# The long-term effect of training and development investment on financial performance in Korean companies

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## Abstract

**Purpose** – The purpose of this paper is to examine the relationship between training and development investment and financial performance over time. Human capital literature suggests that training and development investment may not immediately affect financial performance but may instead create effects that are realized over time. However, most existing cross-sectional research explores the influence of training and development investment on performance while overlooking training and development investment's long-term effects.

**Design/methodology/approach** – This study focuses on the recovery period following the Great Recession circa 2008 in the South Korean business context. Longitudinal data from 312 firms, including four distinct waves, were used. Latent growth modeling was used to help identify a pattern of reciprocal relationships between training and development investment and financial performance over time.

**Findings** – The results indicate that even though growth in training and development investment is stable over time, there are significant between-firm differences in training and development investment trajectories over time. Prior financial performance was shown to be positively related to higher levels of training and development investment, but it was not related to growth in training and development investment. The initial level of training and development investment did not predict subsequent profit, but growth in training and development investment was positively related to future financial performance.

**Originality/value** – This study suggests that as an organization's training and development investment increases over time, a delayed effect on financial performance may emerge because of this accumulated investment. Ultimately, the results highlight the importance of having a stock of human capital, rather than concentrating upon momentary flows that yield immediate effects.

**Keywords** Workplace training, Human resource strategies, Human capital, Human capital theory, Training and development investment, Financial performance, Latent growth modelling

**Paper type** Research paper



As a focal human resource (HR) practice is used to develop human capital within firms, training and development represent a growing area of scholarly interest (Sitzmann and Weinhardt, 2018; Zula and Chermack, 2007). Continuous formal learning opportunities in accredited institutions form a critical pathway for developing general human capital, or capital that is applicable to any organizational context (Campbell *et al.*, 2012). Informal learning that occurs in the workplace can help employees to acquire tacit knowledge in performing higher task-complexity jobs and ultimately develop firm-specific human capital, or capital that is only meaningful within a specific organizational context (Dämmrich *et al.*, 2015). Previous meta-analytic studies have found that investment in training and development can lead to better financial performance (Crook *et al.*, 2011; Tharenou *et al.*, 2007).

Particularly, firm-specific human capital is difficult for competitors to replicate because the capital is optimally tailored to the work environment in which it was first cultivated (Hatch and Dyer, 2004). Researchers have argued that firms with ample training and development opportunities can more effectively yield firm-specific human capital and stimulate subsequent financial performance than can firms that do not offer training and development opportunities (Berk and Kaše, 2010).

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Even though these studies have provided empirical evidence of this relationship, doubts have been raised regarding the robustness of the results. Most cross-sectional research has explored the contributions of training and development to financial performance while overlooking the long-term effects of such investment (Rindfleisch *et al.*, 2008). This limitation means not only that the research model is inherently flawed (e.g. simultaneity bias; Delaney and Huselid, 1996), but also that the modeling is unlikely to demonstrate time compression diseconomies, which constitute one of the most significant aspects of training and development investment (Dierickx and Cool, 1989; Kim and Ployhart, 2014). Because the effects of training and development investment are experienced over a period of time, considerable lag time is required before these effects may be realized in the form of enhanced financial performance (Wright *et al.*, 2001).

Therefore, this study offers an examination of the relationship between training and development investment and financial performance over time by addressing two research questions:

*RQ1.* How does training and development investment change over time?

*RQ2.* How does growth in training and development investment influence financial performance over time?

In order to mitigate the limitations of the previous research, this study uses longitudinal data from 312 South Korean (hereafter Korean) firms covering four distinct waves from 2008 to 2013. This study explores the reciprocal and non-linear relationship between certain patterns of training and development investment and financial performance by using latent growth modeling (LGM). Finally, this study finds empirical evidence to suggest that as a firm's training and development investment increases over time, a delayed effect on financial performance may emerge because of this accumulated investment.

## Theoretical background and development of hypotheses

The literature review consists of three parts: human capital theory as a conceptual framework, the relationship between training and development investment and financial performance, and an introduction to the present study.

### *Human capital theory*

In the 1960s, Gary S. Becker coined the phrase "human capital" to refer to the stock of knowledge, skills, experiences, and other characteristics that serve as the central drivers of economic growth (Becker, 1993). Over 50 years later, this concept continues to help elucidate how investments in human capital can contribute to a firm's competitive advantages by enhancing employee productivity. Proposing a resource-based view (RBV), Barney (1991) pinpointed firm-specific human capital as a source of sustainable growth for companies and suggested that it cannot be perfectly acquired from strategic-factor markets (e.g. labor markets). Since valuable, rare and hard-to-imitate human capital acts as an isolating mechanism for sustainable growth, a firm's competitors are not able to replicate its advantages instantaneously (Crook *et al.*, 2011; Hoopes *et al.*, 2003).

