



## INTANGIBLE ASSETS INVESTMENT AND FIRMS' PERFORMANCE: EVIDENCE FROM SMALL AND MEDIUM-SIZED ENTERPRISES IN KOREA

Hyeon Sik SEO , YoungJun KIM \*

*Korea University Graduate School of Management of Technology, Seoul, Korea*

Received 24 March 2018; accepted 04 December 2019

**Abstract.** While many studies have examined the relationship between investment in intangibles assets and performance in large corporations, current research is lacking in regard to intangible investments in small and medium enterprises (SMEs). This study looks at SMEs in which intangible investments would usually be minor because they tend to consider intangible investment as an inefficient cost and concentrate on investments in tangible assets. This paper aims to contribute to the current literature and suggests that investment in the intangible assets of (human capital, advertising, R&D) is essential for SMEs pursuing superior firm performance. Actual data collected from 173 SMEs in Korea were analyzed employing hierarchical regression methodology. Results indicate that all three intangible resources have a positive effect on a firm's profitability and value. Interestingly, this research finds that investment in advertising has the most influential impact on a firm's profitability and value. This study has implications for SMEs in achieving their profitability and value. The results in this study highlight that intangible investment is not a waste of money for SMEs, and that business managers could strategically utilize these three key contributors (human capital, advertising, R&D) and adopt investment in intangible assets to accomplish their managerial goals.

**Keywords:** intangible assets, human capital, advertising, research and development, firm performance, small and medium-sized enterprises.

**JEL Classification:** M20.

### Introduction

In the rapidly changing and competitive modern business environments, firms strive to acquire strategic assets that can be the foundation for generating and preserving the competitive advantage of companies. A firm's strategic assets can come in many forms. One of the fundamental strategic assets is also arguably intangible because intangible assets can provide a firm with vital and valuable competitive advantages.

---

\*Corresponding author. E-mail: [youngkim@korea.ac.kr](mailto:youngkim@korea.ac.kr)

Given that intangible assets are often unusual and socially multipliable, they are more likely to generate a competitive advantage (Hitt et al., 2001). Kramer et al. (2011) and Van Ark et al. (2009) suggest that intangible assets are progressively regarded as crucial drivers for innovation and knowledge creation. As Saunila and Ukko (2014) have found, in almost all industries, the profitable operation and management of firms are becoming dependent on the ability to generate innovation, which intangible assets can create.

Intangible investment is considered a crucial resource that enables a firm to sustain its competitive advantage. In fact, intangible asset investment is increasing globally. In some cases, this investment equals or surpasses investment in traditional tangible assets such as buildings, equipment and machinery (OECD, 2011). A firm's intangible investments are forms of their capital expenditures on marketing, innovation, employee training and job skills (Webster, 2000). Intangible investment includes expenditure for human capital, in the form of training and education, expenditure for research and development, and expenditure for market development (Mansfield, 1984; Lynch & Black, 1998; Bontis & Fitz-Enz, 2002; Bresnahan et al., 2002; Van Ark et al., 2009). Corrado et al. (2005) explained that intangible investments are classified into three broad groups: computerized information (computer databases and programmes), innovation property (scientific and non-scientific R&D), and economic competencies (knowledge embedded in a firm's specific human capital and branding).

Prior studies have examined the link between intangible investment and a firm's performance. Bassi et al. (2002) suggested that a firm's profitability is associated with human resource management in which employee training is a key element of a firm's economic value. In Ho et al. (2005), investment in R&D positively affects firm value. Cozzarin and Percival (2006) experimented with a firm's key performance factors (i.e. promoting firm or product's reputation, R&D and training employees) as organizational strategies for innovation. Intangible assets investment makes the firm's success more believable in the market, which is important for branding and reputation (Aaker, 2007; Yin Wong & Merrilees, 2008; Montesor & Vezzani, 2016). Chen and Waters (2017) demonstrated that advertising positively affects profits. According to Wang et al. (2017), R&D investment is positively related to financial performance. Joshi and Hanssens (2010) showed a positive relationship between advertising expenditure and firm value, and firm value is shown to be affected by organizational capital such as human capital in Miles and Van Clieaf's (2017) study. Productivity is positively associated with intangible assets in Añón Higón's et al. (2017) research.

Although prior studies prove that intangible investment has a direct effect on firm performance, small and medium-sized enterprises (SMEs) usually lack intangible investment due to their financial constraints. On top of this, many SMEs do not utilize financial sources through loan covenant from financial institutions (Motta, 2020). Thus, they tend to consider intangible investment as inefficient, and concentrate on investments in tangible assets. But their performance outcomes may depend more on effective intangible investments, rather than tangible. This paper explores the impact of the SMEs' intangible assets investments on the performance of a firm, employing the actual data from SMEs in Korea. It opens new prospects for research on SMEs in the field of intangible investment that has mainly been conducted by large corporations. In addition, this paper advances a previous study which investigates human capital, advertising and R&D by examining these three key contributors in an integrated model. Moreover, unlike the former research, this study investigates the re-

relationship between intangible investment and both “profitability” and “value” as performance measures to see whether and how intangibles investment affect two types of performance measures differently. The results empirically demonstrate that intangible asset investment plays a pivotal role in improving a firm’s profitability and value. Hence, this study contributes to an extension of existing literature in intangible asset investment by highlighting the role of three key factors of profitability and value of enterprises, rather than just productivity. Moreover, it emphasizes that small and medium-sized enterprises should concentrate more on sustaining intangible investment. Finally, while the previous study used subjective measures based on the perception of each SME’s senior managers, this study differentiates and improves limitation of prior research by utilizing objective measures. The findings in this study will shed some lights on SMEs business managers and policy makers in other countries. This paper is structured as follows: the second section presents an overview of the theory related to intangible assets as a firm’s success factors in order to interpret variables and hypotheses. The third section discusses methodology and explains the data used in the analysis, the fourth section is a discussion of the results, and the fifth section is robustness checks. Finally, the sixth section draws conclusions and direction for future research.

## **1. Theoretical background**

Based on a firm’s resources (Barney, 1991), a competitive advantage depends on the retention of superb and precious assets (Andonova & Ruíz-Pava, 2016). Intangible assets contribute to the construction of this competitive edge (Hoskisson et al., 2000). Intangibles assets are conceptualized as a crucial resource for development and competitiveness all over the world (Montresor & Vezzani, 2016). Intangible resources play a critical role in producing and selling new and advanced items (Arrighetti et al., 2014). According to Arrighetti et al. (2014), intangible resources are made up of autonomously created assets such as brand equity and designs, and externally created assets such as technologies and economic competencies. Business investment is developed by dealing with corporate expenditure on intangible investments such as firm-specific training, and organizational efficiency, brand equity, design and R&D (Corrado et al., 2005, 2016). Economic competencies can be regarded as investments that are critical to merchandizing innovation. They include activities such as employee training and branding. Investment in innovative property can be considered an expenditure for R&D activities (Goodridge et al., 2017). Arrighetti et al. (2014) suggest that intangible resources help enterprises with profitability as well as market valuation. Gamayuni (2015) argue that intangible assets create the ability to generate profit, and have a significant impact on enterprise value. Recent literature defines an enterprise’s human capital, advertising and R&D as strategic intangible resources (Añón Higón et al., 2017). Hence, this research should benefit from concentrating on the relative impact of human capital, advertising and R&D.

### **1.1. Investment in human capital and performance**

Human capital is regarded as a rare and valuable resource that enables the firm to maintain its competitive edge (Chowdhury et al., 2014). An enterprise’s human capital is composed of expertise and insight built by an employee through education and training. It plays a key

role in an enterprise's learning capability (Leonard-Barton, 1992; Coff, 2002; Yam et al., 2004; Chen & Huang, 2009). Human capital resources containing education, training and experience are regarded as critical for creating a firm's competitiveness and value (Barney, 1991; Saridakis et al., 2017). Del Valle and Castillo (2009) suggested training as an investment in human capital, which helps enterprises acquire a competitive advantage that results in higher profitability. A firms'- human capital can be defined as a profitability factor (Blundell et al., 1999) and helps to absorb new knowledge, technology and skills (Unger et al., 2011; Reuber & Fisher, 1999). Hatch and Dyer (2004) suggested that investment in training accelerates a movement of tacit knowledge. According to human capital theory (Becker, 1964), human capital investment in training and education, which can accumulate employees' knowledge and skills, could have positive economic value. Hence, investment in training is an effective method for improving employees' knowledge and proficiency in order to enable enterprises to become profitable and valuable. Enterprises focus on strategic human capital investments such as training and participation which let employees take part in innovation activities (Damanpour, 1991; Laursen & Foss, 2003). Many enterprises furnish a variety of training courses for employees to improve their performance (Brockbank, 1999; Mumford, 2000; Chen & Huang, 2009). Investment for education and training can improve the expertise and competence of staff (Torraco & Swanson, 1995). In accordance with previous research, by investing in training, enterprises produce a stock of skills, knowledge and competency which results in performance (Barney & Wright, 1998; Ployhart et al., 2009). Gamayuni (2015) suggested that the human capital of an organization is connected to knowledge, technology and skills that create value and enhance its competitive advantage. Human capital in an organization contributes to increasing enterprise value and its capability to maintain value and to generate development and innovation (Miles & Van Clieaf, 2017). Investment in human capital enables employees to be better than their competitors, absorb new missions quickly and solve diverse assignments to achieve the firm's goal. This encourages employees to accumulate knowledge and skills interrelated to the firm's development in order to accomplish outstanding performance. Thus, investment in human capital-based intangible assets is an important resource that is invaluable for a firm's performance.

