Science, Technology, and Social Sciences Procedia
2022; 2022(5): CiM08
https://wjst.wu.ac.th/index.php/stssp

# The Impact of Intangible Assets on Firm Performance in Construction Companies in China†

**Yining Yang[1,*], Trairong Swatdikun[2], Alisara Salamolee[2] and Kongkiat Sahayrak[3]**

*[1]College of Graduate Studies, Walailak University, Nakhon Si Thammarat 80160, Thailand*
*[2]School of Accountancy and Finance, Walailak University, Nakhon Si Thammarat 80160, Thailand*
*[3]Faculty of Business Administration and Management, Ubon Ratchathani Rajabhat University, Ubon Ratchathani 34000, Thailand*

**([*]Corresponding author's e-mail: 794978608@qq.com)**

## Abstract

Intangible assets are an indispensable and valuable asset in the production and operation of listed companies. It brings strength and benefits to the company. This research puts forward knowledge on intangible asset by focusing on potential impact on firm performance. As resource-based view suggests that is a positive correlation. intangible asset and goodwill and firm performance. This archival research collects secondary data from Refinitive Eikon. Descriptive, correlation, multiple regression was performed. The finding indicates that size, debt, intangibles, and goodwill are not influence on tax avoidance at the significance level at 1%. However, the results were loosened when firm performance was measure through other profits. The result confirms resource-based view that an Enterprise's resource is collectively serve as foundations to improve performance.

**Keywords:** Construction Listed Companies, Firm Performance, Intangible Asset, Goodwill, China

## Introduction

The increasing importance of science and technology, intellectual capital, intangible assets, and other assets that have no physical form are increasingly used in the modern business management. The unique heterogeneity of intangible assets can make them have the relatively large value creation potential has gradually become the driving force and driving factor for the development of the enterprise. A failure to recognize and capitalize on the value of these assets might lead to missed opportunities and increased risk exposure given the growing relevance of intangibles in generating growth and income.

The management of intangible assets can not only improve the social scientific and technical invention and technological level, promote economic development and social progress in the social overall environment, but also enhance the company's invention efforts, increase its market competitiveness, and fundamentally realize value. The reason why some developed countries in the world have been able to lead the world for a long time is because they have a large number of high-tech enterprises, and the core strength of these enterprises is mainly derived from the intangible assets such as the wisdom of their own unique professionals, patents, and land use rights. As a result, companies in these regions have given full play to the contribution of intangible assets to corporate growth, helping companies develop rapidly while gaining the upper hand in competition. Intangible assets are an indispensable and valuable asset in the production and operation of listed companies. They can continuously improve the market competitiveness of listed companies and make the company move towards a virtuous circle. In the fierce market environment, listed companies should pay attention. Thus, this research examines the impact of intangible assets on firm performance using empirical evidence from Chinese Listed companies.

†Presented at the Conference in Management: Winter 2022 (December 17, 2022 at Walailak University, Thailand)

## Literature review

### Intangible assets

Intangible assets are important resources for the operation of modern affairs, especially those in industries that are related to intellectual property, and the digital technology. This can be determined that the proportion of intangible assets increased from 17 % of total assets in 1975 to 84 % in 2015 in the S&P500 securities segment. The principles of intangible asset recognition (Healy et al., 2002) until the resolution of the current implementation methods of enforcement. While the value of intangible assets is a debate about suitability (Uzma, 2011), Bilal and Rouabhi (2016) argue that intangible asset data is useful to users making economic decisions. However, it found that amortization of intangible assets and impairment of intangible assets are information that is not related to business decisions. Because accounting standards have the option to act to cover different characteristics of intangible assets. Financial statement users must therefore realize that accounting options may be used to design numbers in the direction of the business (Fasan & Marcon, 2018). Iain (2010) studied the relationship between intangible assets and British economic development, and clarified the important driving role of intangible assets investment. Deschryvere (2014) believes that the relationship between R&D investment of intangible assets and company growth is complex, so the author focuses on analyzing the role of R&D of intangible assets in shaping this relationship through empirical evidence. Finally, the empirical results show that the company's continuous sales growth must be accompanied by positive investment in intangible assets. Andonova & Ruíz-Pava (2016) explores the role of intangible assets in profitability using a sample of companies in the Columbia region from 1995 to 2012. Empirical evidence shows that intangible assets play an important role in the company's performance improvement, and this conclusion also confirms that intangible assets have become a source of competitive advantage for companies.

