Research on the Influence of Financial Shared Service on Enterprise Investment Efficiency and Equity Financing Cost

——Taking ZTE as an example

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Abstract: This paper selects ZTE's financial data from 1999 to 2019 as a sample and analyzes the changes in investment efficiency of enterprises in different stages of the implementation of financial shared services with the help of the investment efficiency model, and compares it with the industry as a whole. Then use the capital asset pricing model to study the impact of investment efficiency changes on corporate equity financing costs. The results show that the introduction of the financial shared service center has indeed improved the investment efficiency of ZTE Corporation, especially when the shared service is in the growing period, it has a more significant effect on the improvement of investment efficiency. At the same time, when ZTE's investment efficiency is high, the expected return rate required by investors decreases, and the cost of equity financing of the company will also decrease. Otherwise, the cost of equity financing of the company will increase.

1. Introduction

Thanks to the continuous improvement of our country's socialist market economic system, more and more enterprises have been continuously strengthened through the implementation of expansion strategies. In order to better meet the daily operation and management needs of large group companies, many scientific and technological achievements are widely used in social business practice. The financial shared service center is a typical success case. As a product of modern advanced technology, it can not only meet the cost-effective principles of business operations, but also greatly improve work efficiency and quality. ZTE is one of the first domestic enterprises to establish a financial shared service center. However, the establishment of the financial shared service center is a systematic project, which involves many factors such as process reengineering and adjustment of organization settings, and may even cause changes in the overall structure of the organization[4]. Therefore, the implementation of financial shared services will not only have an important impact on the quality of the internal control of the organization, but also promote the improvement of comprehensive quality of financial personnel[8]. These factors are closely related to the investment efficiency of enterprises.

So, will ZTE's investment efficiency change due to the establishment of a shared service center? And will investors, as one of the most important stakeholders, adjust the expected return on investment due to changes in investment efficiency and affect the company's equity financing costs? This article will study these issues.

2. Theoretical Analysis and Research Hypothesis

Investment is one of the important ways to realize the value-added of enterprises. It is a more common organizational behavior for large-scale group enterprises in mature stage. However, whether the capital flow is sufficient is related to the survival of the enterprise. Investment expenditure is usually a large reduction in capital flow. Therefore, only when the investment is at an appropriate scale can the goal of maximizing corporate value be achieved without jeopardizing the free cash flow required to maintain normal operations. Because investment efficiency is so critical, many scholars have thoroughly studied the factors that affect investment efficiency, among which the quality of internal control and the quality of decision makers are particularly important. He Xuexia and Wang Yu (2020) empirically tested the relationship between internal control quality and enterprise investment efficiency, and the results showed that whether it is a state-owned enterprise or a non-state-owned enterprise, internal control quality and non-efficient investment are negatively correlated[1]. He Juan (2017) divides cash holding motivation into preventive motivation and agency motivation. The study found that under the condition of defects in the internal control of the company, cash holding under agency motivation is more likely to lead to over-investment. After internal control defects were repaired, excessive investment behavior was suppressed [2]. Xiong Na, Song Hongling and Jiang Shaobo (2020) used the financial background of executives as the intermediary variable to study the relationship between the enterprise's risk-taking level and investment efficiency. The conclusion shows that executives with financial background have an inhibitory effect on risky investment behaviors, and help to improve investment efficiency [3]. Financial shared service is a centralized financial management mode combined with modern information technology[9]. It optimizes business processes to cause changes in organization settings and functions[7], which affects the quality of internal control of the organization. At the same time, the introduction of a shared service center has higher requirements on the overall quality of financial personnel, which essentially promotes the transformation of accounting functions. Finance and accounting personnel who can participate in decision-making and management can better meet the needs of development. The quality of internal control and the comprehensive quality of decision makers are the key factors that affect the efficiency of investment. At the same time, investors are also close followers of investment efficiency. The increase in investment efficiency will give investors a greater sense of security, which in turn will reduce the investor's expected rate of return and reduce the cost of equity financing for the enterprise. Based on this, the article makes the following assumptions:

H1: The implementation of financial shared services can positively promote investment efficiency.

