

A Study on Diagnostic model about global innovation capability of SMEs

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1. Introduction

Domestic Innovative SMEs are required to create potential benefits by entering into global market instead of staying limited domestic market. However, domestic SMEs are relatively vulnerable to global competence, thus, the proportion of SMEs in total export is decreasing continuously.

As the global competition is accelerating, domestic SMEs are required to increase global innovation capability.

In this paper, indicators which evaluate comprehensive global innovation capabilities of SMEs were selected from foreign and domestic literature review and developed from questionnaire survey and empirical analysis.

The diagnostic model was proposed to evaluate and rate the innovation capability of SMEs and suggest alternatives to insufficient capabilities and optimum supporting programs for SMEs, thus, contribute to increase SMEs' global innovation capabilities.

2. Related Works

Major indicators affecting core capabilities of enterprises are divided into external and internal factors. M. Potter's theory is the representative external indicator theory, while core competence theory of G. Hamel and C.K. Prahalad is the representative internal indicator theory diagnosing enterprises' competence.

In this paper, we establish a research model by utilizing core competence theory focusing on internal indicators.

Vangelis Souitaris(2002) developed a diagnostic model about global innovation capability of SMEs from a RBV perspective and suggested 4 main indicators, as technological capability, marketing capability, human resource capability and organization capability.

Lee(2004) proposed the major factor affecting global innovation capability of SMEs is the monopolistic superior competence among enterprises' specific interior factors, thus, enterprise should possess firm-specific properties impossible to imitate and based on knowledge.

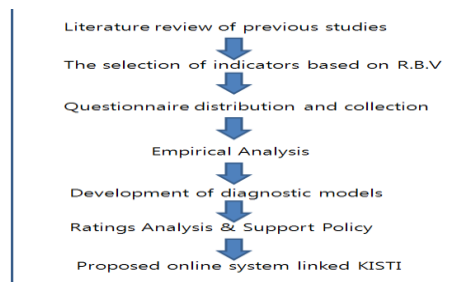
Ji(2005) indicated that Domestic technology innovation companies intend to possess firm-specific advantage in technological capabilities and CEO's ability while they have difficulties in possessing financial capabilities or marketing capabilities.

Bae(2003) and Lee(2004) suggested that global innovation capability of CEO and network capability are major factor affecting SMEs' global innovation competence.

In this paper, SMEs' interior indicators affecting global innovation capabilities were analyzed and 7 major indicators were derived

3. Proposed Method

The research process are divided into 7 steps. At the 1st stage, literature review of previous studies was performed. At the 2nd stage, 7 potential global innovation competence indicators were selected, based on the internal indicator theory, i.e. core competence theory of G. Hamel and C.K. Prahalad and utilized the Vangelis and Souitaris(2002)'s model as a basic model. At the 3rd stage, questionnaire survey was performed and



At the 4th stage, from basic statistical and factor analysis, meaningful factors were derived. At the 5th stage, diagnostic model was developed and trial application was performed to verify the proposed model.

4. Results and Summary

From the foreign and domestic literature review, 7 major indicators diagnosing global innovation competence were derived, which are comprised of technological capabilities, marketing capabilities, network capabilities, financial capabilities, production capabilities, and CEO capabilities, specifically.

[Table 1] 7 major indicators diagnosing global innovation competence (GIC)

CEO capability	- age, career, gender, etc
Technological capability	- R&D, patent, etc
Marketing capability	- reputation, sales promotion, etc
Network capability	- global parter, corporation skill,
Production capability	- human skill, hardware, etc
Human Resources capability	- organization, etc
Financial capability	- assets, r&d expenses, etc

The amount of export and weight of export were set as substitute variables of global competence. 50 specific measurement indicators to measure 7 major indicators were derived and questionnaire survey were performed.

From factorial analysis of specific measurement indicators, 4 meaningful global innovation competence indicators were derived.

First indicator means the proportion of R&D investment to sales, R&D workforce to total workforce, global marketing investing expense to total expense.

Second indicator means size of the companies, composed of sales and workforce.

Third indicator means capital, R&D investment amount and foreign and domestic patent numbers.

Forth indicator means a kind of marketing competence, reflecting reaction ability to global market, which is comprised of analysis degree of global competitors, global market and potential customer needs, understanding about foreign laws and regulations, establishment of marketing strategy to enter global market, ability to acquire global information and reflection of global trends

$$\text{Ln(Exports)} = 6.017 + 0.691*FA2 + (-0.719)*FA5 + 0.520*FA7$$

$$\text{Ln(Exports Ratio)} = 2.798 + 0.264*FA3$$

We applied this Global Innovation Capability Diagnosis model into 4 companies and verified with global commercialization experts. Also, guideline for GIC diagnosis model is designed acting as specific diagnosis performance guide line, and composed of analysis of characteristics and status of grades, and suggestion of GIC enforcing methodology at each grade.

5. Summary

In this study, diagnostic model was proposed to evaluate and rate the innovation capability of SMEs and suggest alternatives to insufficient capabilities and optimum supporting programs for SMEs from literature survey, GIC model was composed based on KIS value and ASTI(Associate of Science and Technology information) SMEs database, thus, sample deviation can be caused and securing accurate data is insufficient. To compose model by analyzing characteristics of companies accurately, various companies' data for long period will be required.

6. References

- [1] Acha, V(2000), "The role of technological capabilities in determining performance: the case of the upstream petroleum industry," DRUID Winter Conference on Industrial Dynamics, Hillerod, Denmark.
- [2] Alessandra De Chiara and Antonio Minguzzi(2002), "Success Factors in SMEs' Internationalization Processes: An Italian Investigation", Journal of Small Business Management, Vol. 40, No.2.
- [3] Bell J. and McNaughton R.(2000), "Born global firms: A challenge to public policy in support of internationalization", Journal of Global Economy Proceeding.
- [4] Cockburn, I. and Griliches, Z.(1988), "Industry Effects and Appropriability Measures in the Stock Market's Valuation of R&D and Patents," American Economic Review, Papers and Proceedings, Vol.78, No.2, pp. 419-423.
- [5] Foster, Richard N(2003), "Corporate performance and technological change through investor's eyes," Research-Technology Management, Vol.46, pp. 36-43
- [6] Eberhart, A. C., W. F. Maxwell, and A. R. Siddique(2004), "An examination of longterm abnormal stock returns and operating performance folloxing R&D increases," Journal of finance, Vol.59, pp. 623-649.
- [7] Knight, G.A. and Cavusgil, S.T.(2004), "Innovation, organizational capabilities, and the born-global firm", Journal of International Business Studies, 35(2).
- [8] Kogut, B(1988), "Joint ventures: Theoretical and empirical perspectives," Strategic Management Journal, Vol.9, No.4, pp. 319-332.