

## **Executive Summary**

Although people admit that IT plays an increasingly important role in economic growth and development, they do not grasp quantitatively the effect of IT on the economy. Indeed, the Growth Accounting method has been popular among economists, but this approach is not appropriate to correctly analyze the effect of IT on the economy. By using the Growth Accounting method, many economists erroneously concluded at the beginning of the IT revolution that the effect of IT on the economy was not significant because the IT capital share of total capital stock was very small. This is the same mistake many economists made in the beginning of the first oil crises in 1973-74. They concluded that the effect of the oil embargo would not be significant because the energy input share in production was very small. These economists miss the point that both the energy input and IT play very important roles in production. Specifically, we cannot correctly measure the effect of IT on the economy without estimating a new production function that includes IT factors.

IT innovation is quite different from traditional innovations such as the invention of the steam engine because the effectiveness of IT innovation is related to not only the IT infrastructure but also management style, culture, languages and so on. We cannot use a traditional production function where disembodied technical progress can be explained by a proxy of time. We have to introduce a new production function where endogenous technical progress can be explained using IT variables. Namely, if we use a traditional production function, we miss the effect of IT on the economy through TFP. As a result, we overlook the fact that the IT revolution can raise potential growth as a sustainable long-term economic growth rate without accelerating inflation.

Since IT related time series data, such as real net IT capital stock, have not been prepared yet in most ASEAN countries, we used the data of 108 Japanese industrial sectors that are classified based on the Stages of Development Ladder in East Asia.

The main conclusions from this project are as follows:

- IT did not play an important role in both primary industries and some resource-related industries, implying that these countries are in the early stage of the Development Ladder.
- The higher the stage of the Development Ladder they reached, the more significantly IT affected output in industries.
- IT variables such as quality of capital (IT capital stock / total capital stock) or IT capital intensity (IT capital stock / Labor input) affected output in industries through TFP.
- Output elasticity w.r.t. IT capital stock increased as IT capital stock increased. As the IT revolution advanced, its effect on the economy increased.
- It is useful to know that output elasticity w.r.t. IT capital stock was 0.1 ~ 0.15 for the Japanese manufacturing sector in the mid 2000s, about 0.25 for high-tech manufacturing and about 0.5 for wholesale and retail trade industries.
- As industries moved up in the Stages of Development Ladder, the marginal product of IT capital stock in General Manufacturing in Stage 2, High-Tech Manufacturing in Stage 3 and Finance, Insurance and Real Estate (FIRE) industries in Stage 4, showed an increasing trend. This implies the possibility of improving the economy of scale in these industries as IT capital stock increases.
- If we use time as a proxy of disembodied technical progress in a traditional production function, we miss the opportunity of raising potential growth due to the IT revolution because we ignore the contribution of IT to the output through TFP.
- We can clearly show that Japan's potential output is much higher than the Bank of Japan and the Japanese economists think.
- The effect of IT on the economy may be more significant in Thailand than in Japan.
- We can assume what the different S-Shape production functions are for ASEAN countries by considering our empirical results for the effects of IT on 108 Japanese industries. These 108 industries were classified into several groups representing characteristics of ASEAN countries based on the Stages of

Development Ladder. This method allows us to better understand the different effects of IT on ASEAN economies and show how ASEAN ITC and human development policies increase potential growth by shifting the S-Shape production functions upward through TFP.

We have some following recommendations from this study:

- ASEAN countries should have common IT database and Input-Output tables in order to analyze the economic development of ASEAN through the globalization due to the IT revolution.
- Since “Openness” and “Globalization” are key concepts of the IT revolution, “free flow of information and knowledge” should be added as one more core element to the following five core elements for an ASEAN single market and production base: (i) free flow of goods; (ii) free flow of services; (iii) free flow of investment; (iv) freer flow of capital; and (v) free flow of skilled labor.