


Innovation and its Implications for Reshoring

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Although multinational firms are still seeking low production costs and large markets, the acquisition of advanced technology is becoming one of the main motivations of foreign direct investment (FDI). This is a relatively recent development as firms traditionally enjoy strong linkages with universities and research organizations in their home country, and tend to avoid the difficulties associated with the supervision and management of R&D activities and concerns over technology leakages. However, as technological innovations determine firms' competitiveness in the global market, they are going abroad with R&D activities to gain access to cutting-edge technology outside their home countