

Managers' Assessment of the Risk Factors and Project Return on Investment (ROI) Among Information Technology (IT) Companies in Zhoukou City, China

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Abstract

The purpose of this survey-correlational study was to identify the risk variables and project return on investment (ROI) among information technology (IT) enterprises in Zhoukou City, China. 49 managers participated in the survey, which was conducted in November 2022 and was chosen by random sampling. The data for the study were collected using a questionnaire that was created by the researcher. The majority of IT companies, according to the study's findings, completed their projects in less than three months on average, had fewer than 10 workers, had one to fifty lucrative projects, and had been in business for less than six years. IT organizations were found to have medium market demand risk, low interest rate risk, extremely low exchange rate risk, medium commodity price risk, low innovation technology risk, and low market risk.

Keywords: Risk Factors, Project Return on Investment (ROI), Information Technology (IT)

INTRODUCTION

Background of the Study

Risks are inherent in every business. It can be said that "doing business" is indeed a risk-taking activity. Nevertheless, risks must be properly managed and be kept within manageable levels (Balatbat, 2019). Risk can simply be described as "things that can go wrong." In the sphere of managing risk, it is not right to say "let's just cross the bridge when we get there." On the contrary, risks should be identified before they even happen so that the company will be in a better position and have time to prepare for them. Successful businessmen and decision-makers make sure that the risks resulting from their decisions are measured, understood and as far as possible eliminated. They also go beyond the direct financial perspective and actively manage risk as it affects the whole organization. This is the essence of risk management. Accepting that risks exist is a starting point for the other actions needed, but the most important is to create the right climate for risk management. Identification of significant risks both within and outside the organization is crucial and allows to make informed decisions. This makes it easier to avoid unnecessary surprises. Risk surrounds and continues to be with us. A former British prime minister once said. "To be alive at all involves some risk."

Information technology (IT) is changing with each passing day, which is effectively promoting the

development of social productivity. As such, IT industry develop forward at a higher speed in the tide of digital revolution. The market has witnessed a rapid development in the new stage. In the last several years, with the persistent achievements made in network technology, China's IT industry market has been developing and its competitiveness has been improving. According to the statistical Bulletin of China's Software and information Technology Service industry in 2020, China's software and information technology service industry has over 40,000 businesses with a total software business revenue of 8,161.6 billion yuan, up 13.3% year on year (data source: China's industrial economy information network <http://www.cinic.org.cn/xw/tjsj/1028137.html>). The success of information technology and the application of all kinds of new technologies bring about many changes in our life, which brings various development opportunities and challenges. With the persistent progress achieved in China's informatization, information technology has been integrated into people's life in all aspects. China's IT enterprises and total assets are gradually increasing, which also means that China's IT enterprise construction has begun to stride into a new era of development. A large number of IT enterprises are standing at the front of the development tide of The Times, participating in various information technology investment projects.

Though Zhoukou is a small city of China, it also was born in the tide of information age. With some risk factors affecting the success or failure of project, it is important that IT enterprises reasonably predict the risks towards the completion of project investment. Enterprises attach particular importance to the return on investment as an important reference index when participating in IT projects. Zhoukou IT enterprises must fully screen out the risk factors and ROI.

Many domestic experts and scholars have conducted research on risk identification. There are studies on engineering projects in foreign countries, but not on the risk factors of IT enterprise investment projects.

At present, research on project risk management at home and abroad mainly focuses on real estate, PPP projects, electric power, roads and other aspects, and there is almost no project risk research based on IT industry. Therefore, on the basis of drawing lessons from other project risk management experts at home and abroad, the research results of this study can be fully used to carry out the project investment risk identification of IT enterprises in Zhoukou City. There is no available literature that determines the risk factors and Project Return on Investment (ROI) particularly in Zhoukou City. More particularly on the correlation of market risk, organizational management organizational risk, financial risks and project ROI.

Hence, this study aims to determine the risk factors and the project return on investment (ROI) of Zhoukou information technology (IT) enterprises. This will not only enrich the existing relevant theoretical research results, but also provide theoretical support and scientific guidance for the improvement of the rapid development of IT projects.

Objectives of the study

This study aimed to determine managers' assessment of the risk factors and project return on investment (ROI) among information technology (IT) companies in Zhoukou City, China.

The study has the following specific objectives:

1. Determine the profile of IT companies in terms of (a) loss-making projects, (b) profitable projects, (c) project completion time, (d) years in operation, and (e) number of employees.