Dierickx and Cool (1989) suggested that a "strategic asset is the cumulative result of adhering to a set of consistent policies over a period of time" (p. 1506). An appropriate time dependency through the benefits of human capital can produce certain "routines" embedded in an organizational system (Crossan *et al.*, 1999; Koch and McGrath, 1996; Penrose, 1959). Thus, prior human capital investments enable firms to enjoy early-mover benefits based on time compression diseconomies, which indicates that human capital investment is less successful if a firm tries to improve its financial performance too quickly (Dierickx and Cool, 1989; Jiang *et al.*, 2014). A given rate of human capital

investment over a certain time interval may produce a larger stock of human capital than a doubled rate of human capital investment over half the time. Time compression diseconomies are characteristic of a firm's intangible assets accumulation process, and they bring about resource heterogeneity to help the firm to maintain a competitive advantage (Knott *et al.*, 2003).

*Training and development investment and financial performance*

Strategic human resource management (SHRM) scholarship suggests that HR practices ultimately aim to generate multi-level performances (Barney and Wright, 1998). Dyer and Reeves (1995) specified a multidimensional model of such performances: HR-related performances refer to employees' attitudes and behaviors (e.g. turnover) that result from HR practices; organizational performances refer to the operational excellence of an organization (e.g. productivity); and financial performances refer to actual monetary values that result from business activities (e.g. return on assets).

Dyer and Reeves (1995) argued that because HR practices are designed to maximize purposeful HR-related performances, these HR practices first influence proximal HR-related performances and afterwards distal performances (i.e. organizational and financial performances; Wright *et al.*, 2003). Meta-analytic research (e.g. Jiang *et al.*, 2012) has shown that HR practices are more likely to affect HR-related, organizational and financial performances sequentially. On the other hand, Guest (1997) expressed skepticism about the "causal distance" between HR practices and relatively further distal performances, as increasing complications combine with internal and external factors to weaken the robust linkage between HR practices and financial performance (Boselie *et al.*, 2005; Rogers and Wright, 1998).

Some scholars have raised questions about this unidirectional mechanism, suggesting that HR practices influence financial performance via organizational performance (Wright *et al.*, 2005). They have proposed a reverse causality mechanism that suggests that high-performing organizations that are profitable are more willing to invest in HR practices than low-performing ones are (Edwards and Wright, 2001; Katou, 2012). These reverse relationships are assumed to develop because high-performing organizations have slack resources to be able to share their profits with their employees by providing competitive compensation, job security, selective hiring systems, extensive developmental opportunities and various forms of empowerment activities (Wright *et al.*, 2005; Pfeffer, 1998). These organizations are thus able to exponentially elevate their employees' capabilities. Capable employees are able to contribute to improved financial performance by bringing in more profit. This increased profit can then be reinvested in the employees.

Despite these debates about the relationship between HR practices and multi-level performances, the relationship between training and development investment and financial performance remains contested. The return on training and development investment is not bidirectionally or unidirectionally proportional to financial performance. Substantial investment in training and development may cause a temporary decrease in returns at the beginning as a result of the transformative changes that take place in an organization before the benefits of the training and development investment are offset by the costs of such investment (Bunderson and Sutcliffe, 2003; Morrison, 2008). A net benefit of long-term training and development investment might only be achieved after reaching the tipping point, or the point at which the organization starts to capitalize on its core competency in order to become competitive in its business environment (Gladwell, 2000). The skepticism regarding the linear relationship between training and development investment and financial performance suggests the importance of taking into account the dynamic nature of training and development in an organization as it affects financial performance. Therefore, it is necessary to explore the non-linear relationship between training and development investment and financial performance.

*The present study*

This study focuses on the recovery period following the Great Recession in the Korean business context. In September 2008, Korean firms were struck by an economic shock following the collapse of Lehman Brothers. The Korean economy heavily relies on export industries, which are extremely sensitive to exchange rates. The Korean won sank 28 percent against the US dollar from August to November 2008 (Chung, 2010). Because such a plummet puts equivalent firms' profits at risk, the fluctuations threw firms into turmoil. Throughout the Great Recession and beyond, the gross domestic product (GDP) growth rate dropped from 2.8 percent in 2008 to 0.7 percent in 2009, bounced back to 6.5 percent in 2010, and then recovered to approximately 2~3 percent growth after the Great Recession (Statistics Korea, 2018).

This research stems from this economic context, asking how training and development investment change in an economic recovery period. The onset of the recession in 2008 might result in a substantial decrease in training and development investment, but the quick recovery from the recession might have encouraged Korean firms to invest in training and development (Hawng *et al.*, 2016). Similarly, Ban (2012) found that the Korean economy had experienced its worst economic recession in 1998 and that there had been 5.98 percent growth in training and development investment from 1999 to 2004. However, the patterns of training and development investment in recovery periods are rarely explored. In general, among training and development professionals, it is widely believed that training and development investment usually decreases during economic downturns but may rise in economic surges.

