An international comparison of competitiveness in knowledge services ☆

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ABSTRACT

Knowledge services is a field that is expected to greatly invigorate the national economy, as it is considered a new growth engine for a world economy that is facing growth without employment. This study aims to comparatively analyze the present state of the knowledge services industry in Korea, the United States, the United Kingdom and Japan, and based on the analysis, to derive implications for policy that will boost the knowledge services industry in Korea. The most recent Input-Output Tables published by each government are used as statistical data, and serve as the reference for the comparative analysis.

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1. Introduction

Today, knowledge assets play an important role in enhancing competitiveness and achieving growth for companies all over the world. The Organization for Economic Cooperation and Development (OECD) has shown great interest in the knowledge-based economy since early on, and has discovered that the development gap between developed countries and developing countries can be attributed to Information and Communications Technology (ICT), R&D innovation which promotes ICT, and the presence or absence of a labor force that is skilled in working with ICT. The OECD has been taking the lead in sharing the development experiences and success stories of developed countries with developing countries. Companies in OECD countries have already invested as much in Knowledge-Based Capital (KBC) such as software, database, R&D, design, marketing, as in physical capital such as machinery, equipment, and buildings. In recent years, emerging developing countries, similarly to developed countries, are increasingly expanding their utilization of KBC (Martín-de Castro et al., 2013). For example, China is intensively investing in Intellectual Property (IP) and design sectors, and Thailand is also promoting IP capitalization projects (OECD, 2012). Knowledge assets have become an important barometer of competitiveness and growth for countries and companies alike (Conceição et al., 1998).

On the other hand, as Korea has until recently pursued manufacturing-based growth, its service industry has been given rather little weight compared to other OECD countries (OECD, 2009). In recent years, the potential growth rate in Korea has been falling due to a slump in investment and employment in the manufacturing sector. There has been rising interest in the role of knowledge service as a field that can provide a new engine for growth and job creation. Since the knowledge service industry leads to the creation of added value and a large number of jobs compared to the manufacturing industry, it is considered to be critical for the sustainable development of the Korean economy, which is going through a period of growth without new employment (Cooke and Leydesdorff, 2006). Against this backdrop, the Korean government, which recognizes the importance of the knowledge service industry, is striving to nurture and develop the knowledge service industry, but few analyses have been conducted on the current state of the industry, and sufficient policies have yet to be introduced.

This study aims to assess the competitiveness of the knowledge service industry in Korea through input-output analyses and comparative analyses on three countries - the United States (US), the United Kingdom (UK) and Japan, all of which are known to be advanced countries in the knowledge service industry sector - and to generate suggestions on policy for the purpose of sustainable growth in the knowledge service industry on this basis. The study did not use the endogenous models frequently used to analyze economic impact and attempted to more accurately estimate the economic impact of the knowledge service industry through exogenous models of the knowledge service industry subject to analyses. Exogenous models have the advantages of more accurately measuring the effects of output in specific sectors as well as the effects of the output on other industries

instead of the total demand. In addition, previous studies on the economic impact of the knowledge service industry were mostly focused on analyses of the ripple effects on one country, but this study diagnoses the current state through an analytical comparison of the economic impact of the domestic knowledge service industry and the industrial structure in advanced countries, and suggests a direction for policy for the purpose of enhancing the competitiveness of the knowledge service industry in the future.

The study is organized as follows. Section 2 first identifies the concept of knowledge service and related previous studies and then reviews previous studies on input-output analysis, the methodology adopted by the study. Section 3 is focused on designating the scope of the knowledge service industry to be adopted by the study, and explaining the specific procedures for the application of the input-output analysis models. Section 4 deals with comparative analyses on production inducement coefficient, employment inducement coefficient and forward-backward linkage effects generated based on the application of models to the knowledge service industry by country, as mentioned in Section 3. In addition, comparative analyses are conducted on the importance of the knowledge service industry in the national economy from the perspectives of the input and output structure in each country and that of each sector constituting the knowledge service industry. Section 5 is the conclusion of the study, and it is focused on presenting policy suggestions for the purpose of achieving the sustainable growth of the knowledge service industry based on the results of the research conducted in each section.