2. Determine the managers' assessment of the risk factors—*market risks* (market demand risk, interest rate risk, exchange rate risk, and commodity price risk); *organization and management risks* (innovation technology risk, change in design risk, information risk, material risk, management capability risk, institutional risk, and personnel risk); and *financial risks* (cash flow risk, profitability risk, operation capacity risk, and solvency risk) among IT companies taken as a whole group and classified according to (a) loss-making projects (b) profitable

projects, (c) project completion time, (d) years in operation, and (e) number of employees.

3. Determine the managers' assessment of the project return on investment (ROI) among IT companies taken as a whole group and classified according to (a) loss-making projects (b) profitable projects, (c) project completion time, (d) years in operation, and (e) number of employees.

4. Determine if significant differences would exist in the managers' assessment of risk factors—*market risks* (market demand risk, interest rate risk, exchange rate risk, and commodity price risk); *organization and management risks* (innovation technology risk, change in design risk, information risk, material risk, management capability risk, institutional risk, and personnel risk); and *financial risks* (cash flow risk, profitability risk, operation capacity risk, and solvency risk) among IT companies taken as a whole group and classified according to (a) loss-making projects (b) profitable projects, (c) project completion time, (d) years in operation, and (e) number of employees.

5. Determine if significant differences would exist in the managers' assessment of the project return on investment (ROI) among IT companies taken as a whole group and classified according to (a) loss-making projects (b) profitable projects, (c) project completion time, (d) years in operation, and (e) number of employees.

6. Determine if significant relationships would exist among the enterprise profile in terms of loss-making projects, profitable projects, project completion time, years in operation, and number of employees and the managers' assessment of the risk factors—*market risks* (market demand risk, interest rate risk, exchange rate risk, and commodity price risk); *organization and management risks* (innovation technology risk, change in design risk, information risk, material risk, management capability risk, institutional risk, and personnel risk); and *financial risks* (cash flow risk, profitability risk, operation capacity risk, and solvency risk) among IT companies.

7. Determine if significant relationships would exist among the enterprise profile in terms of loss-making projects, profitable projects, project completion time, years in operation, and number of employees; and the managers' assessment of the project return on investment (ROI) among IT companies.

8. Determine if significant relationships would exist in the managers' assessment of the risk factors—*market risks* (market demand risk, interest rate risk, exchange rate risk, and commodity price risk); *organization and management risks* (innovation technology risk, change in design risk, information risk, material risk, management capability risk, institutional risk, and personnel risk); and *financial risks* (cash flow risk, profitability risk, operation capacity risk, and solvency risk) and their

assessment of the project return on investment (ROI) among IT companies.

Theoretical and Conceptual Framework of the Study

Kirkpatrick's four-level model (Kirkpatrick, 1738, in Winfrey, 1999, 2009). In terms of assessment, this study is anchored on Kirkpatrick's four-level model—level 1 – reactions level 2- learning, level 3- transfer, and level 4 - results. Each successive evaluation level is linked with information provided by the lower level. Assessment begins with level one, and then moves through levels two, three, and four. (Kirkpatrick, 1738, in Winfrey, 1999, 2009).

Hawley's (1893, in Kishore, 2020) risk theory of profit. As to risks, this study connects itself to Hawley's (1893, in Kishore, 2020) risk theory of profit. The theory explains that, the main function of an entrepreneur is risk-taking. An entrepreneur coordinates various factors of production and these factors are paid their contractual payments.

Tammala (1994) believed that the main goal of risk identification stage is to form a complete risk description, evaluate alternative risk management decisions and select the most appropriate plan. In the process of handling, it is necessary to identify risks first, so as to determine the types, characteristics and impacts of risks, and then quantify the possible losses caused by various risk factors through assessment.

Investment Theory (WallstreetMojo, 2023). As to project return on investment, this research is related to the investment theory (WallstreetMojo, 2023).

Investment theory suggests that an investment is an adjustment to the capital stock over a specific period. Here, investment is a flow concept, not a stock concept like capital. This implies that capital is computed by taking a short period into account, while investments are computed over a lengthy period.

Financial theory of investment (Duesenberry, in Madhavan, 2018). Also known as the cost of capital theory of investment, assumes that the market rate of interest represents the cost of capital to the firm which does not change with the amount of investment it makes. This study aimed to determine managers' assessment of the risk factors and project return on investment (ROI) among information technology (IT) companies in Zhoukou City, China.

The study assumed that certain identified enterprise profile and risk factors would relate to project return on investment (ROI) among information technology (IT) companies.

