

The Role of Human Capital in Entrepreneurial Process of IT Ventures in Korea

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Abstract

This study examined public companies by comparing the effect of human capitals of entrepreneurs on each stage of entrepreneurial process in Korean venture industry. In our sample of 260 KOSDAQ-listed firms, we then sought to find what characteristics of human capitals influence each stage of entrepreneurial process. Our primary objective was to help close a research gap regarding human capital. We examined the comparative importance of various types, such as age, school prestige, educational level, related industry experience and functional background, on the each stage of entrepreneurial process. Our findings supported that the role of the youth, related industry experience and functional background in predicting who among the entrepreneurs of the sample companies would develop opportunities in IT industry. However, other human capital measure, such as school prestige and educational level, did not appear to be factors.

Keywords: *human capital, entrepreneurial process, information technology, venture capital, initial public offerings*

1. Introduction

A lot of researchers argued that an entrepreneur is the most important performer in the entrepreneurial process [1, 2]. But our knowledge about how the human capitals of entrepreneurs influence entrepreneurial process remains limited. Do entrepreneurs who attempt to start business in fast-changing industry begin with different characteristics of human capitals? What characteristics of human capitals lure VCs' investment? What characteristics of human capitals can play the role of signals to influence IPO performance positively? Further no researches investigate and compare the human capitals of entrepreneurs in the each stage of entrepreneurial process.

Previous researches mainly examined whether a firm is created or not, but few studies on in what industry an entrepreneur develop opportunity and found a new firm rarely carried out despite its importance [3, 4, 5]. Although some of researches suggest many variables as human capitals to lure VCs' investment, very few researches focus on the ones of entrepreneurs [6, 7]. And existing studies investigate the signaling effect of the governance structure of top management team in the perspective of agency theory, but no researches verify the signal effect of the human capitals of entrepreneurs on IPO performance.

This study examined public companies by comparing the effect of human capitals of entrepreneurs on each stage of entrepreneurial process in Korean venture industry. In our sample of 260 KOSDAQ-listed firms, we then sought to find what characteristics of human

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capitals influence each stage of entrepreneurial process. Our primary objective was to help close a research gap regarding human capital. We examined the comparative importance of various types, such as age, school prestige, educational level, related industry experience and functional background, on the each stage of entrepreneurial process.

2. Theoretical Background and Hypothesis

2.1. Founding Stage

Human capital theory maintains that an entrepreneur's human capital is an important factor in business development in founding stage [8]. Why, when, and how do some people and not others exploit the opportunities. One of the answers is individual differences. Older executives have greater psychological commitment to the organizational status quo [9, 10]. Older executives may be at a point in their lives at which financial security and career security are important. Their social circles, their spending traits, and their expectations about retirement income are established. Any risky actions that might disrupt these generally are avoided [11]. And in line to the reasoning with youth's characteristics of the active and risk-taking, [12] propose that firms with young managers will be more inclined to pursue risky strategies than will firms with older managers. IT industry requires a lot of risk-taking, for product life cycles is shrinking, development times are being compressed, and operations keep accelerating. Therefore, the younger an entrepreneur is, he or she will be more likely to make decision to exploit opportunities in IT industry.

Hypothesis 1-1. A younger entrepreneur will be more likely to develop business opportunity in IT industry.

Why some people and not others discover particular entrepreneurial opportunities? Business opportunities in new technology industry such as information technology area exist under rapid changes in technology and market [13, 14]. To discover a new business opportunity in areas under high uncertainty such as information technology industry, entrepreneurs may acquire business opportunity from different levels of society through weak tie from their alumnus of elite school, not through strong tie from existent organizations. Therefore, if an entrepreneur graduated from elite school, he or she will acquire novel information that is generated by a given change in order to discover opportunities in IT industry.

Hypothesis 1-2. An entrepreneur form elite school will be more likely to develop business opportunity in IT industry.

