# The Impact of Intangible Assets on Firm Growth and Firm Value

**Pattaraporn Pongsaporamat**
Naresuan University, Thailand
E-mail: pattarapornp@nu.ac.th

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## Abstracts

This study investigates the relationship between intangible assets, firm growth, and firm value of non-financial listed firms in the Stock Exchange of Thailand. Prior research in this area mainly used the intangible assets in various forms, this study divided the intangibles assets into intangible assets obtained from business acquisition or goodwill and other intangible assets. Firm value is proxy by Tobin q, an economic measure that reflects the market value of the whole business. Firm growth is calculated from the sustainable growth model which specify from a financial statement perspective. The results are consistent with the hypothesis that the intangible assets and goodwill are positively associated with firm value. However, both intangible assets and goodwill are not significantly related with firm growth. This result implies that firms with large amount of physical capital accelerates the sustainable growth rate than firms with intangible investment. Finally, the study also finds significant relation between firm characteristics and the firm value.

**Keywords**: Intangible assets; Firm growth' Firm value

## Introduction

Financial statement user, both inside and outside company, frequently focus on the firms' performance rather than other information (Breton & Taffler, 1995). Therefore, accurate and reliable financial information by companies is one of the most important sources for investors and analysts in evaluating a company. However, there are many criticized for the indeed ability or inability of financial reports to reflect the actual value of firm. Previous research often identified the intangible asset as one of the most issue that cause the widening gap between market value of firms and book value reported in financial statement (Canibano et.al., 2000; Skinner, 2008; Lev et.al., 2009; Penman, 2009).

With respect to the recognition, the International Accounting Standard (IAS) 38 indicated that an intangible asset appears in a firms' financial statements if it is identifiable, controlled by the firm and has future economics that can be measured reliability. As a result of this policy, few intangible assets have been reported within corporate assets. In addition, Zeghal and Maaloul (2011) stated that the difference of market and book value occurred when firms may have items that meet the criteria of an intangibles, but such items will not be contained in the financial statements for reliability reasons of their measurement. Consequently, the financial statements are become less informative as they provide reliable but not relevance information (Skinner, 2008).

Meanwhile, the intangible assets investment of the company remains expanded rapidly in various country such as United states, Japan, and Europe due to the intensified global competition, the use of information and communication technology, the emerging of new

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business models, and the prevalence of service-oriented businesses. The Organization for Economic Cooperation and Development (OECD) cited that the increasing of intangible assets in such businesses have significant impact on firms' performance (OECD, 2011). Moreover, intangible assets are the most critical resources for sustainable competitive advantage. It enhances a firm's financial and market performance (Lin & Huang, 2011; Roulstone, 2011; Makrominas, 2017). Due to the important role of intangible assets, several accounting standard setters such as the International Accounting Standards Board (IASB) and Financial Accounting Standards Board (FASB) have changed the accounting treatment of the intangible assets, especially the goodwill's impairment approach, in order to provide more qualitative information to financial statements users.

Prior literatures demonstrate that intangible assets are the key components in driving the economic (Gu & Lev, 2003). Mehta and Madhani (2008) found that investment in intangible assets also enhance firms' performance. Megna and Klock (1993) and Peters and Tylor (2017) report that intangible assets affect the firm value. Moreover, Dettori (2012) noted that intangible assets develop firm level and country level productivity. Furthermore, intangible assets influence stock price (Ely & Waymire, 1999; Ritter & Wells, 2006), and economic growth. According to intangible assets literature, this research is interested in studying the relationship between intangible assets and business growth and business value of companies listed on the Stock Exchange of Thailand.

## Hypotheses Development

Resource-Based Theory (RBT) was proposed by Penrose (2009) who suggested a model on the effective management of firms' resources, diversification strategy, and productive opportunities. The Resource-Based Theory (RBT) indicate that firm's resources are the main drive behind competitiveness and performance. These resources include both tangible physical assets and intangible assets that have been internalized by the firm and used effectively and efficiently to implement specific competitive and profitable strategies.

Helfat and Peteraf (2003) demonstrated that there are two underlying assumptions of the RBT related to the explanation of how firm-based resources generate sustained competitive advantage and why some organizations may continually outperform others by gaining higher competitiveness. First, the bundles of resources owned by firms are different from each other. Since firm possesses unique resources in a specific situation, it can possibly be more skilled to perform particularly activities and create competitive advantage. Second, the complexities of trading resources across firms may create persistence in differences in resources.