The SHRM literature has suggested that training and development investment could contribute for post-recession profit (Kim and Ployhart, 2014). Firm-specific human capital that is acquired through cumulative training and development can be an intangible asset because it generates sustained economic rents that guarantee returns that exceed the firm's opportunity costs for training and development investment (Hatch and Dyer, 2004). Throughout the large-scale surveys of employers in UK before and after Great Recession, Felstead *et al.* (2013) identified that even though training and development could be constrained by budget rigidity, employers are likely to invest more in training and development due to outside pressures for market competition in the recovery period.

Post-recession recovery, which requires fundamental changes in business strategy, particularly needs to depend upon human capital that is formed by the rearrangement of work routines within firms or the creation of new skills and knowledge (Kim and Ployhart, 2014). Recognizing that training and development can provide opportunities for firms to develop firm-specific human capital as a lower-risk/higher-return project, this study explores whether firms used human capital-led acceleration strategies such as training and development investment to facilitate economic recovery in light of the 2008 recession Barajas *et al.* (2017). Therefore, this study assumes that there was growth in training and development investment among Korean firms in the post-crisis period to prepare the firms for future financial performance growth:

*H1.* There was a significant growth in training and development investment over time.

This study has a further interest in exploring whether variation exists in firms' training and development investment trajectories over time, thereby enabling the identification of between-firm differences. A severe economic recession forces firms to change strategy by performing resource reallocation. In order to avoid bankruptcy or to retain sufficient liquidity, risk-averse firms may postpone productivity-enhancing expenditures that are related to human capital (Santoro and Gaffeo, 2009). This radical reduction in human capital investment enables vulnerable firms to survive during severe downturns. Yet firms that are "swimming against the stream" may increase their expenditures to take advantage of the economic disturbances as a growth opportunity (Shakina and Barajas, 2014). Survivors can enjoy the transformed

competitive landscape due to reduced market competition, and they can strengthen long-term competitive advantages after the recession as a result of their efforts to enhance productivity (Santoro and Gaffeo, 2009):

*H2*. There were significant between-firm differences in training and development investment trajectories over time.

Previous studies have explored the unidirectional mechanism that extends from training and development investment to financial performance through enhanced employee attitudes and behaviors (Edwards and Wright, 2001; Katou, 2012). This approach can limit scholarly understanding of the dynamic nature of training and development investment, which is contingent on business strategies, while overlooking the causal order of the relationship. In order to test the reverse causality, this study hypothesizes that high-performing firms were likely to increase their investment in training and development:

*H3*. Financial performance (Time 0) was positively related to initial training and development investment (Time 1).

This study suggests that the starting point (Time 1) of training and development investment was not positively associated with the subsequent (Time 3) level of financial performance; however, growth in training and development investment was positively associated with the subsequent (Time 3) level of financial performance. The first part of this statement represents the causal distance between training and development investment and the relatively further distal outcome indicator of financial performance over time. The second part reflects the characteristics of the human capital that has been accumulated and the time-lagged effects of training and development investment. This means that regardless of the starting point of training and development investment, financial performance is accelerated by growth in training and development investment over time. While training and development investment may not affect a firm's immediate financial performance, the investment may create effects that are realized over time. Finally, this study assumes that training and development investment increased over time and that a firm's financial success emerged after continuous learning reaches a tipping point:

*H4*. Growth in training and development investment over time was positively related to financial performance (Time 3).

## Method

### *Sample*

This study used a data set from the Human Capital Corporate Panel (HCCP), which was administered by the Korea Research Institute for Vocational Education and Training (KRIVET, 2015). To perform a stratified and random sampling, the firm samples that were initially selected were those firms that had hired over 100 employees ($n = 4{,}109$). Based on the Korean Standard Statistical Classification, these firms were then classified according to a $3 \times 3$ matrix: industry (manufacturing, banking, and non-banking services) and firm size (100–299, 300–999 and more than 1,000 employees). Finally, 500 (12.2 percent) of the firms were sampled at random from each cell in the matrix to prevent possible over- or under-sampling. Although there were moderate changes in the sampling of the HCCP data set and unforeseeable shifts such as bankruptcies or mergers and acquisitions, a total of 381 firms were consistently sampled. This study used 312 of those firms' complete data with three repeated measurements. This study used the corporate-level data described here, as well as corporate financial data from 2008 (Time 0), 2009 (Time 1), 2011 (Time 2) and 2013 (Time 3). The descriptive characteristics of the samples used in this study, which are representative of the Korean business sector, are provided in Table I.

*Measurements*

The unit of analysis for this study was the organization. All data were normalized to reflect current financial values by applying the Korean Consumer Price Index that corresponded to each year of data collection (Statistics Korea, 2018). This process was corrected for inflation.

*Training and development investment*. HR directors of all the companies that were surveyed as part of the HCCP reported their actual corporate training expenditures every two years. In this study, training and development investment represent financial investment in workplace learning practices with the aim of helping employees develop job competencies. Total expenses for training and development, such as trainer fees, training materials and equipment and classroom rental fees, were included in training and development investment. Due to the high kurtosis of the data, a log transformation was performed.