### Firm performance

The success of a company may be assessed using a variety of financial metrics. Operating margin, return on equity (ROE), return on assets (ROA), are a few examples of popular financial measurements. Certain financial measurements will have greater significance than others depending on the sector in which the firm operates. For example, significant statistics to watch in a manufacturing business may be total unit sales, return on assets, and inventory turnover, while in a financial institution they might be stock prices, cash flow, revenue, and operating income. Given that the consulting sector does not require a lot of assets, return on assets and inventory turnover may not be important metrics for these businesses.

### Conceptual framework

This research puts forward conceptual framework to test the impact of intangible assets on corporate profitability as:

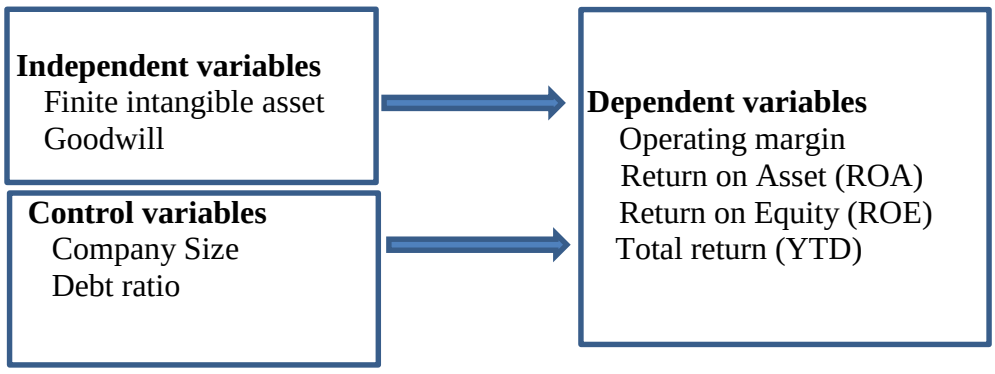


**Figure 1** Conceptual framework.

## Research methodology

### Research method

This Archival research uses secondary quantitative data. Appropriate processing and interpretation of the data collected so that it becomes the basis for research arguments. Therefore, there are strict requirements for the collection and processing of second-hand data.

### Data collection

The sample data comes from Refinitive Eikon database. Data comes from annual reports and financial statements of listed companies. The population of this paper is equal to the 204 construction listed companies in China. However, deal to the immense missing data of intangible asset. Collect data on Chinese listed companies in the last 5 years, this study received a complete 1017 datasets.

### Research model

$$Y = \alpha + \beta_1 \text{Finite Intangible asset} + \beta_2 \text{Goodwill} + \beta_3 \text{Size} + \beta 4 \text{Debt}$$

where,

Y were firm performance (Operating margin, ROA, ROE, and YTD ratio)
Size = Natural Logarithm of Total Assets
Debt = Long-Term Debt to Equity.

### Data analysis

This study adopted both descriptive and inferential statistics. It begins with mean, standard deviation, maximum, minimum, correlation is also performed. Then, the regression analysis of a single dependent variable with more than 2 independent variables, which represents the law that the quantity of a phenomenon or thing changes proportionally to the quantity of numerous phenomena.

## Results and discussion

### Descriptive statistics

This research provides descriptive statistics of intangible assets and firm performance from 2017 to 2021 in construction sector of listed companies. This section reports descriptive statistics of 1017 complete data sets as followed:

**Table 1** Descriptive statistics of intangible assets, performance, and control variables.

| | Mean | Standard deviation | Maximum | Minimum |
|---|---|---|---|---|
| Finite Intangibles asset | 45,720,108 | 140,203,942 | 1,644,364,552 | 0.000 |
| Goodwill | 42,564,891 | 170,465,847 | 3,036,636,703 | 0.000 |
| Total Assets | 14,538,905,330 | 37,631,133,206 | 352,668,045,977 | 6,920,480 |
| Long-Term Debt to Equity | 0.243 | 0.185 | 0.870 | 0.00 |
| Operating Margin | 0.161 | 0.406 | 4.491 | -4.696 |
| ROA | 0.035 | 0.148 | 3.589 | -1.324 |
| ROE | 0.127 | 0.276 | 1.475 | -3.094 |
| YTD | -0.110 | 0.417 | 2.068 | -0.952 |

ROA represents the rate of return on total assets; YTD represents the total return of the stock.