Resources in RBT refer to assets, business processes, capabilities, the firm's attributes, knowledge, information, etc. controlled by a company to implement strategies in order to enhance efficiency and effectiveness (Barney, 1991). Prior literatures suggested that the source of firm resources can come from both within the organization (Internal resources) and outside the organization (External resources) (Kozlenkova et.al., 2014; Lewis et al., 2010; and Li & Calantone, 1998).

Moreover, Barney (1991) divided firm's resources into three categories, namely physical capital resources, human capital resources and organizational capital resources. Physical capital resources refer to firm equipment, plant, geographical location including the physical technology utilized by a firm. Human capital resources comprise of experience, intelligence, training, judgment, relationships, and insights from employees. Finally,

organizational capital resources refer to a firm's structure, the firm's formal, and informal system such as planning, managing, and coordinating systems. Organizational resources also relate to informal relations amongst divisions within a firm and the relationships between a firm and its business environments.

According to the categorization of firm's resource, Barney (1991) organized the three types of resources in RBT into tangible and intangible assets. Tangible resources refer to all the assets, which include economic gains and visible business contributions, such as products and goods. (Lyons & Brennan, 2019) while intangible resources comprise all the assets possessed by a firm including the access to capabilities and knowledge, organizational, strategic, and social benefits (Keranen & Jalkala, 2013). However, Lev et.al. (2009) remark that while all firms own and use these three resources, there is notable difference in their ability to convert them into financial success.

While the role of tangible assets is well established in the literature and in practice, RBT emphasis the role of intangible assets as strategic resources that needs and deserves investigation (Mahoney & Pandian, 1992; Grant, 1991). Chen et.al. (2005) also suggests that a firm's resources, which are internally developed, is a significant determinant of its ability to achieve and sustain the competitive advantage. Consistent with RBT, Villalonga (2004) indicated that firm with high intangible resource intensity, have more persistence earnings streams resulting in firm value enhancement and diversity in firms' financial and market growth.

Prior research frequently demonstrates the relationship between the intangible assets and firm performance. For example, Canibano et.al. (2000) found that investment in intangible assets of the firm, especially R&D, resulting in higher performance. Similarly, Sougiannis (1994) reported that increase in R&D investments led to an increase in profit over seven years. Moreover, Lu and Beamish (2004) indicated that Japanese firms with higher investment in intangible assets reached more profitability. Mehta and Madhani (2008) revealed that an increase in firm's performance depends on various forms of intangible assets such as customer and supplier relationship, the performance of employees, and brand quality. In addition, intangible assets are a key performance indicator of a firm's profitability and future performance sustainability. Furthermore, Russel (2014) found that intangible assets, especially exploration, evaluation, and goodwill, are associated with the performance of Australian firms.

Besides the performance view, intangible assets also related with firm value. Prior literature commonly measured firm value by Tobin q or Q ratio and use proxy for intangible assets in various forms. For example, Megna and Klock (1993) used patent and R&D to proxy for intangible capital of the firms. They found that intangible capital is an important determinant of firm value. Moreover, Gleason and Klock (2003) focused on intangible capital in pharmaceutical and chemical industry. They revealed that intangible capital is a statistically significant determinant of Tobin q. Similarly, Tseng and James (2005) construct intellectual capital from four type of intangible capital including human capital, relational capital, innovation capital, and organizational capital, and found the positive relationship between intellectual capital and firm value proxy by Tobin q. Furthermore, Gamayuni (2015) study on the effect of intangible assets and firm value of public companies in Indonesia. The results indicated the positive and significant effect between intangible assets and firm value.

Another stream of research reveals the relationship between intangible investment and firm sustainable growth. Chen et.al (2005) highlight that intangible assets, particularly intellectual capital shows a high prospect of being an indicator of future financial performance

as it is an important in enhancing the firm growth. In addition, Mukherjee and Sen (2019) reported that intellectual capital is an influencing factor for corporate sustainable growth much as other factors, including physical capital, relational capital, innovation capital, and process capital. Demir and Tolga (2014) used R&D expenditure to proxy intangible assets and found that R&D investment positively affect firm growth.

As mentioned above, the prediction about the relationship between the intangible assets, firm value, and the firm growth stated in alternative form is as follow:

H1: the intangible assets are associated with firm value.
H2: The intangible assets are associated with firm growth.
H3: the goodwill is associated with firm value.
H4: The goodwill is associated with firm growth.