2. Literature review

2.1. A study on knowledge service

The first conceptual research on knowledge service was conducted based on a research report titled *Knowledge-Intensive Business Services: their role as users, carriers and sources of innovation* (Miles et al., 1995), which was presented by the European Union (EU). In comparison with such major production factors in the existing industrial society as labor, capital and land, the concept of service aimed at improving productivity and increasing the added-value of product services in the existing industries was defined through the use of major production factors based on creativity-oriented knowledge, and it was named Knowledge-Intensive Business Services (KIBS). It is significant for being the first to designate knowledge-based service as something separate from general labor-intensive services such as cleaning services or information provision services such as real-estate brokerage. In an effort to apply a more clarified concept of KIBS to real industries, OECD (1998) defined R&D activities, input of ICT and highly skilled workers and high-utilization services as knowledge service and considered industries with a high portion of the service input as Knowledge-Based Industries (KBI).

In addition to a series of conceptual research, most research literature has focused on defining characteristics based on the concept of knowledge service and conducting empirical analyses on the role of knowledge service in the real industries. In an effort to define the role of KIBS as innovative agents in the real industries, Aslesen and Isaksen (2007) focused only on the region of Oslo in Norway for the purpose of empirical analyses. In addition to subdivision by region, the knowledge service industry was confined to the software industry and the organizational consultant sector, and analyses were conducted to identify if KIBS encouraged real innovation and growth, and the analyses identified its significance. The study is characterized by regional and industrial subdivision to conduct an empirical analysis on KIBS. Departing from KIBS, García-Quevedo et al. (2013) defined Knowledge Intensive Services (KIS) as knowledge-intensive business services, taking the meaning in a broader sense, and surveyed innovative firms in Valencia in Spain. Notably, this study found that R&D services play an important role in innovating companies. Similarly to the research conducted by Aslesen and Isaksen (2007), the survey was conducted in a specific

area, but this study is differentiated as it was focused on examining companies regardless of whether or not they were in the knowledge service sector. Doloreux and Shearmur (2013) conducted a survey on 804 manufacturing establishments in Quebec in Canada, and analyzed the roles of KIBS in terms of innovative strategies. Through the analyses, it was found that the level of innovation in manufacturing companies was raised through interactions with KIBS. There are similarities to previous studies because the survey was conducted in a specific area, but it is differentiated because manufacturing firms were subdivided. Lee (2004) conducted research in order to analyze and understand the roles of KIS with regard to industrial innovation in Korea. Like the study conducted by Doloreux and Shearmur (2013), the level of contribution of KIS to manufacturing companies was analyzed, and the analyses indicated that KIS played an important role in innovating manufacturing businesses. However, it is difficult to expect that the research conducted by Lee (2004), who surveyed only the manufacturing companies, can define the roles of knowledge services in industrial innovation in Korea.

As mentioned above, existing studies related to knowledge services have mostly been focused on subdividing areas included in the knowledge service industry and examining particular regions. Although it is often stated that the knowledge service industry is playing an important role in innovating industries and that its importance in terms of economic development is continuously growing, there has been no study that aimed at macroscopically analyzing national economic status and the roles of the knowledge service industry, and suggesting quantitative results. In addition, previous studies have mostly adopted survey analysis as a method of research, and this is considered as an inappropriate methodology for dealing with national economic impact of the knowledge service industry, which is related to the purpose of the study. In most cases, survey analysis has limitations when it comes to figuring out or dealing with social context, and this is due to the fact that while a survey analysis enables us to understand and analyze fragmented informers' opinions or behavior based on questionnaires, it is not appropriate for asking complex and thoughtful questions or handling overall social opinions.

Only a few studies have been conducted on national comparative analyses on the knowledge service industry. Many studies have made suggestions for a national policy or R&D strategy based on comparative analyses among nations, but few analyses have been conducted on the knowledge service industry (Muller and Doloreux, 2009). As such, this study is differentiated from previous studies, as it selected the US and the UK as representative economic powerhouses centering on the knowledge service industry, and it also selected Japan, where the manufacturing industry serves as an industrial base, to vertically compare the knowledge service industries in the four countries of Korea, the US, the UK and Japan while examining the economic impact of the knowledge service industry. In addition, the study has significance in that quantitative information is acquired through the use of an economic approach known as input-output analysis, and that suggestions on policies can be made on the direction of enhancement and development of the knowledge service industry on this basis.

2.2. A study on input-output analysis

The study aims to analyze the knowledge service industries in Korea, the US, the UK and Japan through the use of input-output analysis, the quantitative analysis method most suitable to the purpose of the study. To quantify the economic impact of the knowledge service industry, it is necessary to be able to observe macroscopic correlations while microscopically understanding all economic sectors in addition to the knowledge service industry. At the same time, it is necessary to macroscopically observe correlations while figuring out all other economic sectors on a microscopic level. Input-output analysis is an analytical method that has the aim of quantifying industrial correlations based on production activities, and as it organically connects the entire