Interdependence between Employee Education and R&D Investment in Impacting IT Firm Performance

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Abstract

An educated workforce is critical for IT firms’ ability to innovate and compete in the market. Surprisingly, there is very little research on how education contributes to the profitability of IT firms and how educated employees contribute to a firm’s research and development activities. Using theories from human capital literature, we propose a model to measure how education impacts firm profits in IT industries and how the relation is moderated by a firm’s R&D investments. Our results suggest that education is associated with a positive firm performance in IT industries. We also show that the interaction effect between R&D and education is positive, suggesting that IT firms which invest in highly skilled employees are in a better position to take advantage of R&D investments. This paper adds several new insights to the literature on human capital and firm performance.

1. Introduction

Rapid innovation has been the engine of technological change over the last decade. No other sector of the economy has witness this change more firsthand than the IT sector. Firms such as Apple, Microsoft, Intel, Motorola and Google spend billions of dollars every year to remain ahead of others on the innovation frontier. Two factors which have become synonymous with technological innovation are research and development and skilled workforce. Research and development (R&D) is the key to IT firms introducing new products and services to the market in a timely manner and ahead of their competitors. A recent report by the Economist Intelligence Unit suggests that IT firms invest in R&D to develop or gain access to innovative solutions. At the same time, this report also suggests that a skilled workforce is at the heart of any country’s IT sector. Highly skilled workers who can keep pace with technological change are in a better position to innovate in IT industries. For example, Google’s unorthodox portfolio of human capital is its Ph.D.-centered culture because it views people with Ph.D. degree as more passionate towards research activities. Autor et al. [17] suggest that IT firms need employees with higher skills to use and manage newer technologies. While prior research examines the returns to human capital and R&D separately, surprisingly there is very little research which focuses on examining the impact of R&D and human capital on firm performance in the context of high tech industries, and the complementary relationship between the two [30].

R&D is an important factor of productivity and several research articles have examined the role of R&D on firm performance [46]. Prior literature identifies R&D investment as a crucial factor in the commercial success of firms’ innovation [53]. In IT industries, the success of firms depends on their capability to innovate. For example, Cisco Systems, which is a market leader in data communication equipment, spends more than 16% of its revenues on R&D. However, R&D is closely related to human capital in a firm. Prior theoretical work [8] suggests that human capital is complementary with R&D investments. Higher skills levels among firm employees are associated with a higher ‘economic competence’ [24] or ‘absorptive capacity’ [60]. Nelson and Phelps [49] suggest that higher education is associated with a higher capability to innovate or assimilate outside innovation. Since IT firms often need to be at the forefront of innovation, they are

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1 The Means to Compete: Benchmarking IT industry Competitiveness reported by The Economist Intelligence Unit [58].

2 See Stross [47]

3 See Cisco News [15]
facing increasing pressure to build a strong base of human capital [17, 61].

The impact of highly skilled employees on firm performance is not clear since employee skills increase both the benefits and the costs to an organization. For example, firms generally need to keep and retain qualified employees through investing in human resource management practices [41]. Prior literature also shows that compensation of employees in IT industries increases with the employees’ human capital factors such as education and experience [52]. Also, highly skilled employees are also more easily employable elsewhere and the firm can face a higher turnover among these employees [33]. For example, it is well known that IT firms face a higher turnover compared to firms in other industries [39].

To summarize, the impact of R&D and human capital on performance of IT firms, and the complementarities between R&D and human capital are not clear and need a closer examination. With the aforementioned motivation, we propose our research questions as follows:

1. What is the impact of employee education on firm performance in IT industries?
2. How is the relationship between R&D and firm performance moderated by employee education?

The main contributions of this paper are: we provide evidence of positive return between employees’ education level and firm profitability in IT industries. In addition, this is the first study, to the best of our knowledge, which estimates the complementarities between education and R&D in IT firms. Our main results are as follows: we show that education is positively associated with firm performance, suggesting that firms with highly skilled employees are more profitable. We show that the relationship between R&D and firm profitability is moderated by the education level of the employees. Firms which employ a higher fraction of educated individuals get a higher return on their R&D investments.