Based on the above, this study suggests the following hypotheses:

H1. Investment in human capital will be positively associated with a firm's profitability.

H2. Investment in human capital will be positively associated with a firm's value.

## **1.2. Investment in advertising and performance**

Marketing resources are essential factors for driving a firm's business strategy. They enable firms to obtain a competitive advantage and better performance (Davcik & Sharma, 2016). Marketing resources express wide value propositions that influence stakeholders in enterprises that generally dispose of these resources to gain capabilities such as a competitive advantage in the market (Hooley et al., 2005; Hall, 1993). Market-based resources are pivotal factors in a firm's performance, in view of their crucial role in enhancing brand recognition (e.g. brand value) and communicating products and services of companies. Resources are the intangible and tangible assets which firms utilize to fulfill their strategies (Barney & Arkan,

2001) and to achieve a firm's goals (Barney & Hesterly, 2015). For example, Barney (1991) investigates the relationship between sustainable competitive advantages and a firm's resources that are valuable, rare and imperfectly imitable. Kozlenkova et al. (2014) argued that capabilities are subsets of a firm's resources. Capabilities are conceived as multiple packs of skills and accumulated knowledge, exercised through organizational processes that allow enterprises to systematize activities and make effective use of assets (Day, 1994; Wang & Sengupta, 2016). Day (1994) regards marketing capability as an integrative process to apply a firm's resources to market-related wants of the business, enabling the enterprise to supplement value to its products and services and satisfy competitive demands (Weerawardena, 2003). Jeng and Pak (2016) proposed the concept of marketing capability, which demonstrates an enterprise's competence in increasing the value of its product and services, and distinguishing them from those of its rivals. Enterprises use their intangible and tangible resources to grasp complex consumer needs and achieve outstanding brand equity (Day, 1994; Dutta et al., 1999; Song et al., 2005, 2007; Yu et al., 2014). Marketing literature suggests that enterprises utilize the capability to convert resources into productivity based on their marketing mix activities and that marketing capabilities are associated with their business performance (Hunt & Morgan, 1995; Vorhies & Morgan, 2003; Vorhies et al., 2009; Morgan, 2012; Yu et al., 2014). Marketing capabilities help firms create a powerful brand image that allows enterprises to attain excellent performance (Ruiz-Ortega & García-Villaverde, 2008; Yu et al., 2014). McKee et al. (1992) argued that marketing capability is essential to communicate effectively and deliver a customer's value. In this respect, communicating the merits of the firm's new products and services to potential users, reminding present customers of product effectiveness, and reinforcing buying decision-making are essential skills that firms should have so as to retain a marketing communication capabilities (McKee et al., 1992).

A marketing communication capability is based on an underlying marketing activity such as advertising (Aaker, 1996, 2008). Advertising allows firms to communicate the attributes and availability of products (or services) and to build an enterprise's image (Peterson & Jeong, 2010). Advertising can contribute to brand value by producing a brand image, raising brand awareness and activating sympathetic brand attitudes (Ailawadi et al., 2003; Keller, 1998; Srivastava & Shocker, 1991; Peterson & Jeong, 2010). Firms with a trustworthy brand can charge premium prices based on the reliability of the brand, and this improves the enterprise's profitability (Andras & Srinivasan, 2003). Following previous management research, investment in advertising is related to an indicator of marketing capability (Kotabe et al., 2002; McAlister et al., 2007; Fosfuri & Giarratana, 2009; Srinivasan et al., 2009; Jeng & Pak, 2016). Many empirical studies found a significant relationship between investment in advertising and a firm's performance (Chauvin & Hirschey, 1993; Ghosh & Lusch, 2000; Wang et al., 2009; Joshi & Hanssens, 2010; Smith et al., 2011). For instance, Ghosh and Lusch (2000) propose that investment in advertising is significantly and positively related to financial performance. Joshi and Hanssens (2010) also found that investment in advertising has a significant impact on value of a firm. Thus, investment in advertising enables a firm and its products to be very engaging and prominent. This, in turn, achieves superior performance. This allows firms to intrigue customers and provide a reliable image. Drawing on the arguments outlined above, this study proposes the following hypotheses:

H3. Investment in advertising will be positively associated with a firm's profitability.

H4. Investment in advertising will be positively associated with a firm's value.

### **1.3. Investment in R&D and performance**

Innovation is a key determinant for profitability and the economic value of enterprises. It is defined as a firm's ability to discover and generate new resources and supply products and services, which are better than those that are furnished by competitors (Hunt & Morgan, 1995; Jeng & Pak, 2016). It helps firms to secure competitiveness and deal with rapidly changing markets (Helfat & Peteraf, 2003; Hult et al., 2004; Teece, 2007; Zhang & Liu, 2010; Jeng & Pak, 2016).

Lawson and Samson (2001) proposed "innovation capability" as a theoretical framework to enhance outcomes of innovation activities. Innovation capabilities play an important role in promoting internal activities related to planning essential policies and responding to exceptional conditions and an external environment (Guan & Ma, 2003; Akman & Yilmaz, 2008). Sher and Yang (2005) defined innovative capabilities as critical factors that achieve strategic competitiveness and improve a firm's performance in dynamic surroundings (Sher & Yang, 2005). Innovation capability concentrates on R&D investment such as R&D capabilities (Sher & Yang, 2005; Subramaniam & Youndt, 2005; Quintana-García & Benavides-Velasco, 2008; Lee et al., 2008; Bertrand, 2009; Jeng & Pak, 2016). At the center of technological capabilities, R&D capability plays an influential role in the enterprises' competitive edge and sustainable growth (Porter, 1980; Teece, 1982; Franko, 1989; Lukas & Bell, 2000). It is important for enterprises' competitiveness to possess R&D capabilities, that enable them to adjust and compete effectively. Dutta et al. (1999) suggested that the R&D capability is defined as an enterprise's competence in using resources to originate helpful technological knowledge better than its competitors. It allows firms to extend technologies and enhance R&D activities (Tseng, 2010).

The R&D capability is mainly composed of R&D intensity (Kotabe et al., 2002; Krasnikov & Jayachandran, 2008). R&D intensity in an enterprise indicates a strategic significance in innovation for enterprises (Gui-long et al., 2017). The intensity of investment in R&D is becoming progressively significant for sustaining enterprises' competitive advantages. Previous studies focused researchers' attention to relevant performance for R&D expenditures. A relevant performance for R&D investment is generally uncertain. Although a high level of R&D intensity does not guarantee a firm's performance (profitability, firm value), enterprises that invest excessively in R&D are likely to achieve greater performance (Shin et al., 2017). In accordance with Ruiqi et al. (2017), R&D investment can improve enterprises' performance by lowering production costs, which is critical for enterprises' survival. Hay and Morris (1979) suggest that a high level of investment in R&D is commonly a high risk and high return approach that is attractive for all shareholders in expectation of better business performance. Ehie and Olibe (2010) argue that R&D investment can strengthen the competency of enterprises to acquire superior performance in the marketplace. According to Oriani and Sobrero (2008), as reflected in modeling market valuation of investment in R&D, a firm's market value can be defined as market capitalization, plus loan capital, plus short term borrowing. Bose

and Pal (2012) proposed that enterprises with high R&D investment have a positive impact on stock prices. Investment in R&D encourages firms to foster efficient operations in order to achieve higher performance. This provides an improved product to the marketplace that reflects customers' needs and can positively change the recognition of customers by differentiating its products from competitors. Based on the above analysis, this research hypothesizes:

H5. Investment in R&D will be positively associated with a firm's profitability.

H6. Investment in R&D will be positively associated with a firm's value.

In summary, based on previous studies on investment in human capital, advertising, and R&D in regards to firm performance, this study suggests that investments in intangible assets (human capital, advertising, R&D) increase profitability and firm value. In the following section, data and methodology are explained and the forecasted relationship is tested. Then results and implications are discussed, and direction for future research is proposed.

## **2. Method**

### **2.1. Sample**

This paper took into account the challenges of exploring and calculating intangible resources as the most crucial of a firm's resources. Therefore, the authors selected a manufacturing sector where human capital, advertising, and R&D, as critical intangible resources are obvious and measurable. The manufacturing industry is a base of national industrial competitiveness, leading to sustainable economic development in Korea. According to statistics from the United Nations, the manufacturing industry accounted for 29.3 percent of Korea's national GDP in 2016, surpassing the U.S.A.'s of 11.7 percent and Germany's of 26.9 percent. The industry that a firm falls into is identified by its two-digit Korea Standard Industry (KSI) code. According to the KSI's classification, manufacturing firms are those with the two-digit KSI code between 10 and 33.

This research ran regressions for all firms in the manufacturing sector. Data for this study were obtained from KISVALUE (at [kisvalue.com](http://kisvalue.com)) which furnishes information on Korean enterprises – (firm size, firm age, profit margin, enterprise's value, education and training expenses, advertising expenses, R&D expenses, sales, and industry classification). The KIS-VALUE database (Compustat equivalent) from NICE information service company (National Information and Credit Evaluation Inc. (similar to Moody's Corporation)) is the main source of historical financial data in Korea.