Entrepreneurs must be able to identify new means-ends relationships that are generated by a given change in order to discover entrepreneurial opportunities. [12] propose that the amount, but not the type, of formal education of a management team will be positively associated with innovation. IT industry requires innovative perspective, for development times are being compressed and product life cycles are shrinking. Therefore, if an entrepreneur has the experiences related to output function, he or she will better identify innovative means-ends relationships that are generated by a given change in order to discover opportunities in IT industry.

Hypothesis 1-3. An entrepreneur with higher level of education will be more likely to develop business opportunity in IT industry.

To recognize an opportunity, an entrepreneur has to have prior information that is complementary with the new information, which triggers an entrepreneurial conjecture [15].

IT industry requires new technologies, for product life cycles are shrinking, development times are being compressed, and operations keep accelerating. Therefore, an entrepreneur's prior information about specialized and underutilized resources such as new technology is critically important to discover an opportunity in IT industry. This prior information is about understanding products, suppliers and competitors [1] and can be acquired through experiences in related industry. Opportunities can be generated not only in the internal organizations, but also in the process of responding to market needs and contacting supplier or external R&D centers. Accumulated knowledge enables an entrepreneur to recognize technological changes, to design new products, and to explore potential customers and suppliers through existing networks with customers, suppliers and distributors [16]. If an entrepreneur has this experiences related to IT industry, he or she will be better equipped to understand the core elements of future products, customers, suppliers and competitors.

Hypothesis 1-4. An entrepreneur with related industry experience will be more likely to develop business opportunity in IT industry.

Job experience significantly contributes to cognitive properties [17]. Managerial jobs can be categorized into three areas according to the functional background, i.e., output, throughput, and peripheral functions [12]. Among these functions, the output function is the most suitable for monitoring and adjusting products and markets [12]. IT industry requires entrepreneurs to understand technology or market, for development times are being compressed and product life cycles are shrinking. Therefore, if an entrepreneur has the experiences related to output function, he/she will better identify technology and market that are generated by a given change in order to discover opportunities in IT industry.

Hypothesis 1-5. An entrepreneur with output function experience will be more likely to develop business opportunity in IT industry.

2.2. Growth stage

Young companies suffer from a lack of resources [19]. VCs are investors who provide venture firms with financial resources professionally. Relevant studies show that the most important criterion for venture capitalists in their assessment of profitability is entrepreneur's ability [20, 6, 7]. In the popular business press, VCs commonly report that "nothing is more important than people..." and, in particular, that they look "for people who have high levels of energy, are willing to work around the clock, and are still hungry for success" [21]. Younger executives may have more physical and mental stamina [22], or may be more able to grasp new ideas and learn new behaviors [23]. What emerges is a picture of youthful managers attempting the active. Therefore, VCs prefer younger entrepreneurs than older ones.

Hypothesis 2-1. A younger entrepreneur will be more likely to obtain VC investment.

Given vulnerability, the market accessibility of venture firms is very important in a short time and VCs judge an entrepreneur's management abilities with his or her market accessibility, for venture firms lack resources [20]. To access the market, entrepreneurs should acquire information, knowledge and many kinds of resources about the market through their private network [24, 18, 19]. The networks from elite schools can increase the opportunities to meet and establish relationships with high-level government officials, business leaders, etc. which are influential in the market and helpful for their market access. Therefore, entrepreneurs' elite school experiences can be observable information to VCs that consider the entrepreneurs' market accessibility as their management abilities.

Hypothesis 2-2. An entrepreneur with elite school experience will be more likely to obtain VC investment.

And also to overcome this vulnerability, venture firms should not play similarly to established firms but need to do innovative strategies to be differentiated with established ones. Since the venture firms lack in track record, VCs try to get observable information with which they can expect the innovative strategies of the venture firms. The amount of, but not the type, of education of executives is positively associated with innovation [12]. Therefore, VCs that look for observable information about potential innovative strategy regard the education level of entrepreneurs as a selection criterion.

Hypothesis 2-3. An entrepreneur with higher level of education will be more likely to obtain VC investment.