The reminder of this paper is organized into four sections. In Section 2, we review the previous literature in education and R&D areas and develop our hypotheses. The research method is described in Section 3. In Section 4, we discuss the findings. A summary and conclusion is provided in Section 5.

2. Literature review and hypotheses

2.1. Human capital and firm performance

Recent strategic management research contributes to the theory of the firm by proposing the resource-based view which states that the firm is a bundle of unique capabilities [31, 34]. One key resource which is valuable, scarce and can help a firm retain its competitive advantage is human capital [7]. Human capital theory suggests that people possess skills, knowledge, and abilities that provide economic value to firms [42]. The characteristics of firm specific human capital, such as scarcity, non-substitutability, which require a firm to incur heavy replacement costs make human capital more valuable to firms [31]. As has been extensively discussed in the human capital literature, organizations need to form a variety of human resource planning and work practices to manage human resource efficiently, such as recruiting talented employees, providing training and promoting opportunities, and developing compensation mechanisms [54].

The rapid development of technology has increasingly driven the demand for skilled employees [37, 38]. Therefore, complementary relationship between information technology and human capital may be an important factor to explain the shift toward skilled labor [38]. The importance of skilled workers is even more significant in IT industries. As Ang et al. [51] suggest, “IT jobs are complex, requiring knowledge of difficult technical concepts such as data modeling, process engineering, and design theory”.

There is little prior research which considers the impact of human capital on firm profitability. Prior literature finds that more educated workers will make other workers more productive [22]. However, prior research in the information systems area also demonstrates that there are substantial costs associated with employees who have a higher education or work experience [43, 51]. There are potential costs imposed on firms to attract and retain qualified employees through human resource management practices, such as training and promotion. In addition, there will be replacement costs imposed on firms when qualified employees leave the firms, which is especially pertinent to IT industries given the high employee turnover as compared to other industries [56].

Although human capital is measured in different ways (education, experience, and training) in prior research, education is often the most commonly used proxy for human capital [3]. In particular, education is becoming more important when there is a rapid technological change because schooling enhances employee skills that facilitate the gathering, processing, and interpreting of information [1]. Moreover, education can also strengthen ability, reduce uncertainty, and contribute to more efficient decision making [25]. The seminal work on human capital theory by Becker [11] suggests that level of education is a strong indicator of human capital.
There is little prior research which considers the impact of human capital on firm profitability. Prior literature finds that more educated workers will make other workers more productive [24]. However, prior research in the information systems area also demonstrates that there are substantial costs associated with employees who have a higher education or work experience [43, 51]. There are potential costs imposed on firms to attract and retain qualified employees through human resource management practices, such as training and promotion. In addition, there will be replacement costs imposed on firms when qualified employees leave the firms, which is especially pertinent to IT industries given the high employee turnover as compared to other industries [39]. Therefore our first hypothesis is:

**H1: Education is positively associated with a higher firm performance in IT industries.**

### 2.2. R&D and firm performance

The impact of R&D on firm performance is a well researched topic [25]. Two main literature streams explain the impact of R&D investments on firms. The learning literature suggests that an important benefit of R&D is that it helps firms to develop absorptive capacity, which enables them to generate new knowledge [60]. A firm’s absorptive capacity for learning, however, depends on its endowment of relevant technology-based capabilities [18]. R&D investment is the necessary condition for the creation of absorptive capacity [59]. The knowledge management literature suggests that innovation occurs when a firm identifies the potential opportunities to fill the gaps in the industry positioning map, such as new customer segments, new customer needs, or new production methods [12]. In order to identify the innovation, a firm needs to search new opportunities by exchanging information and knowledge, building on current knowledge, synthesizing external knowledge with internal knowledge, and becoming a learning organization. Therefore, efficient knowledge exchange among functions internal and external to the firm is critically important to success [48]. Roussel et al. [50] suggest that R&D is the key to develop new knowledge within a firm.

The development of technological strength and accumulation of knowledge resulting from R&D efforts determine firm performance in high tech industries [14]. Since IT industries are technologically intensive, innovation is the key to developing a source of sustained competitive advantage [9]. Therefore, it is imperative for firms to increase their resource allocation to R&D investments so that their technological advantage over competitors is enhanced [62]. Therefore, our second hypothesis is that greater R&D investment will have positive impact on firm profitability for IT firms.

