Executive Summary

1. Introduction

Technology transfer from Japan to East Asia (Asia NIES, Malaysia and Thailand) seems to have progressed smoothly as Japanese firms' overseas production has advanced successfully. But, it is still controversial that to what extent technology transfer has been brought about by this movement. Japan may interpret that it has achieved very successful technological diffusion while East Asian may not. In this research, technology transfer and diffusion has been examined empirically to clarify its progress and the impact of innovation on it.

2. Overseas Production and Technology Transfer

The swell of international business activities has made technology transfer more complex and difficult to understand. Past research on international technology transfer has lost persuasive power. Methods of measurement and analysis suitable for the trend towards a borderless economy and the innovation competition are needed.

(1) Places of procurement by Japanese firms operating in East Asian countries have been diversified. Parts manufacturing technology has been remarkably advanced. What we have to look into for better understanding of technology transfer is not the final products but the production of the major parts.

(2) We hypothesized that the progress in CTV (color television sets) and camera manufacturing technology resulted in promotion of technology transfer from Japan to East Asia. We examined the impact of innovations on technology transfer.

3. Methods

We surveyed major colour television and camera manufacturers that have established companies operating assembly process in East Asia and asked about the actual state of technology transfer and innovation. The survey was conducted between May and October in 1990.

First, we examined the various major colour television and camera parts with regard to their respective places of procurement. By examining this, we estimated what technology has transferred to where. That method can be

applied to clarify the situation of difference between intrafirm and interfirm technology transfer.

Second, we considered the effect that technological progress has had on technology transfer. To show changes in the parts structure, a tree diagram displaying relationships between finished goods and parts was designed. Process innovations in camera manufacturing were also investigated. We conducted a qualitative analysis of the effect of each technological advance that has occurred in colour television and camera manufacturing on technology transfer.

4. Results and Conclusions

Firstly, measurement methods for technology transfer brought about through direct Japanese firms' investment was thought out. It is inferred by the procurement of major parts and components.

Secondly, case studies of technology transfer in CTVs and cameras were conducted. As for CTVs, technology transfer from Japan to East Asia has progressed through the direct investment of Japanese firms. There is a difference of degree in technology transfer by the components. As for cameras, the progress of technology transfer is slower than CTVs. Furthermore technology transfer can be divided by technology transfer within the firm and technology transfer outside of the firm. In this view, the latter is virtually negligible.

Thirdly, in these industries the procurement of parts and components are executed through the network of Japanese capital parts makers in Japan and East Asia. This is because of structural limits in technological development that make it hard for East Asia to develop the components production technology and to make the components through domestic production.

Fourthly, in CTV and camera manufacturing, the influence which technological progress has on the technology transfer is pointed out. It is shown that technological progress has occurred in parallel with the expansion of overseas production and that a certain sort of technology progress functions, to promote technology transfer. It can also be observed that the technology can be embodied in a part, component, a machine or an piece of equipment and through their circulation. They have been well adopted in East Asia. Integrated circuits in electronics appliances is an

example. In this case, however, the hightechnology is used as in a black-box and as a result, the actual manufacturing technology becomes more difficult to transfer. Further a framework for analysis of the influence of the technology progress on technology transfer is proposed. That framework is based both on the medium through which technology is transferred and on the ease with which manuals are prepared.