Venture firms often lack the knowledge of their environments, and don't yet establish relationships with customers and suppliers [19, 25]. [20] have argued that VCs judge entrepreneurs' management abilities with their market accessibility and entrepreneurs' prior experience plays main role when venture firms access the market through obtaining necessary resources. This access enhances the level of exposure to high-quality information about products, markets and technological opportunities. Good relationships with suppliers provide access to quality raw materials, superior service, and fast and reliable deliveries [26]. If entrepreneurs possess related industry experiences, they already have necessary knowledge or can acquire it and they already know customer or supplier better so they can set up the favorable relationship with them easier. Therefore, entrepreneurs' related industry experiences can be observable information to VCs that consider the entrepreneurs' market accessibility as their management abilities.

Hypothesis 2-4. An entrepreneur with related industry experience will be more likely to obtain VC investment.

Venture firms have little business experience, and so operate under the guidance of immature and unrefined routines [27]. Because venture firms are often unable to make outputs of consistent quality, they face a high probability of dissolution [25]. Given these situations, to set up product R&D or marketing/sales are more important than to improve the efficiency of the transformation process. Entrepreneurs with output function experience can better understand product R&D or marketing/sales than the ones with throughput one and emphasize outputs in their strategies such as product innovation, related diversification, advertising and forward integration. Therefore, VCs that look for observable information about potential output strategy regard the output function experiences of entrepreneurs as a selection criterion.

Hypothesis 2-5. An entrepreneur with output function experience will be more likely to obtain VC investment.

2.3. Harvest Stage

Initial public offering (IPO) as a harvest option from both the entrepreneur's and investor's point of view is one of the uniquely entrepreneurial process [28, 29]. The IPO process is characterized by a considerable amount of uncertainty. Much of this uncertainty is a function of the relative lack of information available to the various parties involved in the IPO process. The resource-based view of the firm [30, 31] is applicable to our focus on the human capital of IPO entrepreneurs that outside investors might utilized in pricing an IPO offering. In the IPO process, outside investors participate to expect the additional and sustained growth of

IPO firms for their capital gain. Looking for many kinds of factors in the prospectus which indicate the future growth of IPO firms, they regard the human capital characteristics of entrepreneurs as important signals to indicate the growth. Since they take some risk in investment at IPO stage to pursue their profit aggressively, they prefer the active and risk-taking entrepreneurs to the passive and risk-averse ones. Consequently, outside investors are likely to view IPO firms with younger entrepreneurs more positively, which leads to higher valuation at IPO.

Hypothesis 3-1 Age of entrepreneurs will be negatively associated with IPO performance.

Organizations are not closed, but open systems whose success and failure are largely determined by their ability to extract valuable resources from the environment [32]. In the process of IPO, [33] suggest that the greater the collective number of outside links associated with the members of the board, the stronger the signal of the young firm's quality and the greater the likelihood that the firm will attract a prestigious investment bank. Among the many kinds of network of entrepreneurs, the networks from their alumni of elite school can increase their performance, for the networks can provide the opportunities to meet and establish relationships with high-level government officials, business leaders, etc. which are helpful for their performance. In the process of IPO, outside investors regard the network from school prestige of entrepreneurs as an important signal. Consequently, we would expect outside investors to view IPO firms with entrepreneurs from elite school more positively, which results in higher valuation at IPO.

Hypothesis 3-2: School prestige of executives will be positively associated with IPO performance.

At IPO stage, the firms struggle with developing new skill and adapting their strategy to match the opportunities and threats they might encounter for their sustained growth [34]. So outside investors will perceive that IPO firms needs innovative entrepreneurs and pay attention to the education level of executives, because entrepreneurs with higher level of education seem to be more innovative. Consequently, outside investors are expected to view IPO firms with entrepreneurs of higher level of education more positively, which makes higher valuation at IPO.

Hypothesis 3-3 Education level of entrepreneurs will be positively associated with IPO performance.