It can be seen from **Table 1** that the average value of finite intangible assets in 2021 is 68.863 (million USD). The average value of finite intangible assets in 2017 is 27.515 (million USD), with an increase of 2.5 times. The standard error of finite intangible assets in 2021 is 210.966 (million USD), which is the largest in the past five years. The largest finite intangible asset in 2021 is 1,644.364 (million USD). The average finite intangible assets in 2017-2021 were 45,720 (million USD), reflecting the changes in finite intangible assets in the past five years.

In terms of goodwill, the average amount of goodwill in 2021 was 67.367 (million USD), and the average value of goodwill in 2017 was 29.134 (million USD), an increase of 2.31 times. The standard error of intangible assets in 2021 is 260.314 (million USD), the largest in the past five years. The maximum goodwill in 2021 is 3,036.636 (million USD). The average goodwill in 2017-2021 was 42.564 (million USD), reflecting the change of goodwill in five years. Additionally, total assets are 14,538.905 (million USD) and the standard is 37,631.133 (million USD). The maximum total assets are 352,668.046 (million USD).

**Correlation analysis**

In **Table 2** reveals no serious correlation among independent variables and control variables consist of L.Intangible asset, L.Goodwill, L.Asset, and Long-Term debt to Equity.

**Table 2** Correlation matrix.

| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
|---|---|---|---|---|---|---|---|---|
| (1) L. Intangibles | 1 | | | | | | | |
| (2) L. Goodwill | 0.300 | 1 | | | | | | |
| (3) L. Asset | 0.392 | 0.193 | 1 | | | | | |
| (4) Long-Term debt to Equity | 0.119 | 0.027 | 0.641 | 1 | | | | |
| (5) Operating margin | 0.016 | −0.056 | 0.088 | 0.023 | 1 | | | |
| (6) ROA | −0.041 | 0.027 | −0.124 | −0.128 | 0.179 | 1 | | |
| (7) ROE | −0.084 | 0.012 | −0.122 | −0.011 | 0.368 | 0.327 | 1 | |
| (8) YTD | −0.009 | −0.018 | −0.003 | −0.014 | −0.064 | −0.050 | −0.197 | 1 |

**Regression analysis**

A series of regression analysis on intangible assets (L.intangibles and L.goodwill) are perform against firm performance (Operating margin, ROA, ROE, and YTD).

**Table 3** The correlation between intangible assets and operating margin.

| | **Coefficients** | **Standard Error** | **t Stat** | ***p*-value** |
|---|---|---|---|---|
| Intercept | −0.422 | 0.168 | -2.507 | 0.012** |
| L.Intangibles | −0.002 | 0.005 | -0.347 | 0.728 |
| L.Goodwill | −0.004 | 0.002 | -2.419 | 0.016** |
| L.Asset | 0.031 | 0.009 | 3.429 | 0.001*** |
| Long-Term debt to Equity | −0.159 | 0.091 | -1.746 | 0.081* |
| $R^2$ = 0.016, Adjusted $R^2$ = 0.012, F = 4.135, Significance F = 0.003 | | | | |

***, **, * denote 1 %, 5 %, 10 % significant level, respectively

**Table 3** indicates that Adjusted R Square is 0.016 which means this equation can explain 1.6 % of the variable's changes. The F significance is 0.003 < 0.05 which means this equation is statically significant. L.Goodwill has t-stat lower than −1.65 L.Asset has t-stat value greater than 1.96, which means both variables has significant impact on operating margin.

