

Relationship between Knowledge Acquisition Activities and the Performance Along Growth Stages of Korean Ventures

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ABSTRACT

High-tech ventures grow mostly by acquiring and utilizing the needed knowledge such as market knowledge, technological knowledge, and management knowledge, from various sources and channels. Knowledge can be acquired internally or externally. Main research questions of the study are as follows: What types of knowledge acquisition activities are utilized in the Korean ventures? Which type is more affective on the performance along growth stages? This study will present the results of empirical analysis based on surveyed data, and will discuss academic and managerial implications.

KEYWORDS

Theory of Venture Growth, Knowledge Acquisition Activity, Knowledge Strategy Taxonomy, Dynamism, Complexity, Growth Stages

1. Introduction

For the venture to grow and contribute to the national economy, there needs continuous efforts to respond to the environmental changes along the growth stage. Especially knowledge-intensive venture has to pour efforts on building up the competitive knowledge base. However, there was little research on the growing process of venture after its foundation, especially its knowledge activities or strategies. This research is focusing on the analyzing the typology knowledge strategy of venture along the growth stage and the environmental characteristic as a determinant of knowledge strategy.

This theme and approach is very important in several reasons. First, the venture itself is the engine of innovation

that leads innovation and generates enormous jobs in the national economy. Second, knowledge becomes critical resource to survive and grow in the competitive and turbulent environment. Third, there needs to research on the knowledge strategy of the venture, which seems to constitute competitive advantage. Finally the venture phenomenon has very dynamic, so that we should try to look at it along the time series or growth stage.

There are three questions to answer in this paper. First, Is there typology of knowledge strategy in knowledge domains of the venture? Second, does the environmental characteristic have an impact on the choice of knowledge strategy? Third, Which knowledge strategy is more effective on the growth rate along the growth stage? Followings are the result of efforts to answer these questions. In the literature review, several concepts from a few research areas are introduced. We analyze the surveyed data from dozens of Korean venture. Finally this paper ends with suggesting the academic and managerial meanings of the results and some ideas for further researches.

2. Literature Review

Knowledge becomes core resource for the sustainable competitive advantage and the value creation. At this point, constructing the organizational knowledge with individual knowledge and the external knowledge (Nonaka,1994).

Most general definition of knowledge is justified true belief which has its origin in the Greek epistemology (Nonaka, 1994). There are various kinds and domains of knowledge. In this study we divide business knowledge into three domains which execute unique functionality. Market knowledge and technological knowledge is the basis for the new product and market, and managerial knowledge consists of various management know-hows. Knowledge has its objects or phenomenon, which can be partly controlled. In the business perspective, the knowledge is aimed to achieve three functions. First of all, the market, which are made of consumers, competitors, suppliers, and distributors, should be understood. How it looks like, what it wants, what rule it follows, and what it will be in the future is the essential part of market knowledge. Second, technological knowledge has power to change the market structure. Innovative knowledge can generate the newly appealing product and services. Finally, the managerial knowledge is the basis for most innovation. It functions when we deals with process like organizing, strategizing, financing, and marketing, Without managerial minds, other two knowledge can not be realized profitably. Here, we should be able to discriminate between the market knowledge and the marketing knowledge, which is a part of managerial knowledge and consists of framework for analyzing market and methods to deliver value to stakeholders.

Nonaka suggested spiral knowledge creation model, which has four modes; Socialization, Externalization, Combination, Externalization. Knowledge creation means more than it is told in other studies. Usually knowledge activities can be divided into knowledge creation, sharing, storing, and utilization(Nonaka, 1994). However, at Nonaka's spiral model knowledge creation includes other activities implicitly, for the socialization

and combination is sharing activity, externalization and internalization is storing, and all these activities are done by utilizing knowledge. He doesn't intended to divide knowledge activities but wants to view them in the ultimate purpose, knowledge creation. This point of view is very adequate to understand knowledge activities in the venture, which has dynamic and complex processes of utilizing, sharing, and acquiring external knowledge, and creating knowledge with internal knowledge base.