**H2: R&D intensity is positively associated with a higher firm profitability in IT industries.**

### 2.3. Interaction terms: Education x R&D intensity

Prior literature argues that R&D capital of firms is to a large extent embodied in the employees [30]. In high tech industries, R&D employees are more valuable because their efforts directly influence the organization’s innovation capabilities [62]. Human capital is also associated with innovation because it enhances the absorptive capacity of a firm [53]. Therefore, for technology firms to take advantage of R&D investments, they should make complementary investments in human capital. As Møen [30] suggests, skilled employees are better placed to leverage R&D investments to produce constant innovation and growth for a firm.

There has been little prior research which examines the interaction between R&D and education on firm performance. Ballot et al. [23] use training as a proxy for human capital to explore the complementarities between human capital and R&D, but their results were inconclusive. They further speculate that education or experience and not training is likely to be the dominant variable which interacts with R&D, and recommend further studies in this area which use education or experience as a proxy for human capital. Lee et al. [55] show that of all human capital variables, education has the greatest impact on R&D performance.

Therefore, we propose that the returns to R&D will be higher for firms with a higher fraction of educated employees. Therefore, our third hypothesis is:

**H3: The impact of education on performance will be higher for firms which invest more in R&D**

In addition to the aforementioned factors that impact firm performance, we include additional variables as controls in our model. Executive compensation [36], corporate governance [27], corporate ownership [20], managerial discretion [4], and salary expenses [28] all impact firm performance and are included as controls.

### 3. Research method and data

#### 3.1. Empirical model

Our empirical model is shown in Figure 1. As discussed in the literature section, we examine the direct impacts of education and R&D investment on
firm performance. We also examine whether the relationship between education and firm performance will be moderated by the intensity of R&D investment.

We measure firm performance by the variable ROA which is the return on assets [19]. Employee education level is an important signaling mechanism of their level of competence [40]. Human capital theory also mainly looks at education as an important determinant of human capital [10]. We use the EDUCATION variable to measure the average education in a firm – EDUCATION is the fraction of employees with a college, Masters or PhD degree. The omitted variable here is the fraction of employees who do not have a college education. We measure R&D levels by the variable RND_INT which is the total R&D expenditure divided by the total revenue.

We include the following control variables in our model. We add executive compensation (EXEC_COMP) which is measured as the logarithm of the average of all forms of compensation, including salary, cash bonus, stock options, and other kinds of compensation received by the executives of the firm. We measure corporate governance by using three different variables, including board size (BOARDSIZE), board independence (INDEPDIRECTOR), and executive ownership (STOCKHELD). Board size is measured as the logarithm of total number of board members. As for board independence, previous literature [21] finds that the greater ratio of outsiders on the board will enhance the corporate governance mechanism. Thus, we use the ratio of outside directors to total number of directors to measure board independence. Executive ownership is measured as the ratio of market value of stock share held by inside directors to total equity. Stock return volatility is also an important factor needed to be considered when designing compensation mechanism. In addition, stock return volatility is also an indicator of innovation activity, which represents high risk and unpredictable characteristics [36]. We measure volatility as the standard deviation of previous three years of firm stock returns (VOLATILITY). In addition, we use managerial variables such as advertising intensity (ADV_INT = ratio of advertising expense to total revenues), employee intensity (LAB_INT = ratio of total number of employees to total revenues), and capital intensity (CAP_INT = ratio of total property, plant, and equipment to total revenues) as controls in our model. Finally, we also control for the salary received by employees in the firm (AVG_LABOR_COST), which is the average salary (in ‘000 New Taiwan dollars - denoted by T$) received by employees in the firm.\(^4\)

