

Measuring Knowledge Intensity by Industries in Korea

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1. Background

The purpose of this paper is to measure knowledge intensity by industries in Korea. The trend of social changes which our society is recently experiencing especially, was pointed out that there are trends of globalization, increasing complexity in society, localization and rapid advancement in information technologies. Following these societal changes, the economic system of Korea is changing to the knowledge based economy system.

OECD(1996;1999) designated some knowledge-based industries, applied to highly developed 10 OECD countries. Those are aircraft industry, office & computing equipment industry, drugs & medicines industry, communications, finance & insurance, and business services. They used the amount of direct/indirect R&D investment as important variables for measuring knowledge intensity in the case of manufacturing industries. On the other hand, the amount of ICT (Information and Communication Technology) intensity and knowledge intensity of the work force is important in the case of service industries.

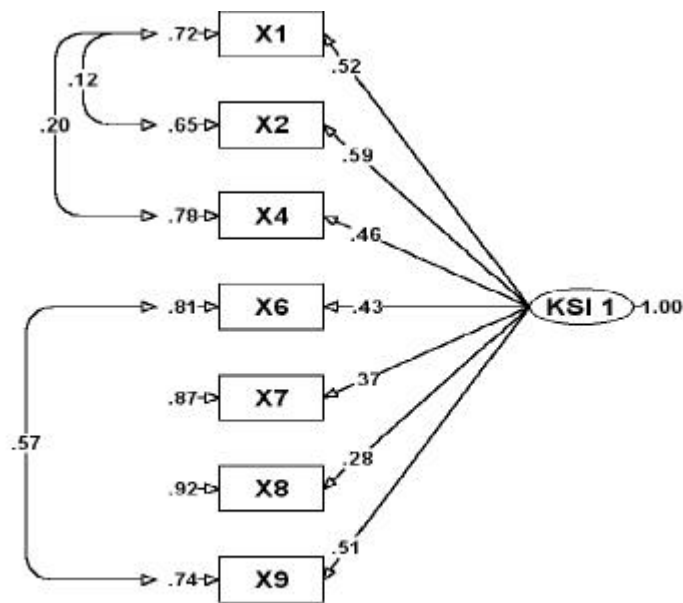
It is well known that the industrial situation of Korea is different from that of highly developed 10 OECD countries. Therefore, it is necessary that a different approach is adapted to measure knowledge intensity by industries in Korea.

2. Measurement of knowledge intensity

We use the LISREL model as a measurement tool for knowledge intensity by industries. LISREL model of this situation is measurement model for X as follows;

$$X = \Lambda x + d$$

Here, X is the observed variables and x is the latent variable. We consider the knowledge intensity as the latent variable. We obtain a path diagram following the above model as follows;



11 DEGREES OF FREEDOM=17.15 (P=0.10) GOODNESS OF FIT INDEX (GFI)=0.96

<Figure 1> PATH DIAGRAM

X1 : direct R&D investment , X2 : indirect R&D investment , X4 : ICT intensity,
 X6 : ratio of high education workers, X7: ratio of researchers, X8 : patents,
 X9 : ratio of knowledge workers, KSI : knowledge intensity

3. Results of knowledge intensity

We calculate the knowledge intensity score by industries using the factor scoring coefficient matrix, $R^{-1}\hat{\Lambda}$, derived from factor scores regression. The standardized factor scores are computed as follows;

$$F = X^{\circ} R^{-1} \hat{\Lambda}$$

here X° is standardized data matrix.

Finally, we obtain the knowledge intensity score by industries, that is,

$$KSI = 0.18X1 + 0.32X2 + \Lambda + 0.24X9$$

REFERENCE

- [1] OECD(1996), Embodied Technology Diffusion : An Empirical Analysis for 10 OECD Countries.
- [2] OECD(1996), Technology and Industrial Performance.
- [3] OECD(1999), Science, Technology and Industry Scoreboard.