The **antecedent variable** was the enterprise profile, classified according to loss-making projects, profitable projects, project completion time, years in operation, and number of employees.

The **independent variables** were the risk factors classified as to market risks, organization and management risk, and financial risks.

The **dependent variable** was project return on investment (ROI).

The conceptual framework for this study is shown below:

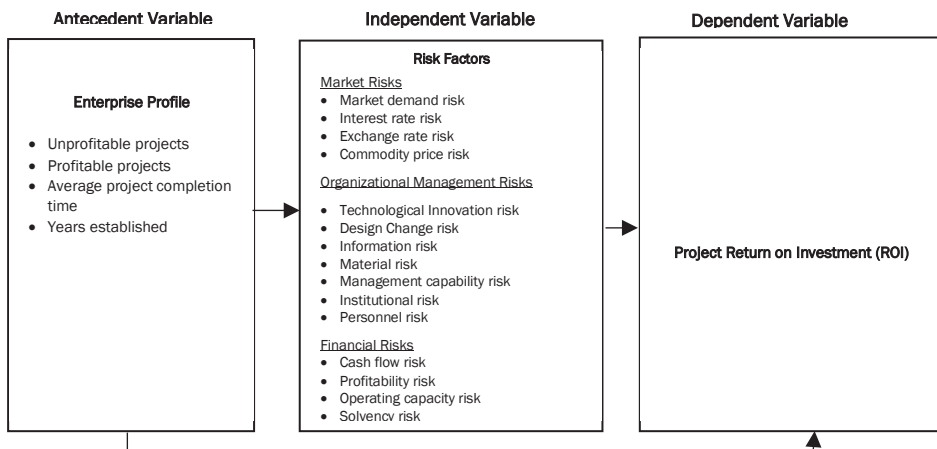


Figure 1. Conceptual Framework of the Study

Significance of the Study

The findings of the present investigation may be beneficial to the following:

Information Technology (IT) Enterprises: This will provide Zhoukou City IT enterprises with effective investment risk forecast when making project investment.

Other enterprises implementing projects. Other industry enterprises can improve the risk factors of this study according to their own industry characteristics and use them according to local conditions.

Customer: This study provides an effective forecast of the project investment risk of IT enterprises in Zhoukou City, which will effectively replete the venture of project tail and the risk of customers.

Government: Some of Zhoukou's IT projects are realized in cooperation with the government. The safe and stable completion of the projects means the smooth completion of public infrastructure, which boosts the implementation of government policies and urban construction.

Public: Since enterprises avoid project investment risk, and promote the safe and healthy construction of IT projects, the increase of government investment in IT infrastructure will bring convenience to Zhoukou people's life and work which improves people's productivity and life efficiency.

Future Investors: This ROI-based research of Zhoukou IT enterprise project investment risk factors will not only enable enterprises participating in IT projects to avoid the above risk factors of investment in advance, but also takes into account the interests of the government and users.

Scope and Limitation of the Study

This study aimed to determine the managers' assessment of the risk factors and project return on investment (ROI) among information technology (IT) companies in Zhoukou City, China. This survey-correlational research was conducted in November 2023. Forty-nine 49 managers from IT companies in Zhoukou City were selected as respondents, using probability sampling. A researcher-made

questionnaire data-gathering instrument was used to gather the data. Frequency counts, percentage analysis, means, and standard deviations were employed in the descriptive analysis. The One-Way ANOVA and the Pearson's r were employed in the inferential analysis. The .05 alpha level was used as the criterion for the acceptance or rejection of the null hypotheses.

Related Literature/Studies

Domestic and foreign scholars in the project investment risk prediction research field has a great space for research. In the research of domestic and foreign researchers, the following points can be found:

(1) Theoretical research on project risk management abroad has been very comprehensive, but domestic research in this aspect is still insufficient. At present, research on project risk management at home and abroad mainly focuses on real estate, PPP projects, electric power, roads and other aspects, and there is almost no project risk research based on IT industry.

(2) In foreign risk prediction analysis, entrepreneurs' comprehensive ability and quality are usually included in the index system, but the index system established by domestic theoretical research institutions pays less attention to this aspect. If more attention is paid to the quality of the project entrepreneur or management team, better evaluation indicators can be established.

(3) In terms of project risk prediction, domestic and foreign experts have carried out a variety of qualitative and quantitative risk prediction methods, but there is almost no prediction of IT project investment risk.

