

The mathematical analysis of internal management environment in private enterprises

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Abstract. This paper aims to build a index system of internal management environment assessment of private enterprises through the establishment of 11 first-level indicators and 27 third-level indicators. The method is to analyze the private-owned enterprises in Hubei province according to the business years, the scale of enterprises and the types of enterprises. The research results show that the index of internal management environment of information transmission industry, industry and postal service is the highest, while the index of internal management environment of restaurant, leasing and business service industry is low. So for the private management of enterprises in Hubei Province there is a weak management awareness and other issues, it is suggested to set up a diagnosis center for private enterprises and hold regular open classes for enterprises.

Key words. Private enterprise, mathematical analysis, internal management environment.

1. Introduction

This investigation aims to evaluate and compare the internal management environment of private enterprises in Hubei Province. The original data is from a survey of 951 private enterprises which is in 7 villages, cities and districts of Hubei. It was started from May 2014 to June 2016, and it is based on the evaluation of the index of local enterprises within their internal management environment, which is made by the manager of the enterprise, City Federation of industry and Commerce, chamber of Commerce and industry association. Firstly, this paper will establish the content

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and framework of the project, collect relevant data and identify research methods. Secondly, this paper will use different indicators to analyze the internal management environment of the private enterprise. Then, it will analyze it from 3 angles, which is the operating life, the industry, the scale of enterprises. Finally, this paper will offer proposals. Methods of investigation: the combination of decentralized surveys and centralized interviews. Research methods: induction and quantitative analysis combined.

According to the Ministry of industry and information technology, the National Bureau of statistics, the national development and Reform Commission, the Ministry of Finance under the "People's Republic of China SME Promotion Law" and "the State Council on further promoting the development of small and medium-sized enterprises of opinions". Based on the scale of private enterprises, it will be divided into large, medium, small, micro sizes. Based on its business scope, it will divide into 16 categories which are agriculture, forestry, animal husbandry and fisheries, industry, construction and etc.

Special research on the internal business environment is rare. Most scholars on the business environment of the study is from the external business environment, such as Chinese Entrepreneurs Survey System, the evaluation index of National Economic Research Institute including government administration, legal environment for the enterprise management, enterprise tax burden, financial services, technical services and social environment for the enterprise management (X.L.Wang, G.Fang, F.Y. Li, 2013). From these indicators is not difficult to see that they are more concerned about the external business environment. But the management environment of enterprises should be divided into the internal and external management environment, and they both should be taken into consideration when studying the management environment of enterprises (Z.Y.Wu, 1990, H.Y. Li,1992), they formulate different indicators.

2. THE THEORY AND METHOD OF THE INTERNAL MANAGEMENT ENVIRONMENT

2.1. The index system of internal management environment

Internal Management Environment includes internal function system and internal enterprise; it was evaluated from the perspective of enterprise management. According to the theory and practice of enterprise management, the indicators of internal management environment of enterprise were set into 11 aspects, including: financial management, asset management, production and operation management, quality management, human resource management, procurement and supply chain management, marketing management, research management, strategic management, operation and supervision management and risk management.

2.2. The calculation of internal management environment index

The survey data were evaluated from 1 to 5 points to evaluate the secondary level of business environment. Score range: 1-5 points. Very good: 5 points; good: 4 points; general: 3 points; poor: 2 points; poor: 1 point.

We do not consider the weight on the index when calculating the management environment index, because this is the first investigation of the management environment of private enterprises, and the adjustment of the calculation method will be considered in the future investigation process. The various indicators of the management environment of the enterprise are very important, the lack of a certain indicator or deterioration of the situation will bring great damage to the business environment.

Therefore, we average the management environment index of each enterprise, and then average to each enterprise's management environment index. The final score ranges will be between 1-5 points.

$$I_{IME} = \text{AVERAGE}(I_{E1}, I_{E2}, \dots, I_{En})$$

Among them, I_{IME} represents the internal management environment index of the enterprise; I_{En} represents the numbers of the internal management environment index in the enterprise

3. INTERNAL MANAGEMENT ENVIRONMENT INDEX OF PRIVATE ENTERPRISE IN HUBEI

3.1. Internal management environment index of private enterprise

The total index of internal management environment of private enterprises is 3.05, which is "general". In different counties, the internal management environment index is 3.97, close to "good"; the lowest is close to the "general" in the 2.53.

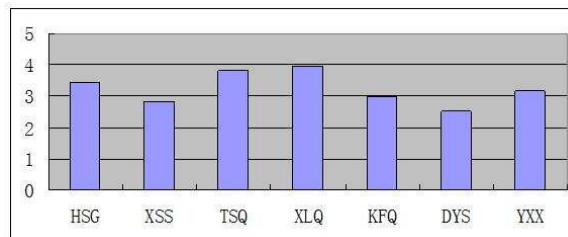


Fig. 1. Internal management environment index of private enterprise

3.2. Management environment classification index of private enterprise

Quality management that is 3.45 ranked top in the internal management environment classification index of private enterprise, as a "general"; human resource management is 3.44, characterized as "general" financial management is 3.39, as a "general"; the procurement and supply chain management is 3.27, characterized as "general"; marketing management is 3.06, qualitative for "general".