**Table 4** The correlation between intangible assets and ROA.

| | **Coefficients** | **Standard Error** | **t Stat** | ***p*-value** |
|---|---|---|---|---|
| Intercept | 0.180 | 0.061 | 2.946 | 0.003*** |
| L.Intangibles | −0.001 | 0.002 | −0.465 | 0.642 |
| L.Goodwill | 0.001 | 0.001 | 1.491 | 0.136 |
| L.Asset | −0.006 | 0.003 | −1.737 | 0.083* |
| Long-Term debt to Equity | −0.061 | 0.033 | −1.861 | 0.063* |
| $R^2$ = 0.022, Adjusted $R^2$ = 0.018, F = 5.567, Significance F = 0.000 | | | | |

***, * denote 1 %, 10 % significant level, respectively

From the table above, Adjusted R Square is 0.022 which means this equation can explain 2.2 % of the variable's changes. The F significance is 0.000 < 0.05 which means this equation is significant. We can see t-stat of intangible variables are all less than 1.96, which means the 2 variables are not significant. The finding indicates that size and debt are influence factors on ROA at the significance level of 0.10.

**Table 5** The correlation between intangible assets and ROE.

| | **Coefficients** | **Standard Error** | **t Stat** | ***p*-value** |
|---|---|---|---|---|
| Intercept | 0.693 | 0.114 | 6.098 | 0.000*** |
| L.Intangibles | −0.004 | 0.003 | −1.149 | 0.251 |
| L.Goodwill | 0.002 | 0.001 | 1.760 | 0.079* |
| L.Asset | −0.026 | 0.006 | −4.254 | 0.000*** |
| Long-Term Debt to Equity | 0.169 | 0.061 | 2.762 | 0.006*** |
| $R^2$ = 0.026, Adjusted $R^2$ = 0.022, F = 6.761, Significance F = 0.000 | | | | |

***, * denote 1 %, 10 % significant level, respectively

From the table above, Adjusted R Square is 0.026 which means this equation can explain 2.6 % of the variable's changes. The F significance is 0.000 < 0.05 which means this equation is significant. The t Stat of L.goodwill is greater than 1.65, which means goodwill has significant impact on ROE at the significance level of 0.10. Additionally, the finding indicates that size and debt are influence factors on ROE at the significance level of 0.05.

**Table 6** The correlation between intangible assets and YTD.

| | **Coefficients** | **Standard Error** | **t Stat** | ***p*-value** |
|---|---|---|---|---|
| Intercept | −0.162 | 0.174 | −0.929 | 0.353 |
| L.Intangibles | −0.001 | 0.005 | −0.235 | 0.814 |
| L.Goodwill | −0.001 | 0.002 | −0.551 | 0.582 |
| L.Asset | 0.004 | 0.009 | 0.446 | 0.656 |
| Long-Term Debt to Equity | −0.057 | 0.094 | −0.602 | 0.548 |
| $R^2$ = 0.001, Adjusted $R^2$ = −0.003, F = 0.174, Significance F = 0.952 | | | | |

From the table above, Adjusted R Square is 0.001 which means this equation can explain 1.0 % of the variable's changes. The F significance is 0.952 > 0.05 which means this equation is not significant. T-stat of 4 variables are all smaller than 1.96, which means the 4 variables are not significant. The finding indicates that size, debt, intangibles, and goodwill are not influence on stock return at the significance level of 0.05.

## Conclusions and recommendations

### Discussion of empirical conclusions

Negatively impact of intangible assets on firm performance in listed companies in China's construction industry. Because for the investor, investment in intangible assets can reduce cash expenditure and obtain greater investment income with less cash investment. For construction enterprises that accept intangible asset investment, they can obtain intangible assets such as technology and land use rights, greatly improve production technology, speed up construction progress, and receive more projects to enhance profitability.

### Research recommendations

Intangible assets are not always used effectively in Chinese businesses. One reason is that it is impacted by the unique intangible asset accounting standards requirements, but a more significant factor is that some businesses exclusively focus on investing in tangible assets rather than intangible assets. Therefore, in the future, businesses should enhance their management of intangible assets, as well as their research and development and use of intangible assets, to the strategic level of business growth. In order to achieve sustained enterprise growth, businesses need constantly upgrade their technological content and level by hiring high-level technicians who can work independently and learn from more advanced businesses. Second, give consideration to the creation and use of various intangible asset categories. The intangible assets that are not recognized by accounting standards and not declared in financial reports, such as company culture and brand recognition, should also be taken into consideration in addition to those that are disclosed in the current financial accounts.