## Sample and Data Collection

The sample of this study consists of non-financial listed Thai firms in Stock Exchange of Thailand (SET index). From the samples, incomplete or missing data firms and rehabilitation firms were removed. The data are obtained from the annual report submitted annually to the Stock Exchange of Thailand in SET Market Analysis and Reporting Tool (SETSMART) database for the year 2019. Financial firms are excluded due to the difference and more restricted regulations.

## Variables

The dependent variable in this study is firm value and firm growth. Firm value is an economic measure that reflects the market value of the whole business. Prior research is commonly used Tobin q or Q ratio to proxy for the value of firm. The ratio measures the firm's market value in connection with the replacement cost of assets. Since the original Tobin q concept is quite complicated, the simple approximation of Tobin q is generated.

The simplified approaches of Tobin q are widely used in market value literature such as Linderberg and Ross (1981), Chung and Pruitt (1994), and Lewellen and Badrinath (1997). This paper calculated Tobin q based on Chung and Pruitt (1994) because the model is less complicated and the result is reliable compared to the original q (Wardhani and Hamidah, 2019). The Tobin q from Chung and Pruitt (1994) approach is as follow,

$$Tobin\ Q = \frac{MVE + PS + Debt}{BVA}$$

Where; MVE = Market value of equity,

PS = Market value of preferred stock,

Debt = Market value of debt, and

BVA = Book value of assets

Firm growth demonstrates a maximum rate that a firm grows a relying on it owns resources without using any financial tools outside the firm. The study measures firm sustainable growth model formulated by Higgins (1977) and many researchers (for example:

Xu & Wang, 2018; Arora et.al, 2018). The model specifies firm's optimal growth from a financial perspective such as firm's retention policy, cost management ability, assets utilization efficiency, and financial strategy (Lockwood & Prombutr, 2010). The model specification is as follow,

$$Growth = Profit\ margin\ x\ Assets\ turnover\ x\ Retention\ ratio\ x\ Equity\ multiplier$$

Where; Profit margin = Net income / Net sales,
Assets turnover = Sales / Average assets,
Retention ratio = Retained earnings / Net income, and
Equity multiplier = Total assets / Total equity

The independent variable is intangible assets which firm reports in statement of financial position in year 2019. The intangible assets in this study divided into intangible assets obtained from business acquisitions or goodwill and other intangible assets.

The control variables are firm characteristics consist of firm size, and firm leverage. Many empirical studies found the associated between firm value and firm size. In this paper, size measured as the natural log of the firm's total assets as of the end of the firm's fiscal year. The expected sign is positive because larger firms are expected to have higher firm value. Moreover, large firms have more resources to enhance the firm value because it has better access to sources of external information than small firm. The leverage concept is an important consideration for investors in making stock assessment. The higher the leverage will result on the greater the financial risk and lower firm value. (Siahaan, 2013). In this paper, the leverage is measured as the total liabilities to total assets ratios and the expected sign is negative.

## Model Specification

This study uses the multiple regression technique to test whether intangible assets and goodwill are associated with the firm growth and firm value. The firm growth and firm value are regressed on the intangible assets and control variables for testing hypothesis 1 and 2 while the firm growth and firm value are regressed on the goodwill and control variables for testing hypothesis 3 and 4. The following models are used for hypothesis testing.

Model 1: $Q_i = \beta_0 + \beta_1 IA_i + \beta_2 SIZE_i + \beta_3 ROA_i + \beta_4 LEV_i + e_i$

Model 2: $GROW_i = \beta_0 + \beta_1 IA_i + \beta_2 SIZE_i + \beta_3 ROA_i + \beta_4 LEV_i + e_i$

Model 3: $Q_i = \beta_0 + \beta_1 GW_i + \beta_2 SIZE_i + \beta_3 ROA_i + \beta_4 LEV_i + e_i$

Model 4: $GROW_i = \beta_0 + \beta_1 GW_i + \beta_2 SIZE_i + \beta_3 ROA_i + \beta_4 LEV_i + e_i$

Where; $Q_i$= the market value (Tobin Q) of firm I, $GROW_i$= the growth of firm I, $IA_i$= the intangible assets of firm I, $GW_i$ = the goodwill of firm I, $SIZE_i$ = the natural logarithm of firm's total assets., $ROA_i$= the return on total assets of firm I, and $LEV_i$= the total debts to total assets of firm i.