Asset management that is 2.92 ranked in the middle, characterized as "general"; operation and supervision management is 2.68, qualitative as "general"; risk management is 2.54, characterized as "general"

The production and operation management that is 2.32 ranked in the back, characterized as poor; strategic management is 2.21, as the poor; R & D management is 1.48, as the poor.

4. ANALYSIS ON THE INTERNAL MANAGEMENT ENVIRONMENT OF PRIVATE ENTERPRISES

The following will be from the 3 perspectives of operating life, the industry, Enterprise scale, using statistical methods to analyze the internal management environment of private enterprises.

4.1. The analysis based on the enterprise operating life

Operating period of 20 years and above, 10-20 years of private enterprises have the highest evaluation value of internal management environment, as 3.61,3.18. Operating period of 5-10 years is in the center, as 3.06. Operating life of 1-5 years, 1 years and below is the minimum, as 2.92,2.60,bias towards negative.

The operating period of 1 years and below are compared with those of 1-5, and the difference between the two groups is significant at the 5% ($t=3.00$);The operating period of 10-20 years are compared with those of 20 years or more, and the difference between the two groups is significant at the 5% ($t=3.10$);The operating period of 1-5 years and 5-10 years between the enterprise, operating period of 5-10 years, and 10-20 years, the difference between the companies is not significant.

Regression equation can be obtained: $Y_2=0.03589*X+2.70796$

Among them, Y_2 means the internal management environment index of private enterprise, X means operating ages.¹

Therefore, the correlation rule can be applied to the relationship between their internal management environment and the operating years. That is a positive correlation between the operating ages and the internal management environment of private enterprises.

The difference between the first index and the two index: The company who has 20 years or more experience has advantages in marketing strategy and tactics, marketing team and channel management, public relations management, research Management, strategic management, operation and supervision management, risk

management .

The company who has one year and below experience has disadvantage mainly lying in cost management, budget and final accounts management, asset management, production and operation management, quality control, labor safety management (EHS), marketing management, research Management, strategic management, operation and supervision management, risk management.

From this, we can put forward two time nodes of private enterprise operating life from the perspective of enterprise internal management environment:

The first time node is 1 years. The operation period of 1 years and below private enterprises lack of management experience, they are still deficient in the cost management, budget management, asset management, production and operation management, quality control, safety management (EHS), marketing management, research management, strategic management, operation and supervision management and risk management.

The second time node is 20 years. The operation period of 20 years and above in the enterprise internal management environment aspects are maturing. The maturity is spontaneously formed. This is the enterprise in the process of operation, through continuous learning to enhance the operational capacity.

But the spontaneous internal mature enterprise operating environment is a long process, if all enterprises have experienced such a process, the growth of enterprises will be slow. Through training and other ways to accelerate the internal enterprise to improve the business environment, to enhance the management capacity, is a way worth considering.

4.2. The analysis based on the industry

Information transmission industry, industry, postal enterprises on the internal business environment of the evaluation value of the top three, respectively, 3.94,3.46,3.36. The followings are food and beverage industry, leasing and business services, real estate development and management, agriculture, forestry, animal husbandry and fisheries, retail, property management companies, respectively,2.98,2.95,2.84,2.83,2.82,2.64, bias in negative evaluation. The evaluation values of the internal management environment of other industries are central, but they are biased towards positive evaluation.

Human resource management:Postal industry, the highest level of information transmission, respectively, 4.40,4.10; warehousing, property management is the lowest, respectively, 2.60,2.67; the rest of the industry evaluation center, but are biased towards positive evaluation.

Purchasing and supply chain management:Warehousing industry, the highest for the 5, the lowest property management, for the 1.64. The rest of the industry evaluation is central.

Marketing management: Information transmission industry, postal industry, the highest index of the warehousing industry, respectively, 4.38, 4.06, 4.00. Property management, agriculture, forestry, animal husbandry, fishery is the lowest, they are 2.52,2.72; the rest of the industry evaluation is central.

Research Management:The transmission of information industry is the highest, is 5; warehousing, postal services, property management, wholesale, retail, transportation industry, animal husbandry and fishery, hotel industry, catering industry, real estate development and operation of the lowest, were less than or close to 1, as "very poor". The evaluation values of other industries are central, but they tend to be negative.

Strategic management: The information transmission industry, the postal industry is the highest, respectively, 4.00, 4.00; warehousing industry is the lowest, 1; the rest of the industry enterprise evaluation is central, but tend to negative evaluation.