*Financial performance*. HCCP provided corporate financial data based on firms' annual financial statements. This study's assessments of financial performance were operationalized using the ratio of ordinary income to total assets, which was determined by dividing each firm's ordinary income by its total assets.

*Data analysis strategy*

The data for this study were analyzed using LGM in order to identify the effects of changes on the association between training and development investment and financial performance over time (Bollen and Curran, 2006; Ployhart and Vandenberg, 2010). LGM is a statistical technique that applies structural equation modeling (SEM) to the analysis of longitudinal data. Traditional longitudinal analytical methods use repeated multiple regressions or the SEM method while simply assuming that the temporal precedence of training and development affects financial performance (e.g. training and development investment at Time 1 results in a stronger financial performance at Time 2). Such research designs do not prevent the specification of measurement errors (Chan, 1998; Dierdorff and Surface, 2008).

*Model specification*

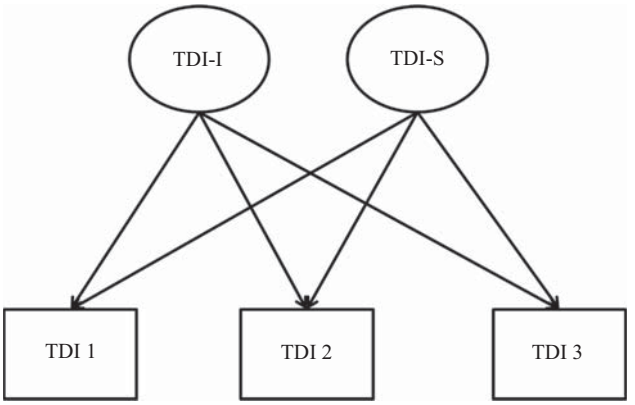
Rogosa (1988) suggested using a two-step LGM approach to determine reciprocal relationships. The first step is to identify changes in an independent variable over time, while the second step is to incorporate predictors that result in important effects on changes in the independent variable and determine whether the changes in the independent variable lead to the subsequent dependent variable. In this study, the first step of LGM was used to test the hypothesis that there is a significant growth and variance in training and development investment over time (see Figure 1).

During the second step, analyses were conducted to examine training and development investment as a predictor and consequence of financial performance (see Figure 2).

**Table I.** Descriptive characteristics of the samples used

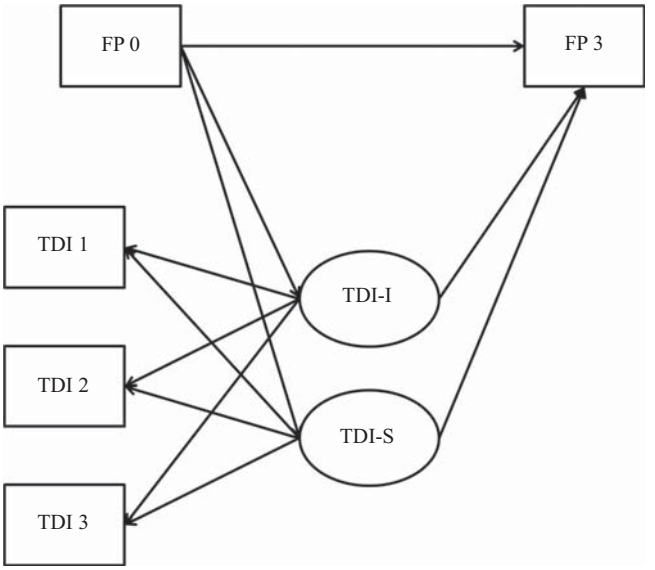
| Industry | Entire Korean business sector | | | | HCCP samples in this study | | | |
|---|---|---|---|---|---|---|---|---|
| | Organization size[a] | | | | | | | |
| | 100~299 | 300~999 | > 1,000 | Total | 100~299 | 300~999 | > 1,000 | Total |
| Manufacturing | 2,436 | 593 | 158 | 3,187 | 109 | 88 | 36 | 233 |
| Banking | 69 | 41 | 48 | 158 | 2 | 7 | 11 | 20 |
| Service | 581 | 140 | 43 | 764 | 27 | 24 | 8 | 59 |
| Total | 3,086 | 774 | 249 | 4,109 | 138 | 119 | 55 | 312 |

**Notes:** This table is based on the 2009 HCCP data. For the sake of clarity, the descriptive characteristics of the sampled data are regrouped from the original categories. [a]Numbers of employees




**Notes:** TDI, training and development investment; FP, financial performance; I, intercept (i.e. initial status); S, slope (i.e. change over time)

**Figure 1.**
Three-wave LGM for training and development investment




**Notes:** TDI, training and development investment; FP, financial performance; I, intercept (i.e. initial status); S, slope (i.e. change over time)

**Figure 2.**
Conceptual research framework: Training and development investment as predictor and consequence of growth

*Model identification*

The two models in Figures 1 and 2 both satisfy the necessary *t*-rule by having three and five observed variables, respectively (Kline, 2011). Moreover, because these two models are recursive models without feedback loops, reciprocal relationships or correlations between disturbances, the models are identified.