In organizational learning domain, knowledge acquisition activity is divided into five types of learning. Congenital learning means that the firm has knowledge base without any other learning when it's founded. Experiential learning is done with internal resources by experimentation, training, and study. Vicarious learning, grafting, and searching or noticing has its knowledge source in the external environment (Huber,1991). Organizational growth stage is studied by many researchers since the Greiner's crisis and evolution model. Kazanjian(1988) suggested growth stage model in technology-based new ventures, that consists of four stages; conception and development, commercialization, growth, and stability. At each stage, the dominant problem and some organizational context are different. At this study, this framework is adopted. So we divide the growth stage into three stages; start-up, growth, and stability

3. Knowledge strategy typology and Growth : Hypothesis

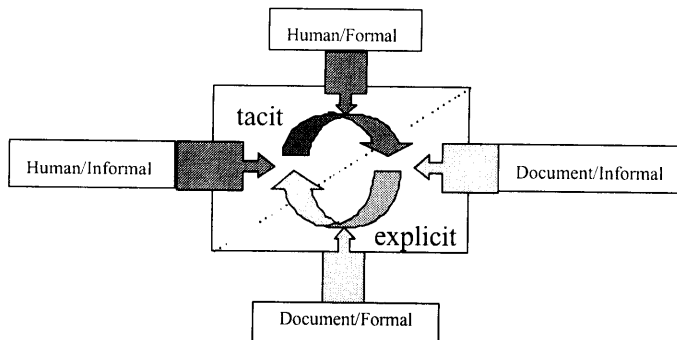
O'Farrell and Hitchens(1988a) have provided alternative theories of small firm growth They suggest that there are four main groups of theory-industrial economics approach, the stochastic model, stage model, and the strategic management perspective. Here we adopt latter two perspectives, so that stage model is basically assumed and the stage progresses by acquiring and utilizing knowledge strategically.

Knowledge is critical in achieving objectives like growth and profit. For example in the individual level, an artery can send arrow to the center of target by embodied knowledge which controls physical and instrumental resources (eg. body, artery) and deals with situations (eg. distance, wind). The knowledge give us the power to deal with uncertainty, so the deviation from the goal decreases.

The knowledge can be acquired by combinative usage of external and internal channels. As you see in the <Figure.1>, the firm can acquires tacit and explicit knowledge from formal and informal relations with external stakeholders, partners, institution and other firms. This method will be call 'external acquisition'. Second, members can create knowledge through interaction efforts based on their own tacit and explicit knowledge. This is 'internal creation'.

These two methods are used as dimension to categorize the knowledge strategy, which is divided into Janus type, engineer type, networker type, and loner. You can see them in the <Figure.2>. Actually as the firm grows, the complexity of knowledge activities increases very rapidly. So these simple frameworks are more powerful in the context like venture.

<Figure.1> Dynamics of Knowledge Activities



<Figure.2> Typology of Knowledge Strategy

High	Engineer	Janus
Internal Creation		
Low	Loner	Networker
	Low	High

External Acquisition

Janus type uses more and often both internal creation and external acquisition. Networker uses external acquisition more, engineer uses internal creation, and loner doesn't give much effort to acquire knowledge. So the hypothetical typology is expressed below.

H1: Knowledge strategy of venture is grouped into four types: Janus, Networker, Engineer, Loner

Dynamism is persistence of change in the environment. Complexity is the diversity of the environmental elements (Miller and Friesen, 1982). Both create opportunities as well as demand for the knowledge creation to succeed in the markets. So the firm will choose Janus type in more dynamic and complex market, and Loner type in less dynamic and complex market. The other two will be more use in dynamic and complex market than loner.

H2: The selection of knowledge strategy is influenced by the environmental characteristics.
 H2-1: Janus type is used in more dynamic environment.
 H2-2: Janus type is used in more complex environment.
 H2-3: Loner type is used in less dynamic environment.
 H2-4: Loner type is used in less complex environment.
 H2-5: Networker and Engineer is used in less dynamic environment than Janus' and more dynamic than Loner's
 H2-6: Networker and Engineer is used in less complex environment than Janus' and more complex than Loner's

At the start-up, resource is scarce, so that knowledge activities should be more focused. If the knowledge base is competitive, Engineer will be more effective. If not, Networker will be effective. Janus isn't adequate at this stage, because this method requires much more resources and attentions than other methods. Loner isn't effective at any stages. This type either has prosperous knowledge base or doesn't recognize the knowledge needs. So if it doesn't fail at the moment, it will fail soon in the more or less dynamic and complex environment. At the growth, the product receives in the market, and firm grows very fast. At this time, both internal and external environment become more complex and dynamic, so firm should use any available methods to acquire adequate knowledge. So the Janus is the fittest strategy at this stage, and Networker is more effective than other two strategies. At the

stability, the knowledge requirement at the existing market and product line doesn't occur. But searching new market and technology should be executed consistently with all possible way of knowledge acquisition. So the Janus is recommendable at this stage

H3: The Performance of each knowledge strategy is different along the growth stage.
 H3-1: Networker and Engineer type grow faster than Janus and Loner at the start-up.
 H3-2: Janus and Networker type grow faster than Engineer, Loner at the growth.
 H4-3: Janus type grows faster than others at the stability.