Operation and supervision management:Warehousing, information transmission industry, the highest postal industry, respectively, 5.00,4.00,4.00; agriculture, forestry, animal husbandry and fisheries, construction, retail, catering industry is the lowest, respectively, 2.14,2.15,2.29,2.40; The evaluation value of other enterprises is central.

Risk management:Information transmission industry, postal services, leasing and business services, are the highest, respectively, 4.50,3.25,3.09; warehousing, catering industry is the lowest, respectively, 2.00,2.02; the rest of the industry value evaluation center, but tend to negative evaluation.

4.3. The analysis based on enterprise scale

Large, medium, small, micro private enterprises in the internal business environment index were 4.21 points, 3.53 points, 2.99 points, 2.62 points respectively.

The study found that there is a positive correlation between the scale of private enterprises and internal business environment index: the larger the scale, the higher the index which shows the business environment is better; the smaller the enterprise scale, the business environment index is low which indicates the operating environment is poor.

4.3.1 The analysis on the difference internal management environment of large and medium-sized private enterprises

There are significant differences between the 11 indexes of the internal management environment of the large and medium-sized private enterprises, and the 27 indexes of the two levels, the difference between the two indexes is significant at the significant level of 5% ($t=2.01$).

4.3.2 The analysis on the difference internal management environment of medium and small-sized private enterprises

There are significant differences in the 11 indexes of the internal operating environment between the medium and small private enterprises, and the indexes of the 27 indexes of the two levels, the difference between the two indexes is significant at the significant level of 5% ($t=3.47$).

4.3.3 The analysis on the difference internal management environment of small and micro-sized private enterprises

There are 10 level index and 23 level two index in the two kinds of small and micro scale private enterprises are significant differences, the two difference are sig-

nificant at the 5% significant level ($t=2.34$). One of the inconspicuous indicators is: purchasing and supply chain management. The level two index are not obvious: ERP system management, supply chain management, procurement management, logistics management.

In addition to the procurement and supply chain management (supply chain management, purchasing management, logistics management, ERP management system), with significant difference between large, medium and small and micro scale private enterprises within the different business environment, especially in financial management, asset management, quality management, human resource management, marketing management, management, research and development strategic management, operation and management, risk management, this difference is particularly significant. Therefore, it is necessary for the small and micro enterprises to conduct a comprehensive enterprise training course.

5. CONCLUSION AND SUGGESTION

5.1. Conclusion

This paper tries to establish an internal business environment includes 11 first level indicators, 27 level two indexes of the evaluation index system of enterprise, and carry out the assessment of the internal operating environment of private enterprises in Hubei. The result is: the total index of internal management environment of private enterprises is 3.05, as "general". In different countryside, the internal management environment index is 3.97, close to "good"; the lowest is close to the "general" of 2.53.

From the years in business, industry, the three dimensions of enterprise scale, using statistical tools for comparative analysis, this paper found that: (1) there is a positive correlation between operating period, enterprise scale and internal management environment of private enterprise. (2) The transmission of information industry, the postal industry enterprise internal business environment index is the highest; the catering industry, leasing and business services, real estate development and management, animal husbandry and fishery, retail, property management within the enterprise business environment index is on the low side, trend to negative.

5.2. Suggestion

The problems on internal management environment of Hubei private enterprises areas follows:**Firstly**,the management awareness is relatively weak. Many business executives will not interested in time-consuming consumption, will not waiting for the benefits in the long term, obviously, this is an easy problem in the development of enterprises. **Secondly**,the enterprise management arbitrariness too large. Private enterprises are mostly come with the family enterprises, small and micro enterprises; they are lack of normalization of the management system. **Thirdly**, they are lack of advanced enterprise management concepts and methods. As for the ERP system management, most of the companies did not use or do not know the management

software, or they think the software is unnecessary.

To improve the operating environment of private enterprises, and promote the fine management of enterprises, we should establish private enterprise diagnostic center **at first**. Enterprise diagnosis center is also called enterprise hospital and enterprise health center. Through the diagnosis of their regular or irregular activities, from the enterprise management, business and financial situation analysis, find the problems, and study on that problems, find out the reason and provide advice from all levels. Employ full-time or part-time professionals to conduct previous survey, field investigation, design improvement programs, implementation of improvement programs. **Secondly**, the enterprise affects the operation of the market. Separating the enterprise diagnosis and enterprise treatment, through the introduction of enterprise training institution and enterprise treatment mechanism to forming the enterprise treatment market, so that they can choose the right treatment according to their own situation. **Thirdly**, regularly hold corporate classes. The best way to cure disease is prevention. Combined with the private enterprise diagnosis and training center operation, summarize the existing management of private enterprises in terms of common problems, hold regular public courses purchased by the government, the popularity of enterprise management basic knowledge and treatment methods, improve the quality of enterprise management personnel to prevent the problems in the management of enterprises.

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