*Model estimation*

Maximum-likelihood (ML) estimation was performed using SPSS 18.0 and Mplus 6.12 software to identify simultaneous interactive relationships. In the first step, an LGM was specified to test the hypothesis regarding the growth trajectory of training and development investment over time. A starting point (i.e. intercept) and a rate of change (i.e. slope) were used to characterize the trajectory of training and development investment (Mason, 2001). The intercept and slope provided information about mean and variance, respectively. All intercepts and slopes were specified to co-vary (Chan and Schmitt, 2000).

More specifically, five estimates were provided in LGM: the mean intercept represents the estimate of the average training and development investment across firms at the initial measurement, the mean slope indicates the average training and development investment change across firms over repeated measurements, the variance of the intercept represents the extent of variability across firms in training and development investment at the initial measurement, the variance of the slope represents the variability in change trajectories of training and development investment across firms over repeated measurements, and the covariance of growth parameters shows the relationship between the intercepts and slopes of training and development investment (Dierdorff and Surface, 2008; Kline, 2011). In order to interpret the fit of the model, this study used four fit indices: $\chi^2$ goodness-of-fit test, the comparative fit index (CFI; Bentler, 1990), the Tucker–Lewis Index (TLI; Tucker and Lewis, 1973) and the root-mean-square error of approximation (RMSEA; Steiger, 1990).

The latent variables provided information that was estimated from the data to test *H1* and *H2*. Financial investment as a predictor and consequence of training and development investment was subsequently specified to test *H3* and *H4*. Financial performance at Time 0 as an exogenous predictor of growth was specified to have a direct effect on both the intercept and slope of training and development investment and the intercept and slope were specified to impact financial performance at Time 3. The financial data from 2008, Time 0, was used as a baseline for the initial level of training and development investment. The financial data from 2013 were used as the most appropriate benchmark for assessing the effects of previous training and development investment on financial performance, given that a firm's long-term strategic plan generally spans a five-year time frame.

## Results

The descriptive statistics for the data are presented in Table II. Log-transformed training and development investments showed high correlations but did not exceed 0.85, although one correlation nearly reached the threshold (Kline, 2011). To examine the univariate normality of the data, the skewness and kurtosis of training and development investment and financial performance were evaluated. All skewness values were between −1.5 and 1.5 and all kurtosis values were between −1.3 and 7. Thus, the gathered data showed a mild form of univariate non-normality.

| Variables | *M* | SD | Skewness | Kurtosis | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|
| TDI 1 | 11.336 | 1.900 | 0.211 | −0.238 | 1 | | | | |
| TDI 2 | 11.262 | 2.045 | 0.170 | −0.158 | 0.849** | 1 | | | |
| TDI 3 | 11.400 | 2.011 | 0.149 | −0.057 | 0.803** | 0.859** | 1 | | |
| FP 0 | 5.26 | 8.000 | 0.270 | 1.263 | 0.189** | 0.191** | 0.169** | 1 | |
| FP 3 | 2.927 | 7.390 | −0.740 | 2.636 | 0.056 | 0.110 | 0.132* | 0.329** | 1 |

**Notes:** $n = 312$ firms. TDI, training and development investment; FP, financial performance; *M*, mean; SD, standard deviation. TDI 1 reflects the data for 2009; TDI 2 for 2011; TDI 3 for 2013; FP 0 for 2008; and FP 3 for 2013. *$p < 0.05$; **$p < 0.01$.

**Table II.**
Descriptive statistics

The estimation of the LGM of training and development investment indicated an acceptable fit to the observed data, even though the RMSEA just exceeded 0.10 (Chen *et al.*, 2008; Kline, 2011). The predictor and consequence of growth in training and development investment showed a good fit to the data (see Table III).

*Hypothesis testing*

In the first step, the mean starting point of training and development investment was estimated to be 11.331 ($p < 0.05$), and the mean rate of change was estimated to be 0.033 ($p > 0.05$). The mean starting point of training and development investment was significant, but the mean rate of change was non-significant. Variance estimates for the intercept (3.531) and the slope (0.344) were greater than zero ($p < 0.05$), indicating significant differences in the initial and growth points of training and development investment for each firm. The estimated covariance between the intercept and the slope was −0.227 ($p > 0.05$); thus, initial levels of training and development investment were negative, but they were not significantly correlated with growth in training and development investment. Ultimately, *H1* was rejected, but *H2* was supported (see Figure 3 and Table IV).

| | $\chi^2$ (df) | CFI | TLI | RMSEA |
|---|---|---|---|---|
| LGM for training and development investment | $\chi 2\ (1) = 4.431, p = 0.035$ | 0.996 | 0.988 | 0.105 |
| Predictor and consequence of growth in training and development investment | $\chi 2\ (4) = 8.702, p = 0.054$ | 0.995 | 0.987 | 0.061 |