## Results

The purpose of this study is to examine the association between the intangible assets and firm growth and firm value of listed companies. This study uses listed firms in The Stock Exchange of Thailand (SET) in year 2019.

In order to test the hypotheses, 126 firms in financial services and insurance sectors are eliminated because of the difference in accounting rules, financial requirements, and other regulations. Moreover, they are more heavily regulated by Bank of Thailand and Department of Insurance. 11 firms under the rehabilitation process are excluded. Then, another 13 firms are eliminated because their data are not available or incomplete data in the database, the company's annual registration statements or annual report. The final sample is 499 firms which is equivalent to 77% of all sample.

Table 1 reports the correlation matrix for the variables. This study focuses on the Pearson correlations because the Spearman-rank correlations are generally consistent with the Pearson correlations.

**Table 1 Correlation**

| | ***IA*** | ***GW*** | ***Q*** | ***GROW*** | ***SIZE*** | ***ROA*** | ***LEV*** |
|---|---|---|---|---|---|---|---|
| ***IA*** | 1 | 0.661** | 0.131** | 0.035 | 0.235** | -0.001 | 0.001 |
| ***GW*** | | 1 | 0.106* | 0.051 | 0.219** | -0.030 | -0.033* |
| ***Q*** | | | 1 | 0.057 | 0.087 | 0.247** | 0.004 |
| ***GROW*** | | | | 1 | 0.156** | 0.042 | -0.717** |
| ***SIZE*** | | | | | 1 | 0.078 | 0.142** |
| ***ROA*** | | | | | | 1 | -0.020 |
| ***LEV*** | | | | | | | 1 |

Note: ** represent significance at the 0.01 level.
* represent significance at the 0.05 level.

Regarding to the intangible assets (IA), the correlation coefficients indicate that the intangible assets are significantly positively related to goodwill (0.661) and firm's value proxy by the Tobin q (0.131). The relationship between IA and Tobin q is consistent with Choi et.al (2000) and Gamayuni (2015) that intangible assets are extremely important in creating corporate value. Moreover, the intangible assets are significantly positively related to firm's size (SIZE) which indicates that larger firms are likely to recognized more intangible assets. However, the intangible assets is not significantly related to the firm's growth (GROW) which calculated from accounting-based model using information in the firm's financial statements.

In addition, the correlation between goodwill (GW) and firm's value (Tobin q) positive significantly (0.106) consistent with Lin and Huang (2011) that the inclusion of goodwill within the financial statement can be implicit about firm's value for investors. On the other hand, the relationship between GW and firm growth is not significant. Regarding to control variables, GW is positively related to firm's size while negatively related to firm's leverage.

## The association between Intangible assets, Firm value, and Firm Growth

The purpose of this study is to test whether there is the association between the Intangible assets, Firm value, and Firm Growth. Firms' value is proxy by Tobin Q and firm growth is calculated by the sustainable growth formulated by Higgins (1977) and widely used by many researchers (Xu & Wang, 2018; Arora et.al., 2018;). Moreover, this study also investigates the association between the intangible assets and firm characteristics, including firms' size and firms' leverage.

The regression of the intangible assets on firm value are performed and shown in Table 2. The adjusted R2 is equal 0.015 The model shows that firm value proxy by Tobin q is positively significantly related to the intangible assets (IA). This result supports hypothesis 1 that the intangible assets is positively associated with firm value. The finding is consistent with prior research (Ritter & Wells, 2006; Gamayuni, 2015; Rahko, 2014) that intangible assets or some types of specific intangible assets affect firm performance, firm value, firm productivity, stock price and economic growth. Regarding to control variables, firm's size and firm's performance have significantly positive relationship with firm value.

**Table 2 Firm value, Firm growth, and Intangible assets**

| | **Firm value *(Q)*** | | **Firm growth *(GROW)*** | |
|---|---|---|---|---|
| | ***B*** | ***Sig.*** | ***B*** | ***Sig.*** |
| *Intercept* | 0.312 | 0.770 | 0.4791 | 0.000** |
| *IA* | 1.958 | 0.006** | 0.376 | 0.365 |
| *SIZE* | 0.041 | 0.394 | 0.246 | 0.000** |
| *ROA* | 4.176 | 0.000** | 0.430 | 0.853 |
| *LEV* | 0.003 | 0.993 | 0.458 | 0.000** |
| N=499 | | | | |