4. Research Methodology

Sample of this study is small firms that are funded by venture capitals. The many research on the new technology based firms constrains firm age within 10 years, but one related with growth stage is on the firms within 15 years (Kazanjian and Drazin, 1989). Data is gathered from technology-based small firms that receive funds from KTB that are representative venture capital in Korea. 113 firms respond among a thousand ones (response rate: 11.3%), and surveyed data of 79 firms are analyzed, that are younger than 15 years.

<Table.1> Characteristics of each growth stage

	Start-up	Growth	Stability
Frequency	14	22	43
Founding Year	94.0 (2.38)	91.1 (2.99)	87.5 (3.07)
Employee size	24.1 (13.91)	63.0 (49.39)	179.7 (153.65)
Sales growth rate	50.2 (78.37)	74.2 (78.46)	13.9 (37.09)

[Note] number inside each cell is mean & that in the blank is S.D

To measure the growth stage, we use Kazanjian(1988)'s method, that is reading description of each stage and checking the fittest one. <Table.1> shows that this method is reliable, because it has power to discriminate firm size, age, and growth rate that are very critical dimension to divide the growth stage.

Knowledge domain explanation is given before asking knowledge acquisition efforts. Efforts are measured in the Likert scale by man-month criterion. Internal creation consists of several sub-methods like survey, interview, recording, R&D, cooperative R&D, training, education, learning by trial and error. External acquisition includes both formal and informal channels; Imitation, replication, social learning, strategic alliance, consulting, knowledge outsourcing, recruitment of specialists, and so on.

Environmental characteristics, dynamism and complexity are measured in Likert scale with multiple items. (Miller& Friesen, 1982). Factor analysis isn't included but the results showed that variables are reliable.

Most essential performance is thought to be growth rate in growth theory of venture. Here we use asset growth rate between 1996 and 1997.

Various analysis like factor analysis, cluster analysis, one-way ANOVA, and two-way ANOVA are used. Cluster

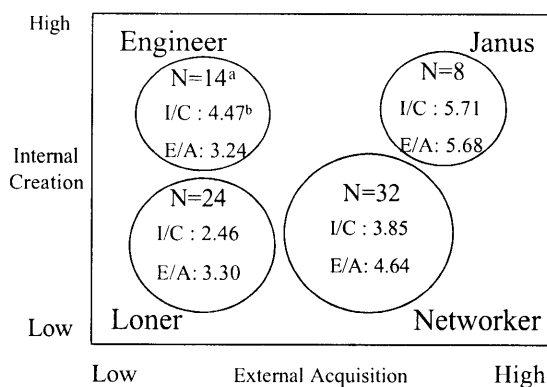
analysis follows Anderson's nearest centroid sorting method, which is standard iterative algorithm minimizing the squared distance between cluster centroids.

5. Results

5-1. Taxonomies of Knowledge Strategy

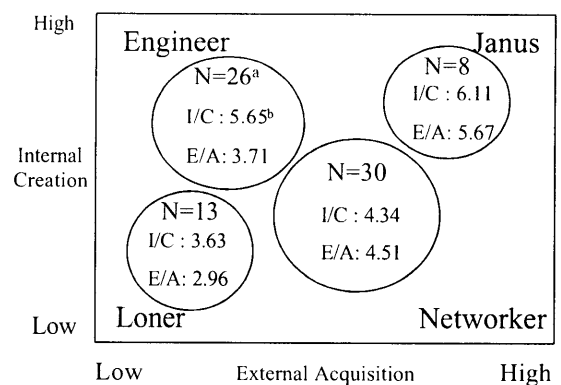
It was proposed in this study that knowledge strategy could be defined as configuration of knowledge acquisition activities. The results of the study provide general support for H1. Four distinct clusters were identified in the cluster analysis. The derived taxonomies suggest four alternative knowledge strategies. Each figure shows that there are taxonomies of knowledge strategy in all the knowledge domains.

<Figure.3> Clusters in Market Knowledge



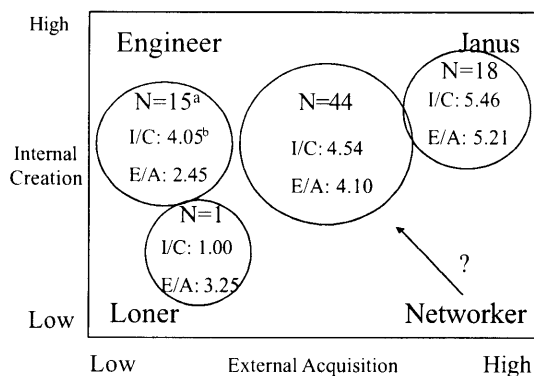
Pseudo F: 65.59 R-squared: 0.77

<Figure.4> Clusters in Technological Knowledge



Pseudo F: 53.07 R-squared: 0.77

<Figure.5> Clusters in Managerial Knowledge



Pseudo F: 54.90 R-squared: 0.77

[Note] a: number of firms included in the cluster

b: I/C is abbreviated from "Internal Creation", and E/A is from "External Acquisition"

5-2. Knowledge Strategy and Environment Characteristics

One-way ANOVA test shows that H2 is generally supported. As predicted, the Janus is more prevalent in the more dynamic and complex environment. This proposition is consistently supported through all the knowledge domains. Loner is more used in the less dynamic and complex environment except market knowledge domain.