**Table III.** Overall fit of the models

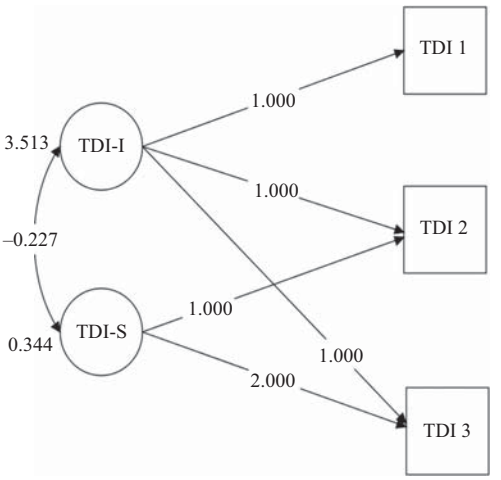



**Figure 3.** Three-wave LGM for training and development investment with unstandardized coefficient estimates

| | Mean | | Variance | | Intercept ↔ Slope |
|---|---|---|---|---|---|
| | Intercept | Slope | Intercept | Slope | |
| Training and development investment | 11.331*** | 0.033 | 3.513*** | 0.344*** | −0.277 |

**Note:** ***$p < 0.001$.

**Table IV.** Parameter estimates of LGM for training and development investment

In the second step, the results showed that financial performance at Time 0 ($\beta = 0.026$, $p < 0.05$) was related to higher initial levels of training and development investment, but it was not related to the training and development investment slope ($\beta = -0.003$, $p > 0.05$). Prior financial performance predicted the initial level of training and development investment, but it did not predict growth in training and development investment. In conclusion, *H3* was supported. With regard to *H4*, while the initial level of training and development investment was not related to subsequent (Time 3) financial performance ($\beta = 0.005$, $p > 0.05$), growth in training and development investment was related to financial performance at Time 3 ($\beta = 0.192$, $p < 0.05$). Even though the initial level of training and development investment was not related to future financial performance, if a firm's training and development investment increased over time, its financial performance was stronger (see Figure 4 and Table V).

Based on the results of the model estimations, all suggested hypotheses were examined. First, there was a significant mean difference in initial training and development investment, but growth in training and development investment was not observed. There were significant between-firm differences in the initial levels and rates of change in training and development investment. Second, financial performance (Time 0) was positively related to initial training and development investment (Time 1). Prior financial performance was positively related to higher subsequent levels of training and development investment, but it

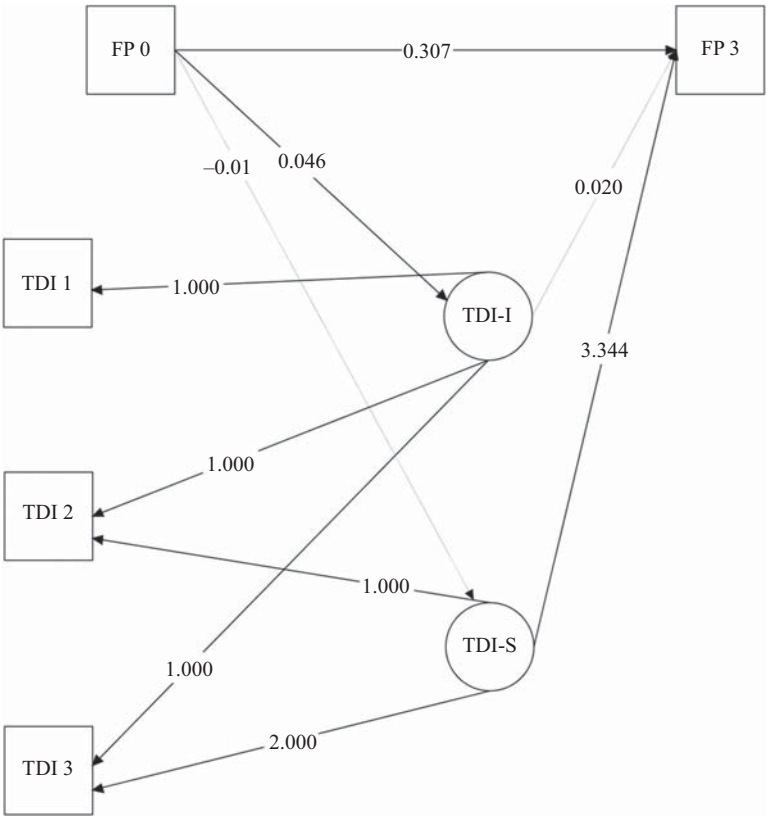



**Figure 4.**
Final model with unstandardized coefficient estimates

**Note**: Dotted lines indicate non-significant paths

was not related to growth in training and development investment. Third, growth in training and development investment over time was positively related to financial performance (Time 3). The initial level of training and development investment did not predict subsequent profit, but growth in training and development investment was positively related to future financial performance.

## Discussion

The study provides a new perspective on training and development investment in the recovery period of the Great Recession by pairing human capital theory and LGM statistical modeling. The results of this study suggest possibilities for employing the time-dependent characteristics of human capital and longitudinal research designs in order to test the underexplored nature of training and development investment.