Regarding the relationship between related industry experience and firm performance, [35] contend the positive relationship between prior knowledge and the performance. Industry-specific managerial experience is an executives' competence. In the process of IPO, as the collective number of outside links of the members of the board of nonexecutive directors can be a positive signal to investment bank [36, 37, 33], the entrepreneurs' networks in related industry could be the positive signal to outside investors. Since the entrepreneurs with related industry experience can provide effective networks, they appear to be more able to acquire and exploit requisite resources for the future growth of their firms. Consequently, we would expect outside investors to view IPO firms with entrepreneurs possessing related industry experience more positively, which results in higher valuation at IPO.

Hypothesis 3-4 Related industry experience of entrepreneurs will be positively associated with IPO performance.

[12] propose that the degree of out-function experience of top managers is positively associated with growth. In the context of IPO, outside investors expect the growth potential of

IPO firms. Looking for many kinds of factors which influence the growth potential of IPO firms, they regard the functional background of entrepreneurs as an important signal. Since the executives with output functions deepen their understandings of products and markets, they appear to be more able to explore new opportunities for the future growth of their firms. Consequently, we would expect outside investors to view IPO firms with executives of output function background more positively, which results in higher valuation at IPO.

Hypothesis 3-5 Output function experience of entrepreneurs will be positively associated with IPO performance.

3. Methods

3.1. Data

The original target research sample consists of 1,253 KOSDAQ (Korea Securities Dealers Automated Quotation) stock market listed firms from July 1, 1996 to December 31, 2005. Basically, we collected disclosures from DART (Data Analysis, Retrieval and Transfer System), which is an electronic disclosure system that allows companies to submit disclosures online (dart.fss.or.kr). The final sample used here is 260 KOSDAQ-listed firms. Of the 1,253 firms, 896 firms were excluded considering following conditions. First, we limited samples to firms which founded after 1990, because business venture in Korea has developed as the information technology industry has expanded quickly since 1990. Second, we limited samples to firms which went public after July 1, 2000 to eliminate bias caused by market condition. KOSDAQ market was under-evaluated from July 1, 1996 to late 1998 due to "IMF crisis" and dot-com stock market bubble busted in from early 1999 to the first half of 2000. Third, we limited samples to firms with a founder as CEO, because a subsidiary or a firm with a CEO who is not a founder is not an entrepreneurial foundation.

3.2. Variables

Dependent Variables

Developing business opportunity in IT industry

We define starting up in IT industry as it. It takes on the value 1 if it is an IT startup and 0 otherwise

Obtaining VC investment

We use the Korean institutional definition to measure VC investment. It takes on the value 1 if it received VC investment and 0 otherwise.

IPO performance

We define firm's market capitalization conditional on it undertaking an IPO (market value and all other nominal figures are converted into real dollars) as IPO performance. The market value of a firm at IPO is defined as: $V^* = (P_u Q_t - P_u Q_i)$ -where P_u is the IPO subscription price, Q_t is the total number of shares outstanding, and Q_i is the number of shares offered in the IPO. In other words, we subtracted from the firm's total market capitalization the dollar amount raised in the IPO. V^* is a measure of the market's assessment of the value of a firm at IPO. [38] used the IPO subscription price to compute V^* ; in unreported models, they observed results similar to the ones we report here when defining V^* on the basis of the first day closing price of a new issue. And, we apply log to this variable for the adjustment of scale.

Independent Variables

Age

We use three ages of entrepreneurs at the each time of founding, growth and harvest stage. We measure how old an entrepreneur was when he or she established his or her venture firms as the age at founding stage. And we measure how old an entrepreneur was when his or her firm received VC investment as the age of the growth stage. But because we don't know the exact time when he or she received VC investment, we define the average age between the age at founding stage and the age at harvest stage as the age of growth stage. Finally, we measure how old an entrepreneur was when his or her firm went IPO as the age of harvest stage. And, we apply log to this variable for the adjustment of scale.

School prestige

Elite schools are defined as Seoul National University, Yonsei University, Korea University, and KAIST (Korea Advanced Institute of Science and Technology), for Korean society generally regards as elite school. School prestige is measured by a dichotomous variable that takes on the value of 1 if the entrepreneurs graduated from Seoul National University, Yonsei University, Korea University or KAIST (Korea Advanced Institute of Science and Technology) and 0 otherwise.