This study limited the sample to small and medium-sized manufacturing enterprises (SMEs) defined by the Enforcement Decree of the Framework Act on Small and Medium Enterprises in Korea as a corporation whose total assets are less than 500 billion won. The data from all the 646 manufacturing enterprises listed as SMEs in Korea over a six-year period from 2011 to 2016 is collected. A firm's level and financial data are accessible generally from the firms listed. Objective and transparent financial data (e.g., total assets, capital investment intensity, firm value, profit margin) are only available from listed firms.

Given that research purpose of this study is to investigate the effectiveness of three intangible investments on firm performance, two steps were taken to extract the best sample data.

First, 433 firms which do not invest in all three of the intangible assets studied (human capital, advertising and R&D) were excluded. Second, 40 firms that did not provide the required information (firm value) were eliminated. The final sample consists of 173 firms (see Table 1).

Based on the final sample, the regression equation model is as follows:

$$\text{Profitability, } t + 1 = \beta_0 + \beta_1 \text{ Human capital, } t + \beta_2 \text{ Advertising, } t + \beta_3 \text{ R\&D, } t + \beta_4 \text{ Size, } t + \beta_5 \text{ Age, } t + \epsilon, t ; \quad (1)$$

$$\text{Firm value, } t + 1 = \beta_0 + \beta_1 \text{ Human capital, } t + \beta_2 \text{ Advertising, } t + \beta_3 \text{ R\&D, } t + \beta_4 \text{ Size, } t + \beta_5 \text{ Age, } t + \epsilon, t . \quad (2)$$

Table 1. Industry distribution of small and medium sized enterprises

| Industry type                            | Number of firms |
|--|-----------------|
| Aircraft component                       | 1               |
| Automobile components                    | 4               |
| Basic medicine material                  | 11              |
| Battery products                         | 1               |
| Chemical products                        | 7               |
| Clothing                                 | 4               |
| Computer products                        | 2               |
| Communication and broadcasting equipment | 20              |
| Drug medicine                            | 16              |
| Electrical equipment                     | 11              |
| Electronic component                     | 9               |
| Fiber                                    | 3               |
| Food                                     | 5               |
| Furniture                                | 1               |
| Glass products                           | 2               |
| Household appliance                      | 1               |
| Machinery equipment                      | 29              |
| Medical supplies                         | 12              |
| Metal casting                            | 1               |
| Metal products                           | 8               |
| Optical instruments                      | 1               |
| Other transport equipment                | 1               |
| Plastic products                         | 6               |
| Precision machinery                      | 2               |
| Rubber and plastic products              | 1               |
| Semiconductor                            | 9               |
| Ship and boat                            | 1               |
| Steel products                           | 2               |
| Visual and audio equipment               | 2               |
| Total                                    | 173             |



## 2.2. Measurements

### 2.2.1. Dependent variable

According to Thornhill and White (2007), profit margin (profitability) is a universal measure of firm performance. It can identify value creation and the effective strategies of a firm. Profitability is regarded as a leading measure of financial performance for firms (Bassi et al., 2002). A firm's profitability is recognized as one of the firm's competences for defining its financial performance (Carmona et al., 2012). Profitability is considered a competency that creates profits in order for a firm to survive in its business. Firms should sustain and increase profitability. To measure a company's performance as the dependent variable, profitability is thus used. This study follows the definition of Carmona et al. (2012) and Shin et al. (2017) to define profitability as gross profit divided by total sales.

A firm's value is also considered an important measure of performance (Bharadwaj et al., 1999). Value is a financial measure used to assess the real value of the firm now and its market value for long-term financial sustainability, viability and durability (Miles & Van Clieaf, 2017). Gamayuni (2015) suggested that an enterprise's value is enhanced by dividing profits among all stakeholders and shareholders. Hence, this study used an enterprise's value (market capitalization plus the firm's debt) as a measure of a firm's performance.

### 2.2.2. Independent variable

Human capital is the independent variable in this study. To define it, this research utilized investment in the education and training of employees. Thus, following prior research (Kitching, 1998), human capital intensity that is proxied by the proportion of education and training expenses divided by total sales is used. Marketing activities were carried out by investing in advertising and promotion. Hence, advertising intensity that is the ratio of advertising and promotion expenses divided by total sales (Riley et al., 2017) is employed. R&D intensity is considered a measure of innovation by using R&D expenditures, which are authentic expenses of investigated items in a firm's R&D activities, including direct expenses in R&D activities and the indirect expenses of service and management in R&D activities (Chen et al., 2017). R&D intensity is the ratio of R&D expenses divided by total sales (Booltink & Saka-Helmhout, 2017). All independent variables are lagged by 1 year (dependent variable  $t + 1$ ) to avoid possible endogeneity issues and to draw better implications.

### 2.2.3. Control variable

To control for a significant effect of additional variables except for main variables, this study gathered data on the firms' ages and sizes. A firm's age was measured in accordance with the number of years in operation from an enterprises' inception (Akgün et al., 2007). Based on previous research (Feng et al., 2017; Riley et al., 2017), a firm's size was measured as the natural log of total assets to control economies of scale. Finally, Table 2 defines and summarizes all variables.

Table 2. Definition of variables

| Variables     | Definition  |
|---------------|---|
| Firm size     | Firm's total assets   |
| Firm age      | Number of years since first enterprises were established                                |
| Human capital | Firm's human capital intensity, (Education and training expense divided by total sales) |
| Advertising   | Firm's advertising intensity, (Advertising expense divided by total sales)              |
| R&D           | Firm's R&D intensity, (R&D expense divided by total sales)                              |
| Profitability | Firm's gross profit margin, (Gross profit divided by total sales)                       |
| Firm value    | Enterprise value, (Firm's market capitalization plus its debt)                          |

### 3. Results and discussion

Table 3 shows descriptive statistics and a correlation coefficients matrix for all examined variables used in this empirical analysis. The dependent variables, profitability and firm value have positive correlation with the three independent variables (human capital, advertising and R&D). Among seven study variables thirty bivariate correlations were statistically significant. Because independent variables show significant correlation, they could have a problem of multi-collinearity. This study analyzed probable multicollinearity by inspecting a variance inflation factor score for the variables. The investigation suggests that multi-collinearity was not a problem in this research. That is, the variance inflation factor value was well below 10. After analyzing the essential prerequisites, including the correlation matrix and multi-collinearity, a multi-variable regression analysis is used to investigate the hypothesized relationships.

Table 4 reports the estimated results of the empirical data on the factors affecting a firm's performance. In Table 4, the regression results are divided into two predictors, as there are two variables. The first dependent variable is profitability (gross profit margin). The second is firm value (enterprise value). Model 1 and Model 9 were established to test the effects of the control variables. Model 2 and Model 10 directly investigated the relationship between investment in human capital and a firm's performance. In both models, the results presented that investment in human capital is positively related to a firm's performance. This suggested that firms that invest in their human capital improved their performance.

In Hypothesis 1, the authors proposed that investment in intangible assets, such as human capital, would have a positive effect on a firm's profitability. Model 2 provides strong support for this hypothesis. A firm's investment in human capital has positive and significant coefficients in the analysis of profitability. Notwithstanding potential profits of employee training, business owners or managers are hesitant about investing in human capital (Bai et al., 2016). In contrast with larger firms, SMEs actually have little opportunity to provide training to their employees. Many small firms are not interested in investing training, which is considered as a cost rather than an investment (Marlow et al., 2004). This paper analyzed how firm performance is affected by investment in human capital in order to improve the knowledge and skills of employees through developing knowledgeable, proficient and well-

Table 3. Correlation matrix for all variables

| Variables        | Mean        | Std.dev       | 1       | 2       | 3       | 4        | 5       | 6       | 7        |
|------------------|-------------|---------------|---------|---------|---------|----------|---------|---------|----------|
| 1. Profitability | 0.261849636 | 0.1622798926  | 1       | 0.368** | 0.065   | -0.079*  | 0.284** | 0.379** | 0.183**  |
| 2. Firm value    | 1.20906E+11 | 1.98914E+11   | 0.368** | 1       | 0.311** | -0.031   | 0.132** | 0.154** | 0.118**  |
| 3. Firm size     | 24.96064969 | 0.5225774367  | 0.065   | 0.311** | 1       | 0.132**  | 0.121** | 0.035   | -0.013   |
| 4. Firm age      | 24.30635838 | 13.54663648   | -0.079* | -0.031  | 0.132** | 1        | -0.025  | 0.042   | -0.280** |
| 5. Human capital | 0.000677972 | 0.0012124351  | 0.284** | 0.132** | 0.121** | -0.025   | 1       | 0.299** | 0.207**  |
| 6. Advertising   | 0.006815807 | 0.0136167588  | 0.379** | 0.154** | 0.035   | 0.042    | 0.299** | 1       | 0.192*   |
| 7. R&D           | 0.064287854 | 0.08696668711 | 0.183** | 0.118** | -0.013  | -0.280** | 0.207** | 0.192*  | 1        |

Note: \* Significant at 5% significance level; \*\*Significant at 1% significance level.

trained manpower. The results indicate that higher investment in human capital is likely to attain higher profitability. The obvious message is that business owners or managers pursuing profit should invest in human capital. Similarly, governments should promote and build various education and training programs if they want to support the sustainable development of SMEs in their countries.