The results of *H1* and *H2* provide a richer understanding of patterns in training and development investment. A certain stable increase or sudden drop in the training and development investments of Korean firms were not observed. At first, this result identifies that the impact of the Great Recession was not as severe as the concern that training and development investment would have fluctuated widely according to the overall state of the economy. There are further considerations to interpret the trends in training and development investment during the recovery period. Recent studies have argued that a firm's ability to manage skill flexibility is a core competency in maintaining the firm's productivity and financial returns particularly during the time of market turbulence (Bhattacharya *et al.*, 2014; Kim and Ployhart, 2014). By selectively hiring individuals with general human capital that fits the firm's business strategies firms could leverage this general human capital to maximize organizational outcomes rather than investing in firm-specific human capital that may take more time to develop. Thus, talent acquisition and retention and investment in labor expenses could become the primary methods by which organizations gained general human capital from the external labor market (Bhattacharya *et al.*, 2014; Van Iddekinge *et al.*, 2009). During the post-recession period, some South Korean firms seemed to focus on acquiring general human capital by reducing new recruitment, particularly for early career talent who needs substantial training and development investment at the beginning and increasing recruitment of skilled employees from the external labor market (OECD, 2017).

Additionally, there were systematic differences in the level of training and development investment among firms. This result is consistent with the findings of Felstead *et al.* (2013), who identified that employers' willingness to invest in training and development was differed by the nature of the market competition. The firm-specific human capital through training and development is highly rooted in complicated social systems in the firm, thus making it difficult to transfer without incurring considerable dynamic adjustment costs (Crook *et al.*, 2011; Hatch and Dyer, 2004) and eventually remains a possible strategic asset that cannot be quickly manipulated by competitors (Bollinger and Smith, 2001). Some firms did consistently invest in training and development despite economic uncertainties in recovery period, seeing this investment as a stimulant of future financial performance growth.

| | TDI-I | TDI-S | FP 3 |
|---|---|---|---|
| FP 0 | 0.026*** | −0.003 | 0.042*** |
| TDI-I | | | 0.005 |
| TDI-S | | | 0.192* |

**Notes:** *$p < 0.05$; ***$p < 0.001$.

**Table V.** Standardized path coefficients of the final model

With respect to *H3* and *H4*, this study found that prior financial performance is positively related to subsequent training and development investment, but the starting point of training and development investment does not guarantee future profit. This result supports Wright *et al.*'s (2005) reverse causality and Guest's (1997) causal distance argument. It is important to note, however, that the results do not prove that temporal precedence predicts a firm's budget allocation. Rather, since the human capital that is acquired from training and development investment may become eroded or obsolete at any given point in time, firms may lose their sustainable competitive advantages if they lack continuous flows of new skills and competencies (Dierickx and Cool, 1989; Garavan *et al.*, 2001; Ployhart *et al.*, 2009).

Finally, the strongest finding of this study supports the importance of growth in training and development investment. Consistent with prior research by Van Iddekinge *et al.* (2009), this study's findings indicate that more training and development investment is likely to predict better financial performance over time. Unlike labor expenses that may vary according to a firm's contextual factors (Bhattacharya *et al.*, 2014), training and development investment should be consistent and stable in order to take advantage of the firm-specific human capital that can accumulate among employees, tasks, tools and routines, as well as in the combination of these entities (Yuan *et al.*, 2010). Ultimately, the results suggest the importance of having a stock of human capital, rather than concentrating on momentary flows that yield immediate effects (Seoul National University College of Engineering, 2015).

*Implications for theory*

The existing literature on intangible assets assumes a log-linear relationship between intangible assets and performance (Adler and Clark, 1991; Gruber, 1992). The central argument made is that individuals or organizations monotonically acquire knowledge and skills, and their productivity is enhanced commensurately as they apply what they acquire. According to the classic learning curve theory, accumulated learning generates a linear progress curve in productivity and performance (Argote, 1996). This learning curve is represented by the progress ratio, which suggests that an increase in units of cumulative learning results in an increase in productivity from units of output at a uniform rate. Finally, cumulative learning acts as an intangible strategic asset for enhancing organizational performance in the long term (Teece and Pisano, 1994).

Beyond a linear assumption of the relationship between intangible assets and performance, the learning curve theory suggests non-linear patterns in intangible assets accumulation and development through learning by doing (Muth, 1986). Developing new knowledge is often accompanied by a significant drop in productivity in the early stages of the learning curve; this drop is represented as an initial downward concavity on the learning curve (Morrison, 2008; Muth, 1986). For example, employees begin to learn a set of work routines that is optimized to maximize the performance of a specific task; as such, it takes time to develop new stable work routines (Zollo and Winter, 2002). At the same time, since employees are less likely to achieve complete mastery of new skills and knowledge, employees are more likely to make errors and need additional training to acquire tacit skills (Hatch and Dyer, 2004). Likewise, the initial downward concavity on the learning curve emerges when the benefit from cumulative learning does not offset the cost of learning. Moreover, there can be a flattening of the learning curve without any distinctive gains in productivity despite investment in intangible assets and a subsequent commitment to deliberate practices (Dorroh *et al.*, 1994). This plateau happens when the economic potential of cumulative learning is building: The plateaued learning curve reaches a higher level of sustained proficiency with the accumulated learning (Morrison, 2008; Thompson, 2012).