H2: When investment efficiency increases, the cost of equity financing will decrease accordingly.

3. Development History of ZTE's Financial Shared Service

ZTE was established in 1985. In the process of continuous expansion of enterprise business and coverage, the shared service model has been applied to business management practices because of its many significant advantages. The application of the financial shared service center in ZTE has experienced the following stages[5]:

Preparation period (1999-2006): Before 2002, ZTE's financial management model was at the stage of decentralization to subordinate organizations. Each branch and subsidiary had their own complete

financial accounting process and system, but the headquarters had a financial department to supervise each subordinate business department. ZTE has successively introduced an online reimbursement system and an ERP system, which has laid an important information foundation for the establishment of the subsequent financial shared service center. From 2003 to 2005, the disadvantages of the traditional financial system became more and more obvious: Large amounts of financial accounting information are difficult to pass in a timely manner[11], and when problems occur, post-event control can only learn lessons and cannot recover losses, but the feasibility of control before and during the event is too poor. Faced with these current conditions, ZTE selected some pilots to implement financial shared services in 2005, and established the first financial shared service center in Shenzhen to conduct a new attempt at the financial management model. The combined effect of increasing management requirements, pre-information foundation and continuous technological advancement has promoted the introduction of ZTE's financial shared service.

Perfection period (2007-2012): With the continuous adaptation and improvement of the financial shared service center in the pilot area, ZTE not only realized the standardization and unification of the financial work of all subsidiaries, but also optimized the process to make the job setting and the division of personnel clear and reasonable. At the same time, with the help of advanced information transmission technology, the problem of slow concentration of financial data is solved, which provides a powerful help for strengthening the control before and during the event. In 2008, after comprehensive consideration of transportation, talent, and cost, ZTE moved its financial shared service center from Shenzhen to Xi'an, and realized the integration of business between the group and its subsidiaries[10]. Through the establishment of a scientific performance evaluation system, the enthusiasm of the staff of the financial shared service center has been greatly improved, and the quality of service has also been significantly improved. ZTE also established a cloud computing service center and IT operation department to provide better technical support for the financial shared service center. During this period, the continuous improvement of business processes, job settings, performance evaluation and service quality has greatly improved the operation level of ZTE's financial shared service center.

Mature period (2013 to present): At this stage, ZTE started the process of internationalization of shared services. It is no longer limited to a certain region , but connects global businesses through a shared service platform. This process is accompanied by the reconfiguration and integration of the Group's resources, as well as a good connection between domestic and foreign businesses. Not only that, ZTE also actively explored the additional functions of financial shared services and expanded the international consulting business of shared services. Although the headquarters of the Financial Shared Service Center during this period was in China, ZTE's mature financial management model has become increasingly powerful at home and abroad, providing direction and reference for the reform of the financial management model of many large enterprise groups. The process of extending the scope of financial shared services from domestic to foreign countries is not a simple copy of previous experience. It needs to take into account all aspects of the cultural environment, management concepts, and business nature.

4. Research design

4.1. Sample Selection

In order to verify Hypothesis 1, this paper selects ZTE's financial data for a total of 21 years from 1999 to 2019 as the sample and uses EXCEL to process the sample as follows: (1) remove all company sample points that lack the required data in all years; (2) Eliminate outliers. After screening, 2520 unbalanced panel data were finally obtained. At the same time, the same method is used to

calculate the overall investment efficiency of the electronics and communications equipment manufacturing industry. This article intends to analyze the changes in ZTE's investment efficiency at different stages of implementing financial shared services, and compare the industry's overall investment efficiency with ZTE's investment efficiency.

