

# Analysis of the Relationship between Intellectual Capital and Firm Performance Based on Enterprise Life Cycle

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**Abstract:** As the most important intangible asset of an enterprise, intellectual capital plays an irreplaceable role in improving firm performance. At different stages of enterprise development, the various elements of intellectual capital have different effects on firm performance. Based on the analysis of the characteristics of intellectual capital in different enterprise life cycle stages, this paper uses simple statistical analysis method to describe the differences between intellectual capital and firm performance in different enterprise life cycle stages. Finally, this paper proposes that enterprises can use various resources in a targeted manner according to their life cycle stages, and maximize the effectiveness of the intellectual capital.

## 1. Introduction

With the advent of the era of knowledge economy, more and more enterprises have begun to pay attention to the intangible resources. As the main content of intangible assets, intellectual capital has become more and more prominent.

In addition, the growth and development of an enterprise is a constantly changing process. Enterprises exhibit different characteristics in the process of initial creation, growth, maturity, recession and extinction. The opportunities and challenges faced by enterprises in different life cycle stages are different, and the role of intellectual capital in enterprises is different. Therefore, this paper studies the impact of intellectual capital elements on firm performance in different enterprise life cycle stages, and makes reasonable suggestions based on this, in order to contribute to the study of the relationship between intellectual capital and firm performance.

## 2. Literature Review

### 2.1. Intellectual Capital

In 1969, Galbraith first proposed the concept of intellectual capital. He believed that intellectual capital include not only static intangible assets, but also a dynamic series of activities. Based on the different understanding of intellectual capital, scholars divide intellectual capital from the perspective of two elements, three elements and four elements. Fu and Wang (2018) divided intellectual capital into human capital and structural capital [1]. Asiaei and Jusoh (2017) divided intellectual capital into human capital, structural capital and relational capital [2]. Rothberg and Erickson (2011) divided intellectual capital into human capital, relational capital, structural capital and competitive capital [3]. In terms of the relationship between intellectual capital and firm performance, scholars generally believe that intellectual capital as a whole can bring better performance to enterprises, but there are different views on the relationship between the various elements of intellectual capital and firm performance. Djekic (2017) selected 75 fruit enterprises in Serbia to conduct interviews to study the impact of human capital, structural capital and relational capital on the development of fruit enterprises. The results finally showed that intellectual capital elements have different effects on enterprises [4].

## **2.2. Enterprise Life Cycle Theory**

Haire first proposed the concept of the enterprise life cycle. He believed that the development of the enterprise can be expressed by the growth curve in biology. Chen (1995) divided the life cycle of the enterprise into six stages according to the development of the enterprise [5]. Hu and Liu (2018) divided the enterprise into four stages: initial stage, development stage, maturity stage and recession stage [6].

## **2.3. Research on Intellectual Capital Based on Enterprise Life Cycle Theory**

At present, scholars have combined qualitative analysis and research with intellectual capital and enterprise life cycle. Ma (2016) used VAIC to find out the conclusion that different elements of intellectual capital have different contributions to firm performance in different stages [7]. Momeni and Pazhvan (2018) studied the relationship between intellectual capital and firm performance in the growth, maturity and recession. The results showed that intellectual capital has significant effects on firm performance in different enterprise life cycle stages [8].

## **3. Characteristics of Intellectual Capital Development in Different Enterprise Life Cycle Stages**

### **3.1. Initial Stage**

In terms of human capital, the cohesiveness of enterprise in the initial stage is relatively strong, and the employees of the enterprise are also adventurous and loyal to the enterprise, which can bring vitality to the enterprise. In terms of structural capital, the organizational structure of start-up enterprise is relatively simple. Most managers of enterprise make decisions based on their own experience. Because of this feature, enterprise has very high flexibility and can quickly respond to changes in the market. In terms of relational capital, start-up enterprise does not have many partners, most of them can only rely on their own friends.

### **3.2. Growth Stage**

In terms of human capital, the management level of the growth enterprise has been effectively improved, and it has been able to attract talents with high technical level. The quality of internal employees has also been greatly improved. Employees can actively respond to the challenges at work. At this stage, human capital plays an important role in the enterprise. In terms of structural capital, enterprise in the growth stage can actively change the organizational rules and regulations, and reasonable structural capital can be conducive to the improvement of firm performance. In terms of relational capital, enterprise in the growth stage pays more attention to brand awareness, and enterprise will spend more money to promote its products. At this stage, if the enterprise can make rational use of the relational capital, and the relational capital can play a good role in the enterprise.

### **3.3. Maturity Stage**

In terms of human capital, after a long period of development, the enterprise has formed its own unique corporate culture, which can enhance employees' sense of belonging and identity, and enable employees to improve their technical level. In terms of structural capital, at the maturity stage, the management system and management model of the enterprise are relatively standardized, and each department can complete its own work as required. In terms of relational capital, the maturity enterprise has established a good brand image in the market. It has its own loyal consumers, and the relational capital can bring lasting benefits to the enterprise.

### **3.4. Recession Stage**

In terms of human capital, due to corporate turmoil, employees of the enterprise will leave the enterprise because of uneasiness, and the employees are highly mobile and unstable. In terms of

structural capital, the organizational system of enterprise in the recession stage has been sound and can play a role in restraining employees. However, the organizational structure of enterprise is too complicated, and there is a phenomenon of rigid management and bureaucratization. In terms of relational capital, the share of enterprise in the recession stage is gradually decreasing. Many customers and suppliers have lost interest in enterprise. At this time, enterprise is less competitive in the market, and enterprise faces large operation risks.