Table 4. Regression results on profitability

| Predictor                | Creterion variable = Profitability (t + 1) |                |                   |                |                   |                |                |                |
|--------------------------|--|----------------|-------------------|----------------|-------------------|----------------|----------------|----------------|
|                          | M1<br>Std beta                             | M2<br>Std beta | M3<br>Std<br>beta | M4<br>Std beta | M5<br>Std<br>beta | M6<br>Std beta | M7<br>Std beta | M8<br>Std beta |
| 1. Profit-ability        |  |                |                   |                |                   |                |                |                |
| 2. Firm value            |  |                |                   |                |                   |                |                |                |
| 3. Firm size             | 0.076*                                     | 0.041          | 0.065*            | 0.072*         | 0.044             | 0.041          | 0.063*         | 0.044          |
| 4. Firm age              | -0.089**                                   | -0.078*        | -0.104**          | -0.041         | -0.094**          | -0.045         | -0.077*        | -0.076*        |
| 5. Hu-<br>man<br>capital |  | 0.277**        |                   |                | 0.179**           | 0.254**        |                | 0.168**        |
| 6. Adver-<br>tising      |  |                | 0.381**           |                | 0.328**           |                | 0.362**        | 0.317**        |
| 7. R&D                   |  |                |                   | 0.173**        |                   | 0.118**        | 0.093**        | 0.067*         |
| VIF                      | 1.018                                      | 1.034          | 1.019             | 1.105          | 1.117             | 1.134          | 1.136          | 1.164          |
| R2                       | 0.012                                      | 0.088          | 0.157             | 0.040          | 0.185             | 0.100          | 0.164          | 0.189          |
| F                        | 5.249                                      | 27.609         | 53.403            | 11.810         | 48.953            | 23.918         | 42.330         | 40.113         |

Note: \* Significant at 5% significance level; \*\* Significant at 1% significance level.

Regression results on firm value

| Predictor         | Creterion variable = Firm value (t + 1) |                    |                    |                    |                    |                    |                    |                    |
|-------------------|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
|                   | M9<br>Std<br>beta                       | M10<br>Std<br>beta | M11<br>Std<br>beta | M12<br>Std<br>beta | M13<br>Std<br>beta | M14<br>Std<br>beta | M15<br>Std<br>beta | M16<br>Std<br>beta |
| 1. Profit-ability |   |                    |                    |                    |                    |                    |                    |                    |
| 2. Firm value     |   |                    |                    |                    |                    |                    |                    |                    |
| 3. Firm size      | 0.321**                                 | 0.309**            | 0.317**            | 0.318**            | 0.310**            | 0.309**            | 0.315**            | 0.310**            |

End of Table 4

| Predictor        | Creterion variable = Firm value (t + 1) |                 |                    |                 |                    |                 |                 |                 |
|------------------|---|-----------------|--------------------|-----------------|--------------------|-----------------|-----------------|-----------------|
|                  | M9<br>Std<br>beta                       | M10<br>Std beta | M11<br>Std<br>beta | M12<br>Std beta | M13<br>Std<br>beta | M14<br>Std beta | M15<br>Std beta | M16<br>Std beta |
| 4. Firm age      | -0.074*                                 | -0.070*         | -0.079*            | -0.042          | -0.076*            | -0.044          | -0.055          | -0.055          |
| 5. Human capital |   | 0.093**         |                    |                 | 0.054              | 0.074*          |                 | 0.042           |
| 6. Advertising   |   |                 | 0.146**            |                 | 0.130**            |                 | 0.129**         | 0.118**         |
| 7. R&D           |   |                 |                    | 0.110**         |                    | 0.095**         | 0.082*          | 0.075*          |
| VIF              | 1.018                                   | 1.034           | 1.019              | 1.105           | 1.117              | 1.134           | 1.136           | 1.164           |
| R2               | 0.102                                   | 0.111           | 0.124              | 0.114           | 0.126              | 0.119           | 0.130           | 0.131           |
| F                | 49.127                                  | 35.758          | 40.485             | 36.765          | 31.049             | 28.952          | 31.993          | 25.915          |

Note: \* Significant at 5% significance level; \*\* Significant at 1% significance level.

This study also proposed in Hypothesis 2 that investment in human capital would have a positive effect on firm value. This hypothesis is supported by a positive and significant effect in Model 10. This study provides insight into the organizational strategy in which investment in human capital can affect an enterprise’s value. To improve firm value, business owners or managers need to be aware of potential resources that can lead to firms creating a sustainable competitive advantage. and consider characteristics of the organizational strategy when making decisions about investment in human capital. Thus, business owners or managers can regard expenditure in human capital as investments, not cost. Governments should also provide business owners or managers investing in human capital with financial incentives to support their continuous growth and development.

Model 3 and Model 11 examined the relationship between investment in advertising and a firm’s performance. In both models, the results show that investment in advertising is positively related to a firm’s performance. This indicates that the enterprises deciding to invest in their advertising contribute to enhancing their firm’s performance.

In Hypothesis 3, this research suggested that investment in advertising would have a positive effect on a firm’s profitability. Model 3 provides support for this hypothesis: The results show that investment in advertising has a positive role in affecting a firm’s profitability. This implies that business owners or managers are aware of the need to fulfill constant investment in advertising in order to survive in their business. Pauwels et al. (2004) suggest that business owners or managers concentrate on improving profit performance. The relationship between investment in advertising and a firm’s profitability provides policy makers with an expansive view of advertising effectively. Policy makers should establish supporting policies for developing small and medium-sized business advertising programs.

This article also suggested in Hypothesis 4 that investment in advertising would have a positive effect on firm value. This hypothesis is supported by positive and significant results in Model 11. The results indicate that investment in advertising has a positive impact on firm value. The result is in line with previous research accomplished by Joshi and Hanssens (2010). Ho et al. (2005) also suggest that advertising plays an important role in leading value creation through promoting products, or services. Thus, business owners or managers should take into account implementing investment in advertising effectively. In addition, the finding provides reasons as to why managers should realize the importance of investment in advertising. To support the sustainable growth of SMEs, policy makers should review various support benefits for the commercial activities of SMEs. To do so, governments should encourage investors to invest in government-aided firms. Investors can be intrigued by a firm continuously investing in advertising for promoting its goods, services or image. Investors may reap benefits from successful advertising activity supporting firm's reputation (Sherman & Hoffer, 1971).

Model 4 and Model 12 explored the relationship between investment in R&D and a firm's performance. In both models, the results showed that investment in R&D is positively related to a firm's performance. This demonstrated that enterprises investing in their R&D should expect an increase in their performance.

In Hypothesis 5, this study suggested that investment in R&D would have a positive effect on a firm's profitability. Model 4 provided support for this hypothesis. A firm's investment in R&D has positive and significant coefficients in the analysis of a firm's profitability. The result shows that investment in R&D has a positive impact on firm's profitability. R&D investments in developing technology are a key driver of future core competencies (Scherer, 1984; Ettl, 1998), even though business owners or managers may underestimate the potential for innovation. The finding provides theoretical insights for managers, and cautious business owners or managers who would benefit from investing in R&D in order for them to recognize the potential performance of innovation. Governments should urge national research institutes to cooperate with SMEs in order to develop the research capacity of SMEs. This build a basis for SMEs to steadily invest in R&D.

This paper finally suggested in Hypothesis 6 that investment in R&D would have a positive effect on a firm's value. This hypothesis was supported by positive and significant effects in Model 12. The results indicate that investment in R&D has a positive impact on a firm's value. Shin et al. (2017) suggest that R&D for innovation plays a powerful role in creating enterprise value. Investigating how investment in R&D impacts a firm's value is attractive to business owners or managers since the most critical investment decision done by business owner or managers is investment in R&D (Barker III & Mueller, 2002). This implies that business owners or managers could utilize this potential indicator to guide decision making in R&D investment. Governments should not only focus on ensuring that SMEs easily receive financial support, but should also provide tax benefits.

Model 5 and Model 13 were used to test the relationship between investment in human capital and advertising and the performance of firms. Investment in human capital and advertising is positively related to the performance of firms in Model 5. The investment in human capital did not demonstrate significant results, but investment in advertising was

positively related to the performance of firms in Model 13. Model 6 and Model 14 were used to test the relationship between investment in human capital and R&D and the performance of firms. Investment in human capital and R&D is positively related to the performance of firms. Model 7 and Model 15 were used to test the relationship between investment in advertising and R&D and the performance of firms. Investment in advertising and R&D is positively related to the performance of firms in this model as well. To acquire additional insight and to carefully inspect the significance of relationships, hierarchical regression analyses were implemented by entering control variables in Step 1 and all independent variables in Step 2 (Table 4, Model 8, Model 16). The hierarchical regression was performed to test main effects of hypotheses in Franklin and Marshall (2019) as well. The process of testing the effects of control variables in Step 1 and the main effects in Step 2 was designed based on the modern research methodology (Long et al., 2011; Chowdhury et al., 2014). The R-squared indicated the amount of variance described by the access of variables in Step 1 and Step 2 of the hierarchical regression. Gogan, Artene, Sarca, and Draghici (2016) state R-squared is a proper indicator to explain the size of the effect. According to Cohen (1988), R-squared can be evaluated as 0.0196 small effect, 0.13 medium effect and 0.26 large effect.

In comparison with Model 1, the R-squared in Model 8 was 17.7% higher. Therefore, investments in human capital, advertising, and R&D are positively related to a firm's profitability. As compared to Model 9, R-squared in Model 16 is 2.9% higher. Furthermore, investment in human capital did not produce significant results, but investments in advertising and R&D are positively related to firm value in this model as well. Model 8 showed a relative influence of variables that can improve profitability. Investment in advertising is the most influential variable. Investment in human capital is the second most influential variable. The third most influential variable is investment in R&D. Model 16 indicated the relative influence of variables that could enhance a firm's value. In this model as well, investment in advertising is the most influential variable. However, investment in R&D is the second most influential variable in this model. The third crucial variable is excluded because investment in human capital was not found to be significant. Ultimately, based on the models, investment in advertising has the strongest impact on a firm's profitability and value.