<Table.3> Knowledge Strategy and Environmental Characteristics in Market knowledge domain

Strategy	Janus (A)	Engineer (B)	Networker (C)	Loner (D)	Multiple Range
Dynamism	4.62	3.36	3.67	3.60	A>B**
Complexity	4.67	3.67	4.41	3.84	A>B,D**/ C>B**

<Table.4> Knowledge Strategy and Environmental Characteristics in technological knowledge domain

Strategy	Janus (A)	Engineer (B)	Networker (C)	Loner (D)	Multiple Range
Dynamism	4.79	3.33	3.75	3.50	A>B,C,D**
Complexity	5.00	3.96	4.08	4.14	A>B,C,D**

<Table.5> Knowledge Strategy and Environmental Characteristics in managerial knowledge domain

Strategy	Janus (A)	Engineer (B)	Networker (C)	Loner (D)	Multiple Range
Dynamism	4.20	3.52	3.61	1.00	A,B,C>D**
Complexity	4.92	3.93	3.97	1.00	A,B,C>D**

[Note] ***: p<0.01, **: p<0.05, *: p<0.1

5-3. Type of Knowledge Strategy, Growth Stage, and Performance

Two-way ANOVA shows that H3 are weakly supported. In market knowledge domain, Janus and Networker grow faster at the growth stage.

<Table.6> Knowledge Strategy, Growth Stage, and Asset growth rate(%) in Market knowledge domain

Strategy	Janus (A)	Engineer (B)	Networker (C)	Loner (D)	Stage-wise
Start-up (I)	N/A	N/A	121.89	114.43	116.56
Growth (II)	121.98	42.21	106.86	17.37	79.85
Stability(III)	48.00	39.49	15.80	29.19	27.65
Type-wise	69.14	40.51	53.41	49.75	I,II>III**
F-value	Model: 2.48** / Growth stage: 8.04*** / Strategy type: 0.26 / Interaction: 1.37				

[Note] ***: p<0.01, **: p<0.05, *: p<0.1

In technological knowledge domain, Engineer grows faster at the start-up as predicted in H3.

<Table.7> Knowledge Strategy, Stage, and Asset growth rate(%) in technological knowledge domain

Strategy	Janus (A)	Engineer (B)	Networker (C)	Loner (D)	Stage-wise
Start-up (I)	N/A	155.02	88.60	81.25	109.52
Growth (II)	58.45	74.21	99.37	29.18	79.85
Stability(III)	26.03	24.93	22.23	43.00	27.65
Type-wise	30.66	57.65	52.32	45.71	I>III**
F-value	Model: 1.47*** / Growth stage: 5.33*** / Strategy type: 0.29 / Interaction: 0.79				

In the managerial knowledge domain, Networker and engineer grow faster than Janus which is less focused.

However, Janus is more effective at growth stage as H3 predicts.

<Table.8> Knowledge Strategy, Stage and Asset growth rate(%) in managerial knowledge domain

Strategy Stage	Janus (A)	Engineer (B)	Networker (C)	Loner (D)	Stage-wise
Start-up (I)	-23.72	43.43	236.44	N/A	116.56
Growth (II)	157.43	29.18	56.24	N/A	79.85
Stability(III)	22.87	18.57	35.02	N/A	27.65
Type-wise	53.60	25.67	62.04	N/A	I,II>III** B<C**
F-value	Model: 9.08***/ Growth stage: 13.32***/ Strategy type: 2.36*/ Interaction: 10.32***				

At the stability, the significant difference of growth rate wasn't found between knowledge strategy. One of the reasons might be that the growth rate is relevant performance at venture in the matured environment. Additionally the profitability should be compared to find out effective knowledge strategy at this stage.

6. Discussion

In this study we approach venture growth phenomenon in knowledge-based view. This area has rarely been studied, so framework and the measurement have limitations. However we've found a few meaningful things in the managerial and academic perspectives; knowledge strategy taxonomies, the environmental influence on the choice of knowledge strategy, and the effectiveness of knowledge strategy along the growth stage.

There needs in-depth case study in further research to find out more detailed knowledge activities and their mechanism. Also longitudinal study will be needed to follow the change of knowledge strategy and knowledge bases.

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