The level of education

The higher level is master or doctorate degree. The lower level is an undergraduate degree or lower. The level of education takes on the value 1 if he/she has the higher level and 0 otherwise.

Industry experience

The industry experience takes on the value 1 if an entrepreneur ever worked at related career experience is in output functions and 0 otherwise.

The functional background

The functional background takes on the value 1 if an entrepreneur's career experience is in output functions and 0 otherwise.

Control Variables

We use gender, earnings stock market index, industry, and VC investment for three dependent variables

4. Results

Model 1 shows younger entrepreneurs are more able to develop start-up opportunities in IT than older entrepreneurs ($\beta = -.062$, $p < .01$). Related industry experience ($\beta = .926$, $p < .01$) and output function background ($\beta = .977$, $p < .01$) have positive influences on developing start-up opportunities in IT. What is not expected, however, are no effects of school prestige and educational level. The results of the regression analysis regarding obtaining VC are presented in models 2. We see that three are significant predictors. As expected, school prestige ($\beta = 1.413$, $p < .001$), related industry experience ($\beta = .833$, $p < .05$) or output function background ($\beta = 1.215$, $p < .001$) are positively associated with obtaining VC. But what is not expected is that age and educational level have on association. Finally, in the model 3, school prestige ($\beta = .060$, $p < .001$) and related industry experience ($\beta = .032$, $p < .01$) have positive

relationship with IPO performance. However, what is not expected is the positive effect of age ($\beta=.060$, $p < .001$).

Table 1. The Results of Regression Analysis

	Model 1 Start-up in IT industry	Model 2 VC investment	Model 3 IPO performance
Gender	.866	-1.592	-.013
Industry		1.334***	.034**
VC investment			.017
Earnings			.481***
Stock market			1.098***
Age 1	-.062**		
Age 2		-.040	
Age 3			.004***
School prestige	.275	1.413***	.060***
Educational level	-.341	.511	-.008
Industry experience	.926**	.833*	.032**
Output function	.977**	1.215***	.003
Constant	.894	.856	-.812
-2Log Likelihood	300.896	256.564	
Cox & Shell R ²	.148	.304	
Adjusted R ²			.539
F			31.314***

* $p < .05$, ** $p < .01$, *** $p < .001$

5. Discussions

This study provides some theoretical contributions. First, this study is differentiated from previous studies examining whether a firm is created or not [3, 4, 5]. Few studies on in what industry an entrepreneur develop opportunity and found a new firm rarely carried out despite its importance. Thus, while previous studies have been off the mark on this issue, we highlighted that the industry where entrepreneurs make start-ups and found that youth, related industry experience and output function background among human capitals of entrepreneurs are helpful for opportunity development in IT. Second our study supplements previous studies focusing on the determinants of VCs' investment decision-making. Previous researchers suggests many variables as human capital, for example top management size, president's number of roles, president's number of other start-ups, university level education in management and economics of founders and the prominence of the prior employers of a start-up's founding team. Additionally, we found that school prestige, industry experience and functional background among human capitals of entrepreneurs lure VCs. Finally, we provide a contribution to signaling research by considering how the human capital of entrepreneurs may influence IPO performance in resource-based view. Despite of the argument that an entrepreneur as CEO and major shareholder plays very important role in IPO firms, which can influence firm performance after IPO, no researches verify the signal effect of his or her human capital on IPO performance. We found that age, school prestige and related industry experience among human capitals of entrepreneurs positively influence IPO performance.

This study has some practical implications. First, when entrepreneurs found startups, they should consider their human capital to develop successful opportunities in fast-changing industry such as IT industry. If they do not have sufficient human capitals requisite for it, they need to have conservative perspectives in making up their mid on start-up. Second, when entrepreneurs need to obtain VC's investment or to increase the value of their firms in IPO process, they should consider their human capital to lure VC's investment or to be positive signals to outside investors in IPO process. If they do not have sufficient human capitals

requisite for it, they need to change CEO or establish joint-CEOs to supplement the human capital of entrepreneurs.

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