## References

Andonova, V., & Ruíz-Pava, G. (2016). The role of industry factors and intangible assets in company performance in Colombia. *Journal of Business Research, 69*(10), 4377-4384.

Austin, L. (2007). Accounting for intangible assets. *University of Auckland Business Review Autumn, 9*(1), 63-72.

Bilal, K., & Rouabhi, A. (2016) The impact of intangibles on the value relevance of accounting information: Evidence from French companies. *Intangible Capital, 12*(2), 506-529.

Chaichen, C., & Chuvej, C. (2008). *Intangible asset management framework, 9*, 15-18.

Cisneros, M. A. I., & Hernandez-Perlines, F. (2018). Intellectual capital and organization performance in the manufacturing sector of Mexico. *Management Decision, 56*(8), 1818-1834.

Cucculetti, M., & Bettinelli, C. (2015). Business models, intangibles and firm performance: evidence on corporate entrepreneurship from Italian manufacturing SMEs. *Small Business Economics, 45*(2), 329-350.

Deschryvere, M. (2014). R&D, firm growth and the role of innovation persistence: An analysis of Finnish SMEs and large firms. *Small Business Economics, 43*, 767-785.

Fasan, M., & Marcon, C. (2018). Accounting choice under IFRS: The role of accounting tradition and managerial opportunism. *International Journal of Academic Research in Accounting Finance and Management Sciences, 8*(3), 209-223.

Healy, P. M., Myers, S. C., Howe, C. D. (2002). R&D accounting and the tradeoff between relevance and objectivity. *Journal of Accounting Research, 40*(3), 677-710.

Iain, C. (2010). National accounting for intangible assets in the knowledge economy. *Journal of Financial Regulation and Compliance, 18*(2), 106-119.

Ittner, C. D. (2008). Does measuring intangibles for management purposes improve performance? A review of the evidence. *Accounting and Business Research, 38*(3), 261-272.

Liu, Z., & Wei, F. (2011). *An empirical study on the correlation between intangible assets and corporate profitability of listed biopharmaceutical companies in China urban economy*. Beijing, China: China's Urban Economy.

Shan, Z. (2013). *Application of EVA model in intangible asset evaluation*. Harbin, China: Modern Economic Information.

Skinner, D. J. (2008). Accounting for intangibles: A critical review of policy recommendations. *Accounting and Business Research, 38*(3), 191-204.

Song, Y. (2013). *Research on financial evaluation index of enterprise value based on EVA*. Changsha, China: Changsha University of Technology.

Sun, Q., & Xiaolan, M. Z. (2019). Financing intangible capital. *Journal of Financial Economics, 133*(3), 564-588.

Tian, K., Ni, H., & Li, L. (2016). *Calculation of China's intangible assets and analysis of its function*. Beijing, China: China's Industrial Economy.

Uzma, S. H. (2012). Challenges of reporting intangible assets in financial statements. *Journal of Accounting Research & Audit Practices, 10*(4), 28-38.

Wang, Y., & Su, T. (2009) An empirical study on R&D information disclosure of listed companies in China. *Journal of Zhongnan University of Economics and Law, 4*, 108-113.

Xiang, X., & Hu, L. T. (2016). *On off-balance sheet intangible assets: From the perspective of the integration of finance and strategy - Also on intangible resources, intangible assets and intangible capital.* Chengdu, China: Southwest University of Finance and Economics.

Xu, J., & Wang, B. (2018). Intellectual capital, financial performance and companies' sustainable growth: Evidence from the Korean manufacturing industry. *Sustainability, 10*(12), 4651.

Zhang, T., Wang, H., & Li, T. (2013). Top 100 intangible assets index of listed companies in China. *Management Theory Altar, 31*, 5.

Zhao, M., & Zhu, L. (2010) Research on the relationship between the intangible assets of listed companies, company value and business performance-based on the data of listed companies in Shanghai stock exchange. *Finance and Economics, 6*, 1.

Zhu, X. (2011). Analysis of inapplicability of Tobin's Q theory in China. *Economic and legal Management, 4*, 2.