**Note:** **, and *represent significance at the 1%, and 5%, respectively.

Table 2 also demonstrates the relationship between the intangible assets and firm growth. The finding shows that the intangible assets (IA) is not significantly related with firm growth. This result implies that firms with large amount of physical capital accelerates the sustainable growth rate than firms with intangible investment (Yu & Zhang, 2018). However, there are another stream of prior research indicated the significant impact of intangible assets to firm's sustainable growth (Demir & Tolga, 2014; Mukherjee & Sen, 2019; Xu & Wang, 2018; Xu & Wang, 2019). Although, the result is inconsistent with hypothesis 2. Moreover, it finds that firm size and firm leverage are significantly related to firm growth.

## The association between Goodwill, Firm value, and Firm Growth

This section provides the result of examining the association between goodwill, the sub-component of intangible assets, firm value, and firm's growth. Table 3 outlines the result of testing the effect of goodwill on firm value and firm growth.

**Table 3 Firm value, Firm growth, and Goodwill**

| | **Firm value *(Q)*** | | **Firm growth *(GROW)*** | |
|---|---|---|---|---|
| | ***B*** | ***Sig.*** | ***B*** | ***Sig.*** |
| *Intercept* | 0.228 | 0.831 | 4.817 | 0.000 |
| *GW* | 3.317 | 0.019* | 0.908 | 0.269 |
| *SIZE* | 0.046 | 0.335 | 0.247 | 0.000** |
| *ROA* | 4.222 | 0.000** | 0.063 | 0.883 |
| *LEV* | 0.005 | 0.880 | 0.459 | 0.000** |
| N=499 | | | | |

**Note:** **, and *represent significance at the 1%, and 5%, respectively.

The result indicates that goodwill has a statistically positive association with firm value proxy by Tobin q. Thus, the results support hypothesis 3 and is consistent with Gamayuni (2015) that the higher the intangible assets the higher the firm value. Moreover, Sudana (2005) suggests that while the intangible assets are not always recognized in the financial statements, the intangible assets together with the tangible assets is one unit that determines the value of the firm. With respect to control variables, ROA is positively associated with firm value.

In addition, Table 3 illustrates that there is no statistically significant association found between goodwill and firm growth proxy by the sustainable growth that derive from the model based on accounting measure in financial statement while firm size and firm leverage is positively significant related. Thus, the hypothesis 4 is reject.

## Conclusions

This study explores the association between the intangible assets and firm growth and firm value of listed firms in SET index. The intangible assets in this study divided into intangible assets obtained from business acquisitions or goodwill and other intangible assets. Firm value is proxy by Tobin q, an economic measure that reflects the market value of the whole business. The firm growth in this study employed the sustainable growth model formulated by Higgins (1977) and many researchers. The data are obtained from the annual report submitted annually to the Stock Exchange of Thailand in SET Market Analysis and Reporting Tool (SETSMART) database for the year 2019.

The empirical results supports hypothesis 1 that the intangible assets is positively associated with firm value. The finding is consistent with prior research (Chin et.al, 2006; Ritter & Wells, 2006; Gamayuni, 2015; Rahko, 2014) that intangible assets or some types of specific intangible assets affect firm performance, firm value, firm productivity, stock price and economic growth. On the other hand, the intangible assets (IA) is not significantly related with firm growth. The result is inconsistent with hypothesis 2 and prior research which indicated the significant impact of intangible assets to firm's sustainable growth. The results implies that

firms with large amount of physical capital accelerates the sustainable growth rate than firms with intangible investment (Yu & Zhang, 2018).

The results also reveal the association between goodwill, the sub-component of intangible assets, firm value, and firm's growth of listed firms in SET index. The result support hypothesis 3 which indicates that goodwill has a statistically positive association with firm value proxy by Tobin q. However, hypothesis 4 is reject because there is no statistically significant association found between goodwill and firm growth proxy by the sustainable growth that derive from the model based on accounting measure in financial statement.

The result of this study contributes to various parties such as academics, investors, financial practitioners, standard setters, and regulators. Moreover, the findings are fulfill to the literature in the following ways. First, this study provides an information of the intangible assets of Thai Listed Firms in the Stock Exchange of Thailand. Second, this study provides a better understanding of the relationship between intangible assets, firm growth, and firm value. Finally, this study provides a better understanding of the relationship between firm characteristics and firm growth, and firm value of Thai Listed Firms.

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