., Ricart, J.E. "How to Design a Winning Business Model". Harvard Business Review, vol.89, no.1-2, pp.100-107, 2011.

[8] Morris, M.H., Shirokova, G., Shatalov, A. "The Business Model and Firm Performance: The Case of Russian Food Servdce Ventures". Journal of Small Business Managemengt, vol.51, no.1, pp.46-65, 2013.

[9] Afuah, A. "Are Network Effects Really all About Size? The Role of Structure and Conduct". Strategic Management Journal, Vol.34, no.3, pp.257-273, 2013.

[10] Laamanen, T., Wallin, J. "Cognitive Dynamics of Capability Development Paths". Journal of Management Studies, vol.46, no.6, pp.950-981, 2010.

[11] Chesbrough, H., Rosenbloom, R.S.. "The Role of the Business Model in Capturing Value from Innovation: Evidence from Xerox Corporation's Technology Spin-off Companies". Social Science Electronic Publishing, vol.11, no.3, pp.529-555, 2002.

[12] Levie, J., Lichtenstein, B.B. "A Terminal Assessment of Stages Theory: Introducing a Dynamic States Approach to Entrepreneurship". Entrepreneurship: Theory and Practice, vol.34, no.2, pp.317-350, 2010.

[13] Thompson, J.D., Macmillan, I.C. "Business Models: Creating New Markets and Societal Wealth". Long Range Planning, vol.43, no.2-3, pp.291-307, 2010.

[14] George, G., Bock, A.J.. "The Business Model in Practice and its Implications for Entrepreneurship Research". Entrepreneurship Theory & Practice, vol.35, no.1, pp.83-111, 2011.

[15] Sosna, M., Trevinyo-Rodríguez, R.N., Velamuri, S.R. "Business Model Innovation through Trial-and-Error Learning: The Naturhouse Case". Long Range Planning, vol.43, no.2-3, pp.383-407, 2010.

[16] XiaoLing, Z., HuFei, G., Yi, Z., et al. "The Scale Development of Typical Business Model's Characteristics and Validation Studies of Its Validity". Science of Science and Management of S.& T., vol.36, no.03, pp.56-66, 2015.

[17] Jingqin, S., Jing, L. "Research on Motivation of China M&A Tide: Based on the Comparison of the Western Theories with Chinese Enterprises". Nankai Business Review, no.02, pp.57-63, 2013.

[18] Miao, C., Jingqin, S. "Management Innovation Driving Forces of Chinese Enterprises and Comparison with Western Counterparts". Studies in Science of Science, vol.30, no.5, pp.755-765, 2012.

[19] Churchill, G.A. "A Paradigm for Developing Better Measures of Marketing Constructs". Journal of Marketing Research, vol.16, no.1, pp.64-73, 1979.