Therefore, on the basis of drawing lessons from other project risk management forecasting experts at home and abroad, the research results of this study can be fully used to carry out the project investment risk forecasting research of IT enterprises in Zhoukou City. Considering the large differences in China's overall policy and cultural background, the study was attuned to China's national business condition.

METHODOLOGY

This study adopted the survey-correlational research design among forty-nine (49) IT companies using a self-constructed questionnaire duly validated by experts. The research was conducted in a manner that guarantees quality and integrity of results. The researcher used Microsoft Excel and SPSS to process and analyze the collected survey data in order to determine the risk factors and ROI of IT enterprise projects in Zhoukou City. For descriptive statistical analysis, the frequency and percentage were used to

conduct variable distribution statistics on the business profile, market risk, organizational management risk, financial risk and project risk level determined by (ROI) of Zhoukou IT companies. The Pearson correlation analysis of the first-level variables of Zhoukou IT companies' business profile, market risk, organizational management risk, and financial risk level determined by (ROI) is conducted to determine the correlation between them.

RESULTS AND DISCUSSION

Managers' Assessment of Risk Factors as to Market Risks (Market Demand Risk, Interest Rate Risk, Exchange Rate Risk, and Commodity Risk) Among Information Technology (IT) Companies

Market demand risk. As an entire group, had **medium market demand risk** as assessed among the managers.

Interest rate risk. The IT companies, as an entire group, had **low interest rate risk** as assessed among the manager.

Exchange rate risk. In all identified categories, the enterprise profile had **very low exchange rate risk** as assessed among the managers.

Commodity risk. The IT companies, as an entire group, had **medium commodity risk** as assessed among the managers. Please see table 2.1.

Managers' Assessment of Risk Factors as to Organizational Management Risks (Technological Innovation Risk, Design Change Risk, Information Risk, Material Risk, Management Capability Risk, Institutional Risk, and Personnel Risk) Among Information Technology (IT) Companies

Technological Innovation risk. The IT companies, as an entire group, had **low technological innovation risk** as assessed among the managers. This was revealed by obtained mean scores which fell within the 1.80-2.59 range.

Design Change risk. The IT companies, as an entire group, had **low change in design risk** as assessed among the managers. This was revealed by obtained mean scores which fell within the 1.80-2.59 range.

Information risk. The IT companies, as an entire group, had **low information risk** as assessed among the managers. This was revealed by obtained mean scores which fell within the 1.80-2.59 range.

Material risk. The IT companies, as an entire group, had **low material risk** as assessed among the managers. This was revealed by obtained mean scores which fell within the 1.80-2.59 range. The obtained standard deviations which ranged from .69-1.70 revealed the narrow dispersion of the obtained means, indicating the managers' homogeneity in terms of their assessment of the material risk among IT companies.

Management capability risk. Except for IT companies established for more than 13 years ($M = 2.71$, $SD = 1.49$) and those with 4-8 months average project completion time ($M = 2.72$, $SD = .93$), assessed by the managers as having **medium management capability risk**, all the other IT companies classified in the rest of the identified categories had **very low management capability risk**.

Institutional risk. The IT companies, in all categories of the identified enterprise factors had **very low institutional risk** as assessed among the

managers. This was revealed by obtained mean scores which fell within the 1.00-1.79 range.

Personnel risk. The IT companies, as an entire group, had **low personnel risk** as assessed among the managers.

Managers' Assessment of Risk Factors as to Financial Risks (Cash Flow Risk, Profitability Risk, Operation Capacity Risk, and Solvency Risk) Among Information Technology (IT) Companies

Cash flow risk. Data in Table 2.3 reveal that the IT companies, as an entire group, had **low cash flow risk** as assessed among the managers. This was revealed by obtained mean scores which fell within the 1.80-2.59 range.

Profitability risk. With the exception of IT companies with more than 100 profitable projects ($M = 3.00$, $SD = 1.41$) and those with 11-20 employees ($M = 2.67$, $SD = 1.22$) assessed by managers as having **medium profitability risk**, the IT companies in all other identified categories of the enterprise profile was assessed as having **low profitability risk**. This was shown by obtained mean scores which fell within the 1.80-2.59 range. The obtained standard deviations which ranged from .00-1.41 revealed the narrow dispersion of the obtained means, indicating the managers' homogeneity in terms of their assessment of the profitability risk among IT companies.

Operation capacity risk. As an entire group, IT companies had **low operation capacity risk** as assessed among the managers. This was revealed by obtained mean scores which fell within the 1.80-2.59 range. This was revealed by obtained mean scores which fell within the 2.60-3.39 range.