Table 1 shows the descriptive statistics of our data.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Units</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Min.</th>
<th>Max.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUCATION</td>
<td>Ratio</td>
<td>0.677</td>
<td>0.208</td>
<td>0.164</td>
<td>1.00</td>
</tr>
<tr>
<td>RND_INT</td>
<td>Ratio</td>
<td>0.036</td>
<td>0.037</td>
<td>0.000</td>
<td>0.233</td>
</tr>
<tr>
<td>ADV_INT</td>
<td>Ratio</td>
<td>0.002</td>
<td>0.005</td>
<td>0.000</td>
<td>0.049</td>
</tr>
<tr>
<td>LAB_INT</td>
<td>Ratio</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.001</td>
</tr>
<tr>
<td>CAP_INT</td>
<td>Ratio</td>
<td>0.329</td>
<td>0.385</td>
<td>0.015</td>
<td>2.166</td>
</tr>
<tr>
<td>VOLATILITY</td>
<td>Ratio</td>
<td>0.221</td>
<td>0.477</td>
<td>-0.534</td>
<td>5.712</td>
</tr>
<tr>
<td>AVG_LABOR_COST</td>
<td>T$</td>
<td>258.22</td>
<td>215.652</td>
<td>7.897</td>
<td>1,187.80</td>
</tr>
<tr>
<td>EXEC_COMP</td>
<td></td>
<td>6.671</td>
<td>1.386</td>
<td>2.717</td>
<td>10.975</td>
</tr>
<tr>
<td>STOCKHELD</td>
<td>Ratio</td>
<td>0.099</td>
<td>0.071</td>
<td>0.019</td>
<td>0.885</td>
</tr>
<tr>
<td>INDEPDIRECTOR</td>
<td>Ratio</td>
<td>0.134</td>
<td>0.161</td>
<td>0.000</td>
<td>0.571</td>
</tr>
<tr>
<td>BOARDSIZE</td>
<td>Number</td>
<td>2.205</td>
<td>0.205</td>
<td>1.609</td>
<td>2.944</td>
</tr>
<tr>
<td>ROA</td>
<td>Ratio</td>
<td>0.074</td>
<td>0.055</td>
<td>-0.034</td>
<td>0.378</td>
</tr>
</tbody>
</table>

3.2. Sample

The data comes from Taiwan Economic Journal (TEJ) database which includes financial statements

\(^4\) 1 US dollar roughly equals 31 Taiwan dollars (in Aug 2008)
data and corporate governance data. We match the observations that for all variables employed in the study and delete those have missing values. After eliminating the missing values in our dataset, the total number of firm-year observations is 713, from 2000 to 2006. The final sample contains 11 kinds of IT sectors in Taiwan high tech industries. The largest sector in our sample is the Electronic components sector, which represents 21.8% of sample, followed by the Photoelectric products sector (17.5%) and the Integrated circuits sector (14.1%). The firms in our sample range in size from 497 million to 461 billion New Taiwan dollars in revenues.

We selected this dataset for our research because the IT industry in Taiwan plays an important role in the global high-tech manufacturing value chain. For example, Taiwan is the world’s largest supplier of laptops, and liquid-crystal-display panels for flat-screen televisions\(^5\). Apart from the world’s biggest producers of computer components, Taiwan’s global market share for communication equipment, such as wireless modems, D.S.L. modems, and personal digital assistants, is above 70%\(^6\). A key factor behind Taiwan’s cutting edge in high tech industries is the availability of highly skilled talents, including high education level of citizens and the large number of overseas-educated Taiwanese who have returned to the island to work\(^7,8\). As more and more local industries are being urged to shift from labor intensive operations to high tech manufacturing and services due to the changing global trends, the demand for skilled employees particularly in Taiwan’s high tech sector is vastly increasing\([29]\). The distribution of industry sectors is shown in Table 2.

### Table 2 Industry sectors

<table>
<thead>
<tr>
<th>Industry Sector</th>
<th>Frequency</th>
<th>% of Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electronic Components</td>
<td>156</td>
<td>21.8</td>
</tr>
<tr>
<td>Photoelectric Products</td>
<td>125</td>
<td>17.5</td>
</tr>
<tr>
<td>Motherboard Scheme</td>
<td>93</td>
<td>13.0</td>
</tr>
<tr>
<td>Integrated Circuits</td>
<td>101</td>
<td>14.1</td>
</tr>
<tr>
<td>Electronic Channel</td>
<td>57</td>
<td>7.9</td>
</tr>
<tr>
<td>Software Applications</td>
<td>11</td>
<td>1.5</td>
</tr>
<tr>
<td>Network Modem</td>
<td>31</td>
<td>4.3</td>
</tr>
</tbody>
</table>