4.2. Methodology

The investment efficiency model of Richardson is used for calculation. The model is as follows:

$$INV_{i,t} = \beta_0 + \beta_1 INV_{i,t-1} + \beta_2 GROWTH_{i,t-1} + \beta_3 LEVEL_{i,t-1} + \beta_4 CASH_{i,t-1}$$
$$+ \beta_5 AGE_{i,t-1} + \beta_6 SIZE_{i,t-1} + \beta_7 RET_{i,t-1} + \varepsilon_{i,t} \tag{1}$$

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$$+ \beta_5 AGE_{i,t-1} + \beta_6 SIZE_{i,t-1} + \beta_7 RET_{i,t-1} + \varepsilon_{i,t} \tag{2}$$

In model (2) ,the part before $\varepsilon_{i,t}$ is used to calculate the expected capital investment of company i in the industry in year t. The actual capital investment minus the expected capital investment is the unexpected capital investment $\varepsilon_{i,t.}$ When $\varepsilon_{i,t}$ is smaller than zero, it means insufficient investment; and when it is greater than zero, it means excessive investment. The absolute value of $\varepsilon_{i,t}$ means non-efficient investment. A larger absolute value means lower investment efficiency. Similarly, in model (1), ε_t represents ZTE's unanticipated capital investment in year t.

4.3. Variable Definitions

Referring to the existing literature, the variables designed in this paper are shown in Table 1.

Table 1: Variable Definition.

Variable type	Variable	Symbol	Calculation method
Explained variable	New capital investment this year	INV_t	Funds paid for the purchase and construction of fixed assets, intangible assets and other long-term assets in this year /total assets
Explanatory variables	New capital investment in the last year	INV_{t-1}	Funds paid for the purchase and construction of fixed assets, intangible assets and other long-term assets in last year /total assets
	Growth opportunities	GROWTH	Market value / final assets
	Debt level	LEVEL	Total liabilities / Total assets
	Monetary fund holdings	CASH	Monetary funds / total assets
	Age to market	AGE	Year of the year-year of go public
	Company Size	SIZE	The natural logarithm of total assets at the end of the period
	Stock yield	RET	(The closing price of the last trading day of the current year ÷ the closing price of the last trading day of the previous year)—1

5. Empirical Results and Analysis

5.1. Descriptive Statistics

Descriptive statistical results can help us grasp the overall characteristics of the sample data through representative indicators such as the mean. This article uses Stata software to conduct a descriptive analysis of variables from five aspects: observation, mean, maximum, minimum, and standard deviation. The results are shown in Table 2:

Table 2: Descriptive statistics of variables.

Variables	Observations		Mean value		Standard deviation		Minimum value		Maximum value	
	ZTE	industry	ZTE	industry	ZTE	Indutry	ZTE	Industry	ZTE	Industry
RET	21	2521	.24	.212	.521	.773	-.461	-.878	1.28	15.211
GROWTH	21	2521	1.402	2.231	.258	1.503	1.081	.832	2.051	23.542
SIZE	21	2521	24.302	21.557	1.295	1.153	21.514	16.508	25.693	26.44
INV	21	2521	.04	.063	.015	.062	.019	0	.071	.545
LEVEL	21	2521	.663	.4	.086	.446	.513	.011	.789	12.238
CASH	21	2521	.213	.221	.047	.154	.138	0	.364	.878
AGE	21	2521	12	7.981	6.205	5.64	2	0	22	26
ε	21	2520	0	0	.006	.052	-.01	-.12	.015	.581
|ε|	21	2520	.005	.035	.004	.039	0	0	.015	.581

According to the statistical results, we can see that the average value of ZTE's enterprise value Q (1.402) is less than the industry average (2.231), but ZTE's enterprise value Q is between 1.081-2.051, while the industry's overall enterprise value is between 0.832-23.542. This shows that the value gap of different companies in the industry is large, and the companies with good development level may have a greater pulling effect on the overall value, making the average value of ZTE's value smaller than the industry average. In terms of new investment expenditure, the minimum value of the industry as a whole is 0, and the minimum value of ZTE is 0.019, which shows that ZTE has investment of different scales every year, and there is no year without investment. The average residual value of the industry and ZTE's residual value are both 0, indicating that the amount of over-investment and under-investment can offset each other. After taking the absolute value of the residuals, the average value of ZTE's absolute value of residuals (0.005) is smaller than the average value of the industry's absolute value of residuals (0.035), indicating that the gap between ZTE's expected capital investment and actual capital investment is smaller, which means that ZTE's investment efficiency is higher than the industry's overall investment efficiency.