After a significant plateau state with seemingly little improvement, sudden improvement may occur as a result of the sufficient accumulation of learning (Lapré and Nembhard, 2011). Hax and Majluf (1982) suggested that cumulative learning generates steeper learning curves. As organisms, organizations are made up of multiple subsystems that perform their own functions but in coordination with other functions (Kofman and Senge, 1993). Even though learning by doing aims to benefit the overall organization, the subsystems in the organization are unable to internalize such benefits equally. There are local variations of absorptive capacity in subsystems of an organization (Cohen and Levinthal, 1990). Since overall organizational performance relies on the integration of absorbed knowledge that enables different subsystems to come together, cumulative learning is rapidly realized when all of the subsystems accrue enough learning to bridge a critical threshold (Azariadis and Drazen, 1990; Kim *et al.*, 2013; Morrison, 2008).

*Implications for research*

Morrison (2008) illustrated the bifurcation dynamics of intangible assets investment, using a learning curve that depicts initial downward concavity and a subsequent plateau. On the one hand, in order to reduce the opportunity cost of learning without adding prompt outputs, additional investment in intangible assets can be hesitant, meaning accumulated learning fizzles and fails (Li and Rajagopalan, 1998). On the other hand, an organization may find a tipping point that yields economic rent through continuous learning by doing (Gladwell, 2000; Repenning *et al.*, 2001). The issue is that the monetary realization of intangible assets accumulation is difficult to pre-estimate and shows stochastic and non-linear dynamics (Erden *et al.*, 2014).

In this regard, the results of this study may motivate a more focused consideration of the substantive role of "time" in intangible assets investment. Since intangible assets research implicitly addresses issues of change without considering the mutable characteristics of individual and organizational behaviors in workplace contexts, its research results may be misinterpreted or fail to demonstrate strong causal inferences about the mechanisms behind a given change (Bono and McNamara, 2011). Therefore, the application of rigorous research designs can contribute to understand the role of time while designing and conducting intangible assets research. Longitudinal statistical designs can help researchers to investigate how firms' intangible assets investments contribute to the creation of competitive advantages, elucidating the specific mechanisms via empirical data. Various longitudinal research designs (including LGM, repeated-measures general linear modeling, and random coefficient modeling) can help shed light on the dynamic nature of intangible assets over time (Ployhart and Vandenberg, 2010).

Moreover, much of the prior research regarding human capital investment assumes that the labor market for human capital is perfectly competitive and firm-specific human capital is the inhibitor to trading human capital in the labor market (Chadwick, 2017). Investing in general human capital is likely to be a financial drain since talented employees with general human capital are more visible in the labor market, meaning that their mobility is inevitably higher than that of their colleagues (Riley *et al.*, 2017). Thus, firms are required to focus their investments in human capital on firm-specific human capital that can be maintained within the individual firms and cannot be applied easily to other firms (Coff and Raffiee, 2015). For firms, firm-specific human capital is an isolating mechanism that enables sustainable growth, but for employees, it is an investment dilemma since employees with firm-specific human capital may recognize that they could become locked into particular firms and suffer significant penalties in the labor market (Coff and Raffiee, 2015; Snell and Dean, 1992).

However, the argument that enables this approach is valid primarily for western economies and particular private sectors that generally show high levels of job mobility. This study examined its research questions using data drawn exclusively from the Korean

private sector and its labor market, which is meaningfully different from the labor markets of Western countries (OECD, 2017). Acknowledging the relatively lower job mobility characterizing Korea's labor market, in which lifelong employment still exists, this study suggests the need for new research directions for human capital theory. In particular, it is necessary to explore the relationship between intangible assets and financial performance in more diverse research contexts and environments in order to revisit the general assumption of human capital theory.

## Limitations and future research

Many researchers have sought to corroborate the relationship between various estimations of human capital and firm performance, thereby establishing a novel theory and identifying new implications in intangible assets research. This study operationalized training and development investment by using the financial factor of training expenditures. Future research might consider estimating human capital as the aggregate form of employees' knowledge, skills, and attitudes within a firm (Bhattacharya *et al.*, 2014). Moreover, the present study extends the idea that human capital emerges and evolves over time and that there are various predictors that influence human capital. The patterns of training and development investment may vary by industry characteristics, for example, because firms in different industries face distinctive competitive business environments (Kim and Ployhart, 2014). Firm size can be a primary determinant of the a firm's ability to provide sizable and continuous training and development investment. Large firms may have more training and development resources (e.g. facilities, equipment, and training and development professionals) because of the firms' economies of scale (Aycan, 2001). Likewise, there are many opportunities for the further investigation of human capital, the results of which would be valuable to training and development research and practice.

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