The final regression equations of the models with the results of the coefficients are as follows:

$$Y (\text{firm profitability}) = -0.105 + 22.542 (\text{Human capital}) + 3.784 (\text{Advertising}) + 0.125 (\text{R\&D}) + 0.014 (\text{Size}) - 0.001 (\text{Age}); \quad (3)$$

$$Y (\text{firm value}) = -2.836E + 12 + 6.892E + 12 (\text{Human capital}) + 1.729E + 12 (\text{Advertising}) + 1.724E + 11 (\text{R\&D}) + 1.182E+11 (\text{Size}) - 806\,798\,304 (\text{Age}). \quad (4)$$

The significant main effect of human capital, advertising, and R&D on firm performance supports a theoretical proposition that the three intangible resources are key factors. Intangible assets investment can be a powerful weapon in the strategic manager's arsenal of options. Thus, business managers should invest effectively and wisely prioritizing among intangible assets (human capital, advertising, R&D) in order to enhance firm performance regarding firm profitability and value.

#### 4. Robustness checks

This study additionally conducted modeling with partial least squares regressions in order to control for the potential problem of small samples (as there were less than 200 firms) and to verify the robustness of finding in ordinary least squares regressions modeling. Table 5 below shows the proportion of variance explained and variable importance in the projection. Partial least squares regressions essentially provide the same result (investment in advertising has the most influential impact on the firm's profitability and value) as ordinary least squares regressions formerly did.

Table 5. Partial least squares regression results on profitability

| Latent Factors | Statistics            |                                  |                   |
|----------------|-----------------------|----------------------------------|-------------------|
|                | Cumulative X Variance | Cumulative Y Variance (R-Square) | Adjusted R-Square |
| 1              | 0.297                 | 0.184                            | 0.183             |
| 2              | 0.464                 | 0.189                            | 0.187             |
| 3              | 0.668                 | 0.189                            | 0.186             |
| 4              | 0.861                 | 0.189                            | 0.186             |
| 5              | 1.000                 | 0.189                            | 0.185             |

| Variables     | Parameters | Latent Factors |       |       |       |       |
|---------------|------------|----------------|-------|-------|-------|-------|
|               |            | 1              | 2     | 3     | 4     | 5     |
| Constant      | -0.105     |                |       |       |       |       |
| Firm age      | -0.001     | 0.342          | 0.338 | 0.348 | 0.348 | 0.348 |
| Firm size     | 0.014      | 0.279          | 0.275 | 0.275 | 0.275 | 0.275 |
| Human capital | 22.542     | 1.227          | 1.214 | 1.213 | 1.213 | 1.213 |
| Advertising   | 3.784      | 1.635          | 1.633 | 1.632 | 1.632 | 1.632 |
| R&D           | 0.125      | 0.790          | 0.821 | 0.820 | 0.820 | 0.820 |

Partial least squares regression results on firm value

| Latent Factors | Statistics            |                                  |                   |
|----------------|-----------------------|----------------------------------|-------------------|
|                | Cumulative X Variance | Cumulative Y Variance (R-Square) | Adjusted R-Square |
| 1              | 0.262                 | 0.123                            | 0.122             |
| 2              | 0.477                 | 0.131                            | 0.129             |
| 3              | 0.684                 | 0.131                            | 0.128             |
| 4              | 0.865                 | 0.131                            | 0.127             |
| 5              | 1.000                 | 0.131                            | 0.126             |



End of Table 5

| Variables     | Parameters | Latent Factors |       |       |       |       |
|---------------|------------|----------------|-------|-------|-------|-------|
|               |            | 1              | 2     | 3     | 4     | 5     |
| Constant      | -2.836E+12 |                |       |       |       |       |
| Firm age      | -806798304 | 0.177          | 0.200 | 0.218 | 0.218 | 0.218 |
| Firm size     | 1.182E+11  | 1.780          | 1.771 | 1.769 | 1.769 | 1.769 |
| Human capital | 6.892E+12  | 0.755          | 0.805 | 0.806 | 0.806 | 0.806 |
| Advertising   | 1.729E+12  | 0.880          | 0.862 | 0.863 | 0.863 | 0.863 |
| R&D           | 1.724E+11  | 0.676          | 0.667 | 0.667 | 0.667 | 0.667 |

## Conclusions

This paper explores opportunities for investment in intangible assets such as human capital, advertising and R&D as valuable sources for better firm performance. In general, it is fundamental for SMEs to weigh the advantages and disadvantages of investing in intangible assets – as opposed to investing in tangibles assets. The results in this study highlight that intangible investment is not a cost or waste for SMEs. Thus, business managers should, not only increase the profitability for their firm's survival, but also provide a positive flow for firm value to investors by investing more in intangible assets. One of the interesting findings is that investment in advertising has an impact on a firm's profitability and value. Profitability and enterprise value contribute to helping business managers or investors make the best judgment for their business operation and investment activity. Given that firms can invest in human capital, advertising, and R&D separately or simultaneously to enhance their performance, business managers should strategically utilize these three key contributors and adopt investment in intangible assets to accomplish their managerial goals. Policy implications are important. Intangible assets, the possible source of economic growth, require long-term sustainable investments and their outcomes consist of the creation and accumulation of knowledge. This achievement is applied not only to a specific field but also to various fields and has a great effect on a company. However, due to the knowledge-based attributes of intangible assets, firms regard their intangible asset investments as areas where uncertainties and failures to ensure the expected returns are likely to be higher. Therefore, governments should set up promotional policies to stimulate SMEs' investment in intangible assets.

First, governments should promote an agreement between their education and training centers and companies and encourage employees of SMEs to participate in education and training. They should develop quality training programs based on specific content that can be applied in actual industries. Consulting and support systems should be established to ensure that trained employees can efficiently apply these to their fields of business to increase the effectiveness of their firm's intangible asset investment.

Second, governments should encourage business owners or managers to recognize the importance of marketing and support the promotion and development of trademarks and brands to foster firms' marketing capabilities. To enable corporate owners to make continuous

intangible asset investment, the governments should reform various regulations to encourage firms' entry into the market and expanding the public market.

Third, SMEs have little R&D infrastructure as it is not easy to secure researchers and necessary funds. Governments, thus, should strengthen the cooperative networks between SMEs, national research institutions and universities so that they can help each other and take advantage of the synergy.

Finally, SMEs may hesitate to make intangible asset investment or may end up with only temporary investment because they have limited financial resources. Therefore, governments should establish a system for financial support and financing. Also, tax benefits should be provided not only for R&D but also for spending needed for commercial activities such as brand building and employee training for organizational innovation. Furthermore, communication channels should be established for business stakeholders to present their own views on intangible asset investment, so that support policies can be constantly reviewed and improved. Thus, this study confirms the importance of intangible assets investment for small and medium-sized enterprises.

One limitation of this research is that this study focused on employees as a whole without any distinction between high-skilled and low-skilled employees. In future research, the authors will examine the education level of employees as well to draw more exact implications about human capital and also investigate the effects of various types of intangible assets investments on other measurements of performance, such as firm growth. Future studies should include other control variables into the model as well. Further study in this area will improve understanding of investment in intangible assets as a key driver of SMEs' survival and growth. It will develop new perceptions regarding organizational instructions, market, and innovation activities of SMEs.

## Disclosure statement

Authors declare that we do not have any competing financial, professional, or personal interests from other parties.

## References

- Aaker, D. (1996). *Building strong brands: Building, measuring, and managing brand equity*. The Free Press.
- Aaker, D. (2007). Innovation: Brand it or lose it. *California Management Review*, 50(1), 8–24. <https://doi.org/10.2307/41166414>
- Aaker, D. A. (2008). *Spanning silos: The new CMO imperative*. Harvard Business Press.
- Ailawadi, K. L., Lehmann, D. R., & Neslin, S. A. (2003). Revenue premium as an outcome measure of brand equity. *Journal of Marketing*, 67(4), 1–17. <https://doi.org/10.1509/jmkg.67.4.1.18688>
- Akgün, A. E., Keskin, H., Byrne, J. C., & Aren, S. (2007). Emotional and learning capability and their impact on product innovativeness and firm performance. *Technovation*, 27(9), 501–513. <https://doi.org/10.1016/j.technovation.2007.03.001>