5.2. Changes in ZTE's Investment Efficiency at Different Stages of Financial Shared Service Implementation

In order to better compare the changes in ZTE's investment efficiency at different stages of the implementation of the financial shared service, the absolute values of the residual value of the

industry as a whole and ZTE were calculated using models (1) and (2), and according to The calculation result is plotted in Figure 1. At the same time, in order to more intuitively describe the overall development trend of ZTE's investment efficiency, this paper calculates the average value of the residual ε in the model every three years from 1999 and draws Figure 2 according to the calculation results.
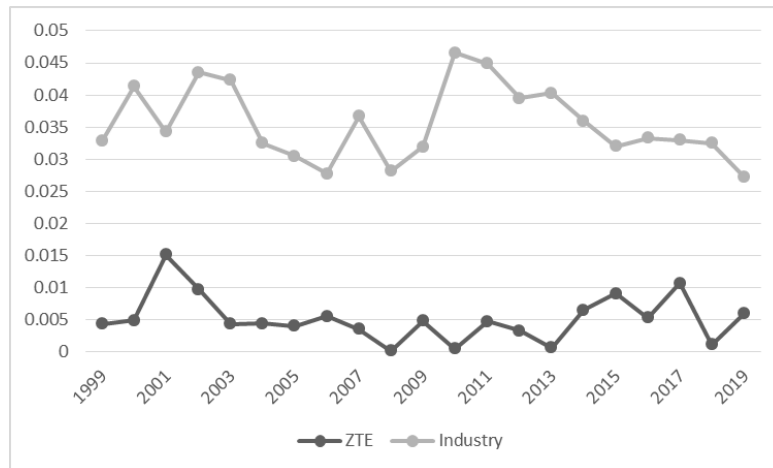

Figure 1: Comparison of changes in ZTE and industry investment efficiency.

Figure 2: Comparison of ZTE and industry investment efficiency changes by stages.

During the preparation stage of financial shared services (1999-2006), ZTE's investment efficiency changes: As can be seen from Figure 1, the gap between the actual capital investment and the expected capital investment was large between 1999 and 2003, but it continued to narrow between 2001 and 2003, which means investment efficiency was improved. Because ZTE's financial management was still in a decentralized mode during this period, the headquarters increased the overall investment efficiency of the enterprise by strengthening the control of its subsidiaries. From 2003 to 2006, the absolute value of the residuals was lower than before but there was little change,

which shows that ZTE's investment efficiency remained stable but did not significantly increase. During this period, the traditional financial management model encountered bottlenecks and prevented further promotion of investment efficiency. The financial shared service center was only operating in some pilots and was still in the preliminary stage. Its impact on investment efficiency was not immediate. All in all, ZTE's investment efficiency has improved in the preparation stage of the financial shared service, but the effect is not obvious in the later period.

During the growth stage of financial shared services (1999-2006), ZTE's investment efficiency changes: The line in Figure 1 has dropped significantly during the period 2006-2008, which indicates that the actual capital investment is getting closer to the expected capital investment and ZTE's investment efficiency has improved significantly. Because the financial shared service in this period has not only been perfected in the implementation of the pilot project, but also the Group and its subsidiaries have entered the stage of integration. The optimization of the process and the rationalization of the division of labor have contributed to the improvement of investment efficiency. However, due to the impact of the 2008 financial crisis, the overall social and economic environment is no longer improving. In addition to the differences and adaptability issues arising from the continuous expansion of the implementation scope of financial shared services, the investment efficiency of ZTE in 2009-2012 has declined in fluctuations. In short, in the growth stage of financial shared services, ZTE's investment efficiency has undergone a significant increase before volatility decline.