Solvency risk. The IT companies, as an entire group, had **low solvency risk** as assessed among the managers. This was revealed by obtained mean scores which fell within the 1.80-2.59 range.

Managers' Assessment of the Project Return on Investment (ROI) Among IT Companies

As an entire group, the IT companies had **low** project return on investment as assessed among the managers. On the other hand, the following IT companies had **medium** projected return on investment as assessed among the managers: those with 1-5, 6-11, and 12 or more unprofitable projects; those established for more than 13 years; and those with 4-8 months average completion time. This was revealed by obtained mean scores which fell within the 2.60-3.39 range.

IT companies with more than 100 projects ($M = 3.50$, $SD = 1.29$) had **high** project return on investment as assessed among the managers (see Table 3).

CONCLUSIONS AND RECOMMENDATION

Conclusion

In view of the findings, the following conclusions were drawn:

1. The IT companies in this research appear to relish profitable projects considering their shorter stint in the business. In addition, they tend to complete their contracts in a much shorter time, usually less than four months and are manned by fewer employees.

Very young indeed, the IT enterprises in this research, seem robust in terms of their ability to crack a promising future in the industry.

2. The possibility of experiencing significant losses that the IT company might experience in the future due to factors that influence the performance of the overall market in which the operation look low-slung and intermediate. There seems to be an indication that, like other business enterprises, the IT companies are not spared of risks—market risks, organizational management risks, and financial risks.

3. There seems to be an indication that IT companies are near to the ground in terms of returns on project investments. There has to be a static index to measure the rate of return of the investment project, given a normal operation year. Low as it seems, the advantages and disadvantages of investment, whose economic significance is not very clear, understandable, nor calculable, could result to modest, if not conservative assessment of project return on investment among the managers.

4. Loss-making projects was a factor found to significantly influence the financial risks in terms of cash flow risk, in favor of those with 6-11 loss-making projects and operational capacity risk, in favor of 1-5 loss-making projects—assessed moderately experienced among IT companies.

It appears that the length of registration with the government is a symbol of strength coupled with the long experience of the enterprise in the construction project.

Number of employees was a factor to significantly influence the financial risks in terms of profitability risk, and solvency risk, both in favor of those with 10-20 employees—assessed moderate among the managers.

5. Project completion time is a factor found to positively and significantly influence the project return on investment among IT companies. It interesting to note that, being efficient, that is, completing the project on time or earlier, as exemplified by IT companies in this research, can boost the project's return on investment.

6. Profitable projects and loss-making are factors found to significantly affect commodity price risk. This explains that the profits derived from a

project may be linked with the changing prices of commodities, posing as potential risk.

7. Profitable projects and loss-making projects were factors found to significantly affect project return on investment among IT companies. The cost of already priced projects that is lower than the revenue or those that exceeds revenue tend to yield substantial consequences on IT companies' project return on investment.

8. Market risks such as market demand risk, interest rate risk, and commodity price risk; organizational management risks such as change in design risk and information risk; and financial risks such as cash flow risk, profitability risk, operation capacity risk, and solvency risk were factors found to significantly affect project return on investment.

Recommendation

In view of the findings and conclusions, the following are recommended:

1. The IT enterprises in Zhoukou City can now refer to the findings concerning the market risks, organizational management risks, and financial risks impinging upon project return of investment.

2. Study results can provide an effective reference for project investments by other enterprises implementing similar projects. They can identify the risk factors integral to their companies and devise strategies to minimize or control risks affecting their business operations.

3. The customers will be greatly informed of the predicament of IT companies in terms of the risks involved and the project return on investment. As such they will be guided by the pricing strategies and other organization and management activities vital to strengthen their company-customer relationship.

4. Since some of Zhoukou City's IT projects are realized in cooperation with the government, through the findings, safe and stable completion of the projects could be realized, thus, the smooth completion of public infrastructure, which will eventually boost the implementation of government policies on urban construction. Through the finding, policies creating, protecting and improving IT ventures in the area could be instituted. A public-private partnership for development of IT infrastructure is highly recommended.

5. The general public may find the findings useful. The market risks, organizational management risks, and financial risks associated with project investments among IT companies could help them understand how IT project investments in Zhoukou City are operated.

6. Replication of the present study is suggested. Future researchers may consider expanding the coverage to other cities in China to truly validate the findings of this research. They may endeavor to

consider other variables such as financial ratios, sustainability and the like, investment indices for IT companies, capitalization,

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