\(^5\) See Sui [13]  
\(^6\) See Belson [35]  
\(^7\) See Taiwan Review [57]  
\(^8\) See Dunn [5]

### 4. Results and discussions

#### 4.1. Empirical results

In this section, we discuss and explain the results of our research models. Table 3 presents the results of our main model. We calculate the Variance Inflation Factors (VIF) to check for collinearity. All the VIF values are less than 5, which rules out any collinearity problem.

Since our sample is panel data, we use Fama-Macbeth method to run the regressions and employ Newey-West to adjust standard errors for autocorrelation [16, 26]. As in common in prior literature [51], we mean-centered the EDUCATION and RND_INT variables to control for multicollinearity in models with interaction terms. The second column denotes the results of our main model in equation (1). The coefficient of EDUCATION is positive and significant, which suggests that education has a positive impact on firm performance. This provides support for hypothesis \(H1\).

In column 3 of Table 3, we report the results of the regression where we add the interaction term to the model in equation 1. We interact our education variable with RND_INT variable – EDUCATION*RND_INT. We find that the interaction term is positive and significant, suggesting that higher levels of education are associated with even higher firm performance. This provides support for hypothesis \(H3\).

### Table 3

<table>
<thead>
<tr>
<th></th>
<th>(ROA_i)</th>
<th>(ROA_t)</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.0269***</td>
<td>0.0237***</td>
<td></td>
</tr>
<tr>
<td>(EDUCATION_i)</td>
<td>0.0497*</td>
<td>0.0580**</td>
<td>2.73</td>
</tr>
<tr>
<td>(RND_INT_t)</td>
<td>0.1269</td>
<td>-0.0120</td>
<td>2.87</td>
</tr>
<tr>
<td>(EDUCATION_i*RND_INT_t)</td>
<td>1.0858***</td>
<td>(0.1099)</td>
<td>2.22</td>
</tr>
<tr>
<td>(ADV_INT_t)</td>
<td>0.5895</td>
<td>0.7463</td>
<td>1.09</td>
</tr>
</tbody>
</table>

\(^5\) See Sui [13]  
\(^6\) See Belson [35]  
\(^7\) See Taiwan Review [57]  
\(^8\) See Dunn [5]
Figures 2 and 3 below show the marginal impact of education and R&D on firm performance respectively. The dashed line represents the coefficient in the second column (which is essentially constant) of Table 3 and the solid line represents the marginal impact based on equation 1 (which depends on the level of the moderating variable). The X-axis in Figure 2 and 3 has the decile values of the R&D intensity and education respectively. The equations of the solid line in Figures 2 and 3 are

\[
\frac{\partial ROA}{\partial EDUCATION} = 0.0580 + 1.0858\times RND\_INT
\]

and

\[
\frac{\partial ROA}{\partial RND\_INT} = -0.0120 + 1.0858\times EDUCATION
\]

respectively.

4.2. Robustness Check

From Table 3, we observe that the coefficient of \(AVG\_LABOR\_COST\) is not significant, whereas the coefficient of \(EXEC\_COMP\) is positive and significant; implying that compensation of top executives plays a significant role in firm performance whereas compensation of the rest of the employees does not.
Could it be that the highly significant coefficient of EXEC_COMP is due to simultaneity in our model, where firm performance and executive compensation both depend on each other, as has been shown in previous research [36]? To answer this question, we estimate a simultaneous equations model with both ROA and EXEC_COMP as dependent variables using three stage least squares. The results are shown in Table 4. We find that EXEC_COMP is barely significant in this specification. Our main results on the relationship between education, R&D and firm performance remain qualitatively the same. It is interesting to note, though, that the coefficient of education on executive compensation is negative and significant. This suggests that firms which have higher levels of education pay lower compensation to their executives. A likely reason is that highly educated employees create reduced information-processing demands for the higher executives which in turn drives down executive compensation [4].