- Akman, G., & Yılmaz, C. (2008). Innovative capability, innovation strategy and market orientation: an empirical analysis in Turkish software industry. *International Journal of Innovation Management*, 12(01), 69–111. <https://doi.org/10.1142/S1363919608001923>
- Andonova, V., & Ruiz-Pava, G. (2016). The role of industry factors and intangible assets in company performance in Colombia. *Journal of Business Research*, 69(10), 4377–4384. <https://doi.org/10.1016/j.jbusres.2016.03.060>
- Andras, T. L., & Srinivasan, S. S. (2003). Advertising intensity and R&D intensity: Differences across industries and their impact on firm's performance. *International Journal of Business and Economics*, 2(2), 167.
- Añón Higón, D., Gómez, J., & Vargas, P. (2017). Complementarities in innovation strategy: Do intangibles play a role in enhancing firm performance? *Industrial and Corporate Change*, 26(5), 865–886. <https://doi.org/10.1093/icc/dtw055>
- Arrighetti, A., Landini, F., & Lasagni, A. (2014). Intangible assets and firm heterogeneity: Evidence from Italy. *Research Policy*, 43(1), 202–213. <https://doi.org/10.1016/j.respol.2013.07.015>
- Bai, Y., Yuan, J., & Pan, J. (2016). Why SMEs in emerging economies are reluctant to provide employee training: Evidence from China. *International Small Business Journal*, 35(6), 751–766. <https://doi.org/10.1177/0266242616682360>
- Barker III, V. L., & Mueller, G. C. (2002). CEO characteristics and firm R&D spending. *Management Science*, 48(6), 782–801. <https://doi.org/10.1287/mnsc.48.6.782.187>
- Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management*, 17(1), 99–120. <https://doi.org/10.1177/014920639101700108>
- Barney, J. B., & Arikan, A. M. (2001). The resource-based view: Origins and implications. In *The Blackwell handbook of strategic management* (pp. 124–188). Blackwell Publishers.
- Barney, J. B., & Hesterly, W. (2015). *Strategic management and competitive advantage concepts and cases*. Pearson.
- Barney, J. B., & Wright, P. M. (1998). On becoming a strategic partner: The role of human resources in gaining competitive advantage. *Human Resource Management*, 37(1), 31–46. [https://doi.org/10.1002/\(SICI\)1099-050X\(199821\)37:1<31::AID-HRM4>3.0.CO;2-W](https://doi.org/10.1002/(SICI)1099-050X(199821)37:1<31::AID-HRM4>3.0.CO;2-W)
- Bassi, L. J., Ludwig, J., McMurrer, D. P., & Van Buren, M. (2002). Profiting from learning: Firm-level effects of training investments and market implications. *Singapore Management Review*, 24(3), 61–76.
- Becker, G. S. (1964). *Human capita*. Columbia University Press.
- Bertrand, O. (2009). Effects of foreign acquisitions on R&D activity: Evidence from firm-level data for France. *Research Policy*, 38(6), 1021–1031. <https://doi.org/10.1016/j.respol.2009.03.001>
- Bharadwaj, A. S., Bharadwaj, S. G., & Konsynski, B. R. (1999). Information technology effects on firm performance as measured by Tobin's q. *Management Science*, 45(7), 1008–1024. <https://doi.org/10.1287/mnsc.45.7.1008>
- Blundell, R., Dearden, L., Meghir, C., & Sianesi, B. (1999). Human capital investment: the returns from education and training to the individual, the firm and the economy. *Fiscal Studies*, 20(1), 1–23. <https://doi.org/10.1111/j.1475-5890.1999.tb00001.x>
- Bontis, N., & Fitz-Enz, J. (2002). Intellectual capital ROI: A causal map of human capital antecedents and consequents. *Journal of Intellectual Capital*, 3(3), 223–247. <https://doi.org/10.1108/14691930210435589>
- Booltink, L. W., & Saka-Helmhout, A. (2017). The effects of R&D intensity and internationalization on the performance of non-high-tech SMEs. *International Small Business Journal*, 36(1), 81–103. <https://doi.org/10.1177/0266242617707566>
- Bose, I., & Pal, R. (2012). Do green supply chain management initiatives impact stock prices of firms? *Decision Support Systems*, 52(3), 624–634. <https://doi.org/10.1016/j.dss.2011.10.020>

- Bresnahan, T. F., Brynjolfsson, E., & Hitt, L. M. (2002). Information technology, workplace organization, and the demand for skilled labor: Firm-level evidence. *The Quarterly Journal of Economics*, 117(1), 339–376. <https://doi.org/10.1162/003355302753399526>
- Brockbank, W. (1999). If HR were really strategically proactive: Present and future directions in HR's contribution to competitive advantage, *Human Resource Management*, 38(4), 337–352. [https://doi.org/10.1002/\(SICI\)1099-050X\(199924\)38:4<337::AID-HRM8>3.0.CO;2-5](https://doi.org/10.1002/(SICI)1099-050X(199924)38:4<337::AID-HRM8>3.0.CO;2-5)
- Carmona, P., Momparler, A., & Gieure, C. (2012). The performance of entrepreneurial small-and medium-sized enterprises. *The Service Industries Journal*, 32(15), 2463–2487. <https://doi.org/10.1080/02642069.2012.677832>
- Chauvin, K. W., & Hirschey, M. (1993). Advertising, R&D expenditures and the market value of the firm. *Financial Management*, 22(4), 128–140.
- Chen, C.-J., & Huang, J.-W. (2009). Strategic human resource practices and innovation performance – The mediating role of knowledge management capacity. *Journal of Business Research*, 62(1), 104–114. <https://doi.org/10.1016/j.jbusres.2007.11.016>
- Chen, J., & Waters, G. (2017). Firm efficiency, advertising and profitability: Theory and evidence. *The Quarterly Review of Economics and Finance*, 63, 240–248. <https://doi.org/10.1016/j.qref.2016.04.004>
- Chen, Z., Zhang, J., & Zheng, W. (2017). Import and innovation: Evidence from Chinese firms. *European Economic Review*, 94, 205–220. <https://doi.org/10.1016/j.eurocorev.2017.02.008>
- Chowdhury, S., Schulz, E., Milner, M., & Van De Voort, D. (2014). Core employee based human capital and revenue productivity in small firms: An empirical investigation. *Journal of Business Research*, 67(11), 2473–2479. <https://doi.org/10.1016/j.jbusres.2014.03.007>
- Coff, R. W. (2002). Human capital, shared expertise, and the likelihood of impasse in corporate acquisitions. *Journal of Management*, 28(1), 107–128. <https://doi.org/10.1177/014920630202800107>
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2<sup>nd</sup> ed.). Lawrence Earlbaum Associates.
- Corrado, C., Haskel, J., Jona-Lasinio, C., & Iommi, M. (2016). *Intangible investment in the EU and US before and since the Great Recession and its contribution to productivity growth* (EIB Working Papers 2016/08). European Investment Bank (EIB).
- Corrado, C., Hulten, C., & Sichel, D. (2005). Measuring capital and technology: An expanded framework. In *Measuring capital in the new economy* (pp. 11–46). University of Chicago Press. <https://doi.org/10.7208/chicago/9780226116174.003.0002>
- Cozzarin, B. P., & Percival, J. C. (2006). Complementarities between organisational strategies and innovation. *Economics of Innovation and New Technology*, 15(3), 195–217. <https://doi.org/10.1080/10438590500222691>
- Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal*, 34(3), 555–590. <https://doi.org/10.5465/256406>
- Davcik, N. S., & Sharma, P. (2016). Marketing resources, performance, and competitive advantage: A review and future research directions. *Journal of Business Research*, 69(12), 5547–5552. <https://doi.org/10.1016/j.jbusres.2016.04.169>
- Day, G. S. (1994). The capabilities of market-driven organizations. *The Journal of Marketing*, 58(4), 37–52. <https://doi.org/10.1177/002224299405800404>
- Del Valle, I. D., & Castillo, M. A. S. (2009). Human capital and sustainable competitive advantage: An analysis of the relationship between training and performance. *International Entrepreneurship and Management Journal*, 5(2), 139–163. <https://doi.org/10.1007/s11365-008-0090-3>
- Dutta, S., Narasimhan, O., & Rajiv, S. (1999). Success in high-technology markets: Is marketing capability critical? *Marketing Science*, 18(4), 547–568. <https://doi.org/10.1287/mksc.18.4.547>