During the mature stage of financial shared services (2013-present), the changes in ZTE's investment efficiency: The gap between the expected capital investment and the actual capital investment gradually increased during 2013-2015, which means that ZTE's investment efficiency has gradually declined.Because during this period, ZTE began to promote financial shared services internationally, no longer limited to China or a certain region in China. The internationalization process of financial shared services faces many complexity factors. This is an tentative and continuous adjustment process, and it is unlikely to be smooth. It can be seen from the phased trend in Figure 2 that after the investment efficiency experienced a decline in 2013-2016, it gradually recovered in 2017-2019. This shows that the problems arising in the process of internationalization are constantly being solved and optimized, and the advantages of financial shared services are gradually revealed, which promotes the improvement of investment efficiency.

It can be seen from Figure 1 that the absolute value of ZTE's residual error in each year from 1999 to 2019 is less than the absolute value of the residual error of the entire electronics and communications equipment manufacturing industry. This shows that compared with the whole industry , the gap between ZTE's actual capital investment and the expected capital investment is smaller and the investment efficiency is higher. Looking at Figure 2, the gap between ZTE's expected capital investment and actual capital investment has been narrowing from 2005 to 2010.   That is to say, after the establishment of a financial shared service center, ZTE's investment efficiency does have Significantly improved. 2010-2016 is a period when ZTE is in the process of promoting globalization, and investment efficiency has decreased. From 2017 to 2019, investment efficiency has gradually recovered. From the perspective of development trends, ZTE's investment efficiency has gone through stages of improvement, declination and improvement, and it is expected to continue to increase with the implementation of financial shared services. Therefore, Hypothesis 1 is verified.

5.3. Impact of Changes in Investment Efficiency on ZTE's Equity Financing Costs

The cost of capital depends not only on the total amount of financing, but also on the rate of return

required by investors. In an ideal capital market, higher investment efficiency usually means more reasonable investment decisions and richer investment returns. Rational investors should be able to recognize changes in investment efficiency and reflect them through the required return on investment. That is to say, when the investment efficiency of a company is high, investors tend to think that the investment decisions made by the decision makers of the company are more scientific and the investment risk is less, which will reduce the return on investment. It means a lower rate of capital cost. In order to verify Hypothesis 2, this paper uses the capital asset pricing model to measure the cost of equity financing of ZTE and the industry to test investors' response to changes in investment efficiency:

$$R_i=R_f+(R_m-R_f)*\beta_i \qquad (3)$$

In formula (3), R_i represents the expected rate of return; R_f represents the risk-free rate of return, which is replaced by the rate of return corresponding to the 30-year Treasury bond, whose value is 4.15%[6]; R_m is the market rate of return, replaced by the annual stock rate of return that considers cash dividend reinvestment; β_i is the systemic risk factor, and is replaced by the BETA value of the corresponding year in the CSMAR database. Substitute ZTE's relevant data and the industry's overall relevant data into formula (3) to calculate their respective expected returns from 1999 to 2016. The expected rate of return is averaged every three years, and then Figure 3 is drawn based on the calculation results.
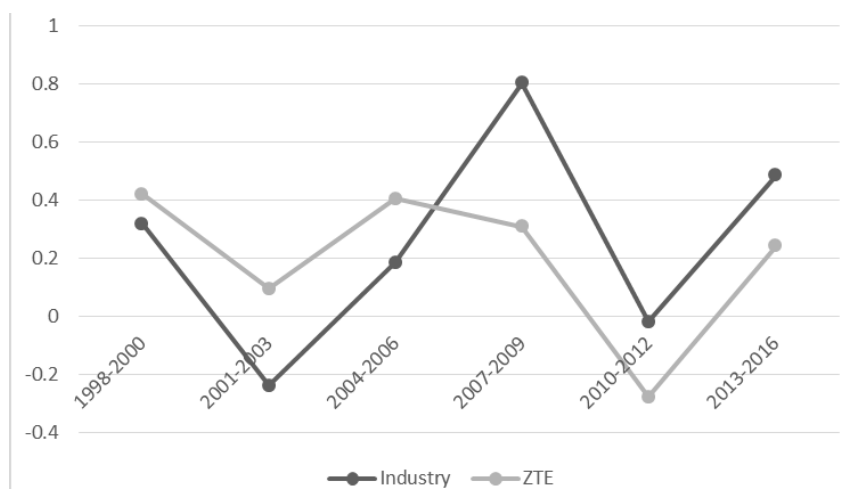