Table 4 Estimations of simultaneous equations model

<table>
<thead>
<tr>
<th></th>
<th>ROAt</th>
<th>EXEC_COMPt</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intercept</td>
<td>0.0934***</td>
<td>-3.5108***</td>
</tr>
<tr>
<td></td>
<td>(0.0315)</td>
<td>(0.6800)</td>
</tr>
<tr>
<td>EDUCATIONt</td>
<td>0.0522***</td>
<td>-0.9805***</td>
</tr>
<tr>
<td></td>
<td>(0.0152)</td>
<td>(0.2200)</td>
</tr>
<tr>
<td>RND_INTt</td>
<td>0.0283</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0841)</td>
<td></td>
</tr>
<tr>
<td>EDUCATIONt*RND_INTt</td>
<td>1.1046***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.3149)</td>
<td></td>
</tr>
<tr>
<td>ADV_INTt</td>
<td>1.0823***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.4053)</td>
<td></td>
</tr>
<tr>
<td>LAB_INTt</td>
<td>6.9442</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(27.2163)</td>
<td></td>
</tr>
<tr>
<td>CAP_INTt</td>
<td>0.0021</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0064)</td>
<td></td>
</tr>
<tr>
<td>VOLATILITYt</td>
<td>0.0172***</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0041)</td>
<td></td>
</tr>
<tr>
<td>AVG_LABOR_COSTt</td>
<td>-0.00003**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0000)</td>
<td></td>
</tr>
<tr>
<td>EXEC_COMPt</td>
<td>-0.0052*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(0.0029)</td>
<td></td>
</tr>
<tr>
<td>STOCKHELDt</td>
<td>0.2295***</td>
<td>0.3913</td>
</tr>
<tr>
<td></td>
<td>(0.0317)</td>
<td>(0.9431)</td>
</tr>
<tr>
<td>INDEPDIRECTORt</td>
<td>0.0488***</td>
<td>-0.3622</td>
</tr>
<tr>
<td></td>
<td>(0.0123)</td>
<td>(0.2766)</td>
</tr>
</tbody>
</table>

5. Discussion and Conclusion

This is the first study, to the best of our knowledge, which explores the complementary relationship between education and R&D investments in IT industries. This is an interesting area because while the role of education and R&D has been studied in prior literature, there is little work on how education moderates the relationship between R&D and firm performance. Moreover, while prior research associates human capital with innovativeness, absorptive capacity and other positive outcomes, there are very few studies which look at how human capital impacts the overall profitability of a firm.

This is especially relevant for IT industries because prior research in IT establishes that higher levels of education and experience are associated with higher compensation for IT professionals. We show that education leads to higher return for a firm, suggesting that the benefits of having employees with higher skills outweigh the costs associated with these highly skilled employees for firms in our sample.

Our examination of the interactive relationship between R&D and education shows that the impact of R&D on firm performance is moderated by education. Because R&D is one of the main factors influencing the success of innovation, firms need high quality workforce to focus on R&D process. As more educated workforce is viewed as having higher comprehensive ability of learning fast and being more creative, more educated workforce will contribute more to increase the value of R&D outcomes. Therefore, firms are in a better position to leverage their R&D investments for higher profits if a higher percent of their employees are skilled.

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7 TURNOVER is the average turnover rate of executives (Chairman, CEO, and CFO)

10 FIRMSIZE is measured as the log of revenues of the firm.
Our analysis also suggests that executive compensation is negatively related to education, suggesting that firms with higher level of skilled employees pay a lower compensation to their top executives. Since executive compensation is not a main area of study in this paper, we leave it to future research to explore this interesting finding in more detail. Our study contributes to human capital literature by examining firm level of human capital in the context of IT firms. In addition, our study also contributes to IT firm valuation research by examining two of the most important capital assets of IT firms, human capital and R&D capital. Previous literature in human capital and R&D are seldom combined together. Our study connects the linkage between these two important capital assets of firms. Furthermore, our study provides reference value for IT firms about the valuation of different contribution of education and its importance. Our study connects the linkage between these two important capital assets of firms. Furthermore, our study provides reference value for IT firms about the valuation of different contribution of education and its importance.

6. References