- Ehie, I. C., & Olibe, K. (2010). The effect of R&D investment on firm value: An examination of US manufacturing and service industries. *International Journal of Production Economics*, 128(1), 127–135. <https://doi.org/10.1016/j.ijpe.2010.06.005>
- Ettlie, J. E. (1998). R&D and global manufacturing performance. *Management Science*, 44(1), 1–11. <https://doi.org/10.1287/mnsc.44.1.1>
- Feng, H., Morgan, N. A., & Rego, L. L. (2017). Firm capabilities and growth: The moderating role of market conditions. *Journal of the Academy of Marketing Science*, 45(1), 76–92. <https://doi.org/10.1007/s11747-016-0472-y>
- Fosfuri, A., & Giarratana, M. S. (2009). Masters of war: Rivals' product innovation and new advertising in mature product markets. *Management Science*, 55(2), 181–191. <https://doi.org/10.1287/mnsc.1080.0939>
- Franklin, D., & Marshall, R. (2019). Adding co-creation as an antecedent condition leading to trust in business-to-business relationships. *Industrial Marketing Management*, 77, 170–181. <https://doi.org/10.1016/j.indmarman.2018.10.002>
- Franko, L. G. (1989). Global corporate competition: Who's winning, who's losing, and the R&D factor as one reason why. *Strategic Management Journal*, 10(5), 449–474. <https://doi.org/10.1002/smj.4250100505>
- Gamayuni, R. R. (2015). The effect of intangible asset, financial performance and financial policies on the firm value. *International Journal of Scientific & Technology Research*, 4, 1–11.
- Ghosh, D., & Lusch, R. F. (2000). Outcome effect, controllability and performance evaluation of managers: Some field evidence from multi-outlet businesses. *Accounting, Organizations and Society*, 25(4), 411–425. [https://doi.org/10.1016/S0361-3682\(99\)00045-8](https://doi.org/10.1016/S0361-3682(99)00045-8)
- Gogan, L. M., Artene, A., Sarca, I., & Draghici, A. (2016). The impact of intellectual capital on organizational performance. *Procedia-Social and Behavioral Sciences*, 221, 194–202. <https://doi.org/10.1016/j.sbspro.2016.05.106>
- Goodridge, P., Haskel, J., & Wallis, G. (2017). Spillovers from R&D and other intangible investment: Evidence from UK industries. *Review of Income and Wealth*, 63(s1), S22–S48. <https://doi.org/10.1111/roiw.12251>
- Guan, J., & Ma, N. (2003). Innovative capability and export performance of Chinese firms. *Technovation*, 23(9), 737–747. [https://doi.org/10.1016/S0166-4972\(02\)00013-5](https://doi.org/10.1016/S0166-4972(02)00013-5)
- Gui-long, Z., Yi, Z., Kai-hua, C., & Jiang, Y. (2017). The impact of R&D intensity on firm performance in an emerging market: Evidence from China's electronics manufacturing firms. *Asian Journal of Technology Innovation*, 25(1), 41–60. <https://doi.org/10.1080/19761597.2017.1302492>
- Hall, R. (1993). A framework linking intangible resources and capabilities to sustainable competitive advantage. *Strategic Management Journal*, 14(8), 607–618. <https://doi.org/10.1002/smj.4250140804>
- Hatch, N. W., & Dyer, J. H. (2004). Human capital and learning as a source of sustainable competitive advantage. *Strategic Management Journal*, 25(12), 1155–1178. <https://doi.org/10.1002/smj.421>
- Hay, D., & Morris, D. (1979). *Industrial economics: Theory and evidence*. Oxford University Press.
- Helfat, C. E., & Peteraf, M. A. (2003). The dynamic resource-based view: Capability lifecycles. *Strategic Management Journal*, 24(10), 997–1010. <https://doi.org/10.1002/smj.332>
- Hitt, M. A., Bierman, L., Shimizu, K., & Kochhar, R. (2001). Direct and moderating effects of human capital on strategy and performance in professional service firms: A resource-based perspective. *Academy of Management Journal*, 44(1), 13–28. <https://doi.org/10.5465/3069334>
- Ho, Y. K., Keh, H. T., & Ong, J. M. (2005). The effects of R&D and advertising on firm value: An examination of manufacturing and nonmanufacturing firms. *IEEE Transactions on Engineering Management*, 52(1), 3–14. <https://doi.org/10.1109/TEM.2004.839943>

- Hooley, G. J., Greenley, G. E., Cadogan, J. W., & Fahy, J. (2005). The performance impact of marketing resources. *Journal of Business Research*, 58(1), 18–27. [https://doi.org/10.1016/S0148-2963\(03\)00109-7](https://doi.org/10.1016/S0148-2963(03)00109-7)
- Hoskisson, R. E., Eden, L., Lau, C. M., & Wright, M. (2000). Strategy in emerging economies. *Academy of Management Journal*, 43(3), 249–267. <https://doi.org/10.2307/1556394>
- Hult, G. T. M., Hurley, R. F., & Knight, G. A. (2004). Innovativeness: Its antecedents and impact on business performance. *Industrial Marketing Management*, 33(5), 429–438. <https://doi.org/10.1016/j.indmarman.2003.08.015>
- Hunt, S. D., & Morgan, R. M. (1995). The comparative advantage theory of competition. *The Journal of Marketing*, 59(2), 1–15. <https://doi.org/10.1177/002224299505900201>
- Jeng, D. J.-F., & Pak, A. (2016). The variable effects of dynamic capability by firm size: The interaction of innovation and marketing capabilities in competitive industries. *International Entrepreneurship and Management Journal*, 12(1), 115–130. <https://doi.org/10.1007/s11365-014-0330-7>
- Joshi, A., & Hanssens, D. M. (2010). The direct and indirect effects of advertising spending on firm value. *Journal of Marketing*, 74(1), 20–33. <https://doi.org/10.1509/jmkg.74.1.20>
- Keller, K. L. (1998). *Strategic brand management: Building, measuring, and managing brand equity*. New Jersey.
- Kitching, J. (1998). Investing in training and small firm growth and survival: An empirical analysis for the UK 1987–97. *International Small Business Journal*, 17(1), 110–111. <https://doi.org/10.1177/0266242698171007>
- Kotabe, M., Srinivasan, S. S., & Aulakh, P. S. (2002). Multinationality and firm performance: The moderating role of R&D and marketing capabilities. *Journal of International Business Studies*, 33, 79–97. <https://doi.org/10.1057/palgrave.jibs.8491006>
- Kozlenkova, I. V., Samaha, S. A., & Palmatier, R. W. (2014). Resource-based theory in marketing. *Journal of the Academy of Marketing Science*, 42(1), 1–21. <https://doi.org/10.1007/s11747-013-0336-7>
- Kramer, J.-P., Marinelli, E., Iammarino, S., & Diez, J. R. (2011). Intangible assets as drivers of innovation: Empirical evidence on multinational enterprises in German and UK regional systems of innovation. *Technovation*, 31(9), 447–458. <https://doi.org/10.1016/j.technovation.2011.06.005>
- Krasnikov, A., & Jayachandran, S. (2008). The relative impact of marketing, research-and-development, and operations capabilities on firm performance. *Journal of Marketing*, 72(4), 1–11. <https://doi.org/10.1509/jmkg.72.4.001>
- Laursen, K., & Foss, N. J. (2003). New human resource management practices, complementarities and the impact on innovation performance. *Cambridge Journal of Economics*, 27(2), 243–263. <https://doi.org/10.1093/cje/27.2.243>
- Lawson, B., & Samson, D. (2001). Developing innovation capability in organisations: A dynamic capabilities approach. *International Journal of Innovation Management*, 5(03), 377–400. <https://doi.org/10.1142/S1363919601000427>
- Lee, X., Xie, N., & Pang, L. (2008, July). *Empirical analysis of R&D capability in China's automotive firms*. Paper presented at the PICMET 2008. Portland International Conference on Management of Engineering & Technology.
- Leonard-Barton, D. (1992). Core capabilities and core rigidities: A paradox in managing new product development. *Strategic Management Journal*, 13(S1), 111–125. <https://doi.org/10.1002/smj.4250131009>
- Long, C. P., Bendersky, C., & Morrill, C. (2011). Fairness monitoring: Linking managerial controls and fairness judgments in organizations. *Academy of Management Journal*, 54(5), 1045–1068. <https://doi.org/10.5465/amj.2011.0008>
- Lukas, B. A., & Bell, S. J. (2000). Strategic market position and R&D capability in global manufacturing industries: Implications for organizational learning and organizational memory. *Industrial Marketing Management*, 29(6), 565–574. [https://doi.org/10.1016/S0019-8501\(00\)00129-2](https://doi.org/10.1016/S0019-8501(00)00129-2)

- Lynch, L. M., & Black, S. E. (1998). Beyond the incidence of employer-provided training. *ILR Review*, 52(1), 64–81. <https://doi.org/10.1177/001979399805200104>
- Mansfield, E. (1984). *R&D and innovation: Some empirical findings R&D, patents, and productivity* (pp. 127–154). University of Chicago Press.
- Marlow, S., Patton, D., & Ram, M. (2004). *Managing labour in small firms*. Routledge. <https://doi.org/10.4324/9780203495612>
- McAlister, L., Srinivasan, R., & Kim, M. (2007). Advertising, research and development, and systematic risk of the firm. *Journal of Marketing*, 71(1), 35–48.
- McKee, D. O., Conant, J. S., Varadarajan, P. R., & Mokwa, M. P. (1992). Success-producer and failure-preventer marketing skills: A social learning theory interpretation. *Journal of the Academy of Marketing Science*, 20(1), 17–26. <https://doi.org/10.1007/BF02723472>
- Miles, S. J., & Van Clieaf, M. (2017). Strategic fit: Key to growing enterprise value through organizational capital. *Business Horizons*, 60(1), 55–65. <https://doi.org/10.1016/j.bushor.2016.08.008>
- Montresor, S., & Vezzani, A. (2016). Intangible investments and innovation propensity: Evidence from the Innobarometer 2013. *Industry and Innovation*, 23(4), 331–352. <https://doi.org/10.1080/13662716.2016.1151770>
- Morgan, N. A. (2012). Marketing and business performance. *Journal of the Academy of Marketing Science*, 40(1), 102–119. <https://doi.org/10.1007/s11747-011-0279-9>
- Motta, V. (2020). Lack of access to external finance and SME labor productivity: Does project quality matter? *Small Business Economics*, 54, 119–134. <https://doi.org/10.1007/s11187-018-0082-9>
- Mumford, M. D. (2000). Managing creative people: Strategies and tactics for innovation. *Human Resource Management Review*, 10(3), 313–351. [https://doi.org/10.1016/S1053-4822\(99\)00043-1](https://doi.org/10.1016/S1053-4822(99)00043-1)
- OECD. (2011). *A new OECD project. New sources of growth: Intangible assets*.
- Oriani, R., & Sobrero, M. (2008). Uncertainty and the market valuation of R&D within a real options logic. *Strategic Management Journal*, 29(4), 343–361. <https://doi.org/10.1002/smj.664>
- Pauwels, K., Silva-Risso, J., Srinivasan, S., & Hanssens, D. M. (2004). New products, sales promotions, and firm value: The case of the automobile industry. *Journal of Marketing*, 68(4), 142–156. <https://doi.org/10.1509/jmkg.68.4.142.42724>
- Peterson, R. A., & Jeong, J. (2010). Exploring the impact of advertising and R&D expenditures on corporate brand value and firm-level financial performance. *Journal of the Academy of Marketing Science*, 38(6), 677–690. <https://doi.org/10.1007/s11747-010-0188-3>
- Ployhart, R. E., Weekley, J. A., & Ramsey, J. (2009). The consequences of human resource stocks and flows: A longitudinal examination of unit service orientation and unit effectiveness. *Academy of Management Journal*, 52(5), 996–1015. <https://doi.org/10.5465/amj.2009.44635041>
- Porter, M. E. (1980). *Competitive strategy: Technologies for analyzing industries and competitors*. Free Press.
- Quintana-García, C., & Benavides-Velasco, C. A. (2008). Innovative competence, exploration and exploitation: The influence of technological diversification. *Research Policy*, 37(3), 492–507. <https://doi.org/10.1016/j.respol.2007.12.002>
- Reuber, A. R., & Fischer, E. (1999). Understanding the consequences of founders' experience. *Journal of Small Business Management*, 37(2), 30–45.
- Riley, S. M., Michael, S. C., & Mahoney, J. T. (2017). Human capital matters: Market valuation of firm investments in training and the role of complementary assets. *Strategic Management Journal*, 38(9), 1895–1914. <https://doi.org/10.1002/smj.2631>
- Ruiqi, W., Wang, F., Xu, L., & Yuan, C. (2017). R&D expenditures, ultimate ownership and future performance: Evidence from China. *Journal of Business Research*, 71, 47–54. <https://doi.org/10.1016/j.jbusres.2016.10.018>