Figure 3: Comparison of ZTE's and industry's expected rate of return changes by stages.

In the preparation stage of financial shared services (1999-2006), ZTE's investment efficiency experienced a steady stage after an increase. It can be seen from Figures 3 and 1 that in the stage of higher investment efficiency (1999-2003), the expected return rate required by investors gradually decreased, and in the stage of stable investment efficiency (2004-2006), the expected return rate required by investors rose. This shows that ZTE's investors pay more attention to investment efficiency. When the investment efficiency is higher, investors will think that the company's decision-making is more scientific, the investment risk is lower, and the required return on investment will be lower. It also means that the cost of equity financing for companies is lower. When the investment efficiency no longer improves but remains unchanged, investors increase the required rate of return, which in turn increases the cost of equity financing of the enterprise.

In the growth stage of financial shared services (2007-2012), it can be seen from Figure 2 that

ZTE's investment efficiency is in a stage of continuous improvement. Combined with Figure 3, we can see that the rate of return required by investors during this period has gradually decreased. However, compared with the period of 2007-2009, the expected rate of return in 2009-2012 decreased even more. This is because 2007-2009 is the initial stage of the implementation of financial shared services, and it has a certain lagging effect on the improvement of investment efficiency. With the continuous improvement and development of financial shared services, its advantages have gradually emerged, and the role of improving investment efficiency has become more obvious, thereby reducing the cost of equity financing.

In the mature stage of financial shared services (2013-present), due to the lack of relevant data of ZTE in 2017 and later, Figure 3 only shows the changes in equity financing costs from 2013 to 2016. It can be seen from Figure 3 that ZTE's equity financing cost is rising continuously compared with the previous stage. Combining Figure 2 can obtain that investors realized that the investment efficiency of enterprises in 2013-2016 decreased, which increased the expected rate of return required for investment and increased the cost of equity financing of enterprises. To sum up, rational investors not only pay close attention to the changing trend of investment efficiency, but can also adjust the expected rate of return required by understanding efficiency: When ZTE's investment efficiency improves, investors lower their return on investment, thereby gradually reducing equity financing costs; when investment efficiency decreases or remains stable, equity financing costs will increase. Therefore, Hypothesis 2 is verified.

6. Conclusion

This paper uses Richardson's investment efficiency model and capital asset pricing model to analyze the impact of different stages of financial shared service implementation on ZTE's investment efficiency and the changes in equity financing costs. Research shows that the establishment of a financial shared service center does help to improve the investment efficiency of enterprises, especially in the growth stage of implementing shared services. As the internationalization of shared services will be affected by many complex factors, the investment efficiency of this period experienced a decline and then an increase. At the same time, when the investment efficiency increases, investors will reduce the required expected rate of return and thereby reduce the cost of equity financing of the enterprise. Conversely, a decline or constant investment efficiency will increase the expected rate of return required by investors and then increase the cost of corporate equity financing. Conversely, a decline or constant investment efficiency will increase the expected rate of return required by investors and then increase the cost of corporate equity financing.

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