Agglomeration and Local Innovation Network in Japanese SMEs: Analysis of the Information Linkage

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The revitalization of Japanese SMEs (small- and medium-sized enterprises) is one of the most important issues in Japanese economy, and weakening SMEs surely leads to losing competitiveness of whole Japanese manufacturing industries, since the former is essential basis for the latter. Countless measures to revitalize the industrial sector have been implemented so far by all levels of government, from central to local, especially and a significant amount of public funding has been poured into various projects, such as promoting venture businesses or supporting academia/industry/government collaboration. The reality of Japanese SMEs, however, shows that revitalization has not acheived. Thus far, such policy measures have not been successful in promoting SMEs's revitalization.

There are lots of way of achieving upgrading and innovation; one is that each SMEs is responsible and mobilizes all resources to it, and the other is that the region has responsibilities and utilizes all policy measures available to achieve it. In other words, the former is the framework of market mechanism, while the latter that of public policy. This paper analyzes innovation via the public policy. For the local innovation policy, the most important matter is how for SMEs to obtain cutting-edge information on technology, market conditions, financing, etc. which are essential to innovation. The key player in this context is local R&D institutions which own technology. For innovation, SMEs have to equip themselves with higher technology and management. One means to achieving this is the industrial cluster policy, which aims to revitalize regional industries and SMEs by agglomerating firms which are large or new start-ups, research institutions related to high or

low technologies, and universities with research of cutting-edge technology. The rationale is provided by Fujita, Krugman, and Venables [1999], Krugman [1991], Porter [1980], Saxenian [1994], for instance. The essence of these theories, in the present context, lies in the flow of information generated by agglomeration; that is, in regions where firms and research institutions cluster, collaboration and competition among those parties and organizations create not chaos, but rather the "coherent power" of vitalization. In the previous paper, we refer to this process as the "endogenous innovation process".[1)] Once a region develops sufficient power to create something new, the process can repeat itself to yield another such upgrading and innovation.

The authors have been conducting research so far in order to formulate how industrial clustering occurs mainly in East Asian economies, and the hypothesis we are postulating is referred to as the "Flowchart Approach" initiated by Kuchiki [2007]. Based on accumulated studies such as Kuchiki and Tsuji [2005], Tsuji, Miyahara, Ueki, and Somrote [2006] Tsuji, Giovannetti and Kagami [2007], Tsuji, Miyajara, and Ueki [2008], and Kuchiki and Tsuji [2009], the Flowchart Approach has been verifying and elaborating. Industrial clustering itself, however, is not the final aim to vitalize the regional as well as national economies, but it is one effective method to trigger economic activities. One more important role of agglomeration is that it is fundamental basis of innovation or industrial upgrading in industrial clusters. This role of clustering has been emphasized by many authors such as Porter [1980], Saxenian [1994], and Fujita, Krugman, and Venables [1999], as already mentioned. This paper thus aims to initiate the so-called "Flowchart Approach to endogenous innovation process" inside an industrial cluster, and makes an attempt to postulate how industrial clustering transforms into the upgrading and innovation process. In order to analyze this process, at first we have to clarify how firms inside of a cluster are conducting innovation and upgrading and how their activities are different from those outside of a cluster.

This paper aims to verify the following two hypotheses: (i) a relationship between innovation and industrial clustering formed by regional SMEs; and (ii) information flow, or quality of linkage among SMEs and regional R&D institutions. Regarding (i), we compare the performance of innovation by SMEs inside and outside of the cluster. If we prove that the former has larger number of innovation that that of the latter, then industrial clustering surely matters to innovation. Regarding (ii), we analyzes the relationship among SMEs and regional R&D institutions in terms of information flow among them, namely, we choose the following three variables as proxy for them: (i) geographic proximity of distance between a SME and

regional R&D institutions; (ii) frequency of communications between them; and (iii) subcontractors of large firms. There is no need for explanation for (i) and (ii), since it is reasonable to measure of information flow among them. The aim of (iii) is required some explanation. The underlining hypothesis is that SMEs in the hierarchical production system organized by large firms may have more information than independent SMEs. The former can receive more information regarding technology, management, market, etc. from mother companies.

In order to verify the above hypotheses, we conducted an extensive mail survey to 5,000 SMEs which were authorized as “innovative” by the Small and Medium Enterprise Agency, and divided these 5,000 SMEs into two groups, those inside or outside a cluster. By comparing the two groups, we analyze how industrial clusters and regional research institutions influence innovations and the upgrading of SMEs.[2)]

The paper consists of the following sections. Section 2 presents the contents of the mail survey conducted in October and November 2007. In Section 3, the methodology of the statistical analysis; and the results of estimations are presented in section 4. In the final section, conclusions and suggestions for the further research will be briefly presented.