- Ruiz-Ortega, M. J., & García-Villaverde, P. M. (2008). Capabilities and competitive tactics influences on performance: Implications of the moment of entry. *Journal of Business Research*, 61(4), 332–345. <https://doi.org/10.1016/j.jbusres.2007.07.029>
- Saridakis, G., Lai, Y., & Cooper, C. L. (2017). Exploring the relationship between HRM and firm performance: A meta-analysis of longitudinal studies. *Human Resource Management Review*, 27(1), 87–96. <https://doi.org/10.1016/j.hrmr.2016.09.005>
- Saunila, M., & Ukko, J. (2014). Intangible aspects of innovation capability in SMEs: Impacts of size and industry. *Journal of Engineering and Technology Management*, 33, 32–46. <https://doi.org/10.1016/j.jengtecman.2014.02.002>
- Scherer, F. (1984). *Innovation and growth: Schumpeterian perspectives*. MIT Press.
- Sher, P. J., & Yang, P. Y. (2005). The effects of innovative capabilities and R&D clustering on firm performance: The evidence of Taiwan's semiconductor industry. *Technovation*, 25(1), 33–43. [https://doi.org/10.1016/S0166-4972\(03\)00068-3](https://doi.org/10.1016/S0166-4972(03)00068-3)
- Sherman, R., & Hoffer, G. (1971). Does automobile style change payoff? *Applied Economics*, 3(3), 153–165. <https://doi.org/10.1080/00036847100000001>
- Shin, N., Kraemer, K. L., & Dedrick, J. (2017). R&D and firm performance in the semiconductor industry. *Industry and Innovation*, 24(3), 280–297. <https://doi.org/10.1080/13662716.2016.1224708>
- Smith, D. J., Gradojevic, N., & Irwin, W. S. (2011). An analysis of brand equity determinants: Gross profit, advertising, research, and development. *Journal of Business & Economics Research (JBER)*, 5(11), 103–116. <https://doi.org/10.19030/jber.v5i11.2607>
- Song, M., Di Benedetto, C. A., & Nason, R. W. (2007). Capabilities and financial performance: The moderating effect of strategic type. *Journal of the Academy of Marketing Science*, 35(1), 18–34. <https://doi.org/10.1007/s11747-006-0005-1>
- Song, M., Droge, C., Hanvanich, S., & Calantone, R. (2005). Marketing and technology resource complementarity: An analysis of their interaction effect in two environmental contexts. *Strategic Management Journal*, 26(3), 259–276. <https://doi.org/10.1002/smj.450>
- Srinivasan, S., Pauwels, K., Silva-Risso, J., & Hanssens, D. M. (2009). Product innovations, advertising, and stock returns. *Journal of Marketing*, 73(1), 24–43. <https://doi.org/10.1509/jmkg.73.1.024>
- Srivastava, R. K., & Shocker, A. D. (1991). *Brand equity: A perspective on its meaning and measurement*. Marketing Science Institute.
- Subramaniam, M., & Youndt, M. A. (2005). The influence of intellectual capital on the types of innovative capabilities. *Academy of Management Journal*, 48(3), 450–463. <https://doi.org/10.5465/amj.2005.17407911>
- Teece, D. J. (1982). Towards an economic theory of the multiproduct firm. *Journal of Economic Behavior & Organization*, 3(1), 39–63. [https://doi.org/10.1016/0167-2681\(82\)90003-8](https://doi.org/10.1016/0167-2681(82)90003-8)
- Teece, D. J. (2007). Explicating dynamic capabilities: The nature and microfoundations of (sustainable) enterprise performance. *Strategic Management Journal*, 28(13), 1319–1350. <https://doi.org/10.1002/smj.640>
- Thornhill, S., & Whilte, R. (2007). Strategic purity: A multi-industry evaluation of pure vs. hybrid business strategies. *Strategic Management Journal*, 28(5), 553–561. <https://doi.org/10.1002/smj.606>
- Torraco, R. J., & Swanson, R. A. (1995). The strategic roles of human resource development. *People and Strategy*, 18(4), 10–21. [http://richardswanson.com/publications/Swanson\(1995\)TheStrategic.pdf](http://richardswanson.com/publications/Swanson(1995)TheStrategic.pdf)
- Tseng, M.-L. (2010). An assessment of cause and effect decision-making model for firm environmental knowledge management capacities in uncertainty. *Environmental Monitoring and Assessment*, 161(1), 549–564. <https://doi.org/10.1007/s10661-009-0767-2>
- Unger, J. M., Rauch, A., Frese, M., & Rosenbusch, N. (2011). Human capital and entrepreneurial success: A meta-analytical review. *Journal of Business Venturing*, 26(3), 341–358. <https://doi.org/10.1016/j.jbusvent.2009.09.004>



- Van Ark, B., Hao, J. X., Corrado, C., & Hulten, C. (2009). Measuring intangible capital and its contribution to economic growth in Europe. *EIB Papers*, 14(1), 62–93.
- Vorhies, D. W., & Morgan, N. A. (2003). A configuration theory assessment of marketing organization fit with business strategy and its relationship with marketing performance. *Journal of Marketing*, 67(1), 100–115. <https://doi.org/10.1509/jmkg.67.1.100.18588>
- Vorhies, D. W., Morgan, R. E., & Autry, C. W. (2009). Product-market strategy and the marketing capabilities of the firm: Impact on market effectiveness and cash flow performance. *Strategic Management Journal*, 30(12), 1310–1334. <https://doi.org/10.1002/smj.798>
- Wang, F., Zhang, X.-P. S., & Ouyang, M. (2009). Does advertising create sustained firm value? The capitalization of brand intangible. *Journal of the Academy of Marketing Science*, 37(2), 130–143. <https://doi.org/10.1007/s11747-008-0112-2>
- Wang, H.-M. D., & Sengupta, S. (2016). Stakeholder relationships, brand equity, firm performance: A resource-based perspective. *Journal of Business Research*, 69(12), 5561–5568. <https://doi.org/10.1016/j.jbusres.2016.05.009>
- Wang, Y., Du, R., Koong, K. S., & Fan, W. (2017). Effects of R&D policy choice on accounting performance and market value. *R&D Management*, 47(4), 545–556. <https://doi.org/10.1111/radm.12225>
- Webster, E. (2000). The growth of enterprise intangible investment in Australia. *Information Economics and Policy*, 12(1), 1–25. [https://doi.org/10.1016/S0167-6245\(99\)00024-4](https://doi.org/10.1016/S0167-6245(99)00024-4)
- Weerawardena, J. (2003). The role of marketing capability in innovation-based competitive strategy. *Journal of Strategic Marketing*, 11(1), 15–35. <https://doi.org/10.1080/0965254032000096766>
- Yam, R. C., Guan, J. C., Pun, K. F., & Tang, E. P. (2004). An audit of technological innovation capabilities in Chinese firms: Some empirical findings in Beijing, China. *Research Policy*, 33(8), 1123–1140. <https://doi.org/10.1016/j.respol.2004.05.004>
- Yin Wong, H., & Merrilees, B. (2008). The performance benefits of being brand-orientated. *Journal of Product & Brand Management*, 17(6), 372–383. <https://doi.org/10.1108/10610420810904112>
- Yu, W., Ramanathan, R., & Nath, P. (2014). The impacts of marketing and operations capabilities on financial performance in the UK retail sector: A resource-based perspective. *Industrial Marketing Management*, 43(1), 25–31. <https://doi.org/10.1016/j.indmarman.2013.07.014>
- Zhang, Y., & Liu, D. (2010, May). *Public R&D Subsidies, Firm innovation and firm performance – Empirical evidence from listed companies in China's SME board*. Paper presented at the Proceedings of the 2010 International Conference on E-Business and E-Government. Guangzhou, China. <https://doi.org/10.1109/ICEE.2010.309>