## **4. Research Design and Analysis**

### **4.1. Research Design**

This paper chooses the information technology industry as the sample, in which the intellectual capital elements data is valued in 2013-2015, and the corresponding firm performance is the average value of the three years in 2014-2016, 2015-2017, 2016-2018.

This paper selects intellectual capital indicators from three aspects: human capital, structural capital and relational capital. The indicators for human capital selection are: employee per capita income, employee human capital maintenance rate, proportion of higher education employees; The indicators for structural capital selection are: management expense ratio, R&D density, current asset turnover rate, inventory turnover rate; The indicators for relational capital selection are: customer concentration, supplier concentration, sales expense ratio, operating income growth rate. In addition, the evaluation index of firm performance uses ROE and Tobin's Q.

Considering that listed enterprises have experienced the initial stage, this paper only studies the relationship between intellectual capital and firm performance in the growth, maturity and recession stages. This paper uses the growth rate industry classification method to divide the enterprise life cycle. Based on the above method, this paper divides 90 information technology enterprises and finally concludes that there are 39 enterprises in the growth stage, 32 enterprises in the maturity stage, and 19 enterprises in the recession stage.

### **4.2. Research Analysis**

This paper firstly descriptive statistics on the variables of the whole cycle. According to the calculation, the average ROE is 6.06%, and the average value of Tobin's Q is more than 100%, which indicate that the overall performance level of information technology enterprises is higher. In terms of human capital, we can see that the proportion of higher education employees is as high as 64.14%, which indicates that information technology enterprises have more high-quality talents. In terms of structural capital, the average management expense ratio is 19.82%, which indicates that enterprises are more efficient in management. The average value of R&D density is 11.44%, this indicator needs to be improved. The average current asset turnover rate is 89.63%, and the average inventory turnover rate is 117%. These two indicators have higher values, indicating that enterprises have better realizing speed. In terms of relational capital, the average value of customer concentration is 23.53%, the average value of supplier concentration is 34.49%, and the average sales expense ratio is 10.98%, which indicate that enterprises need to strengthen their marketing investment. The average operating income growth rate is 28.03%, indicating that information technology enterprises are still in a period of rapid development.

Next, this paper describes the differences between intellectual capital and firm performance in different life cycle stages. By comparing the data of growth stage, maturity stage and recession stage, we can see that there are differences in intellectual capital and firm performance in different enterprise life cycle stages. From the perspective of mean, the intellectual capital elements and performance in the growth stage and maturity stage are better than the intellectual capital elements and performance in the recession stage. From the standard deviation point of view, the intellectual capital elements and performance in the maturity stage are better than the intellectual capital and performance in the growth stage and the recession stage. By analyzing data, the value of human capital in the growth stage is obviously better than that of structural capital and relational capital,

the value of each element in the maturity period is close, and the value of the relational capital in the recession stage is better than that of structural capital and human capital.

## 5. Conclusion

This paper analyzes the relationship between intellectual capital elements and firm performance in different enterprise life cycle stages, and finds that intellectual capital has different effects on the performance of listed enterprises in different enterprise life cycle stages. This shows that enterprises should rationally use resources according to their development stages and invest limited resources into the core elements of intellectual capital. Only in this way can they improve the firm performance. In addition, research also shows that enterprises should pay attention to the development of intellectual capital. Enterprises should pay attention to the development and investment of human capital, they must introduce high-quality talents in a timely manner. Enterprises should also strengthen the management of structural capital, analyze enterprise expenditures and improve management levels. Enterprises should also pay attention to relational capital, they should maintain and manage the customer resources of the enterprise on a daily basis, continuously meet the needs of customers, and establish good cooperative relations with suppliers.

## References

- [1] FU Chuanrui, WANG Meiling. 2018. Voluntary Information Disclosure of Intellectual Capital, Enterprise Life Cycle and Cost of Equity Capital-Evidence from China's High-tech A-share Listed Companies. *Economic Management*, Vol. 40 (04).
- [2] Asiaei K, Jusoh R. 2017. Using a Robust Performance Measurement System to illuminate Intellectual Capital. *International Journal of Accounting Information Systems*.
- [3] Rothberg H N, Erickson G S. 2011. Competitive Capital: A Fourth Pillar of Intellectual Capital. Hamilton *Ontario*.
- [4] Djekic I, Dimitrijevic B, Tomic N. 2017. Quality Dimensions of Intellectual Capital in Serbian Fruit Industry. *Engineering Management Journal*, Vol. 29 (3).
- [5] CHEN Jiagui. 1995. Discussion on Enterprise Life Cycle and Enterprise Evolution. *China Industrial Economy*.
- [6] HU Huaxia, LIU Wen. 2018. Analysis of the Factors Affecting Financial Fraud and Its Evolution from the Perspective of Enterprise Life Cycle. *Finance and Accounting Monthly*.
- [7] MA Ru. 2016. Research on the Correlation between Enterprise Life Cycle, Intellectual Capital and Enterprise Performance. *Accounting News*.
- [8] Momeni A, Pazhvan A. 2018. The effect of Life Cycle Stages on Relationship between Intellectual Capital and Performance of Firms in Tehran Stock Exchange. *Asian Journal of Research in Marketing*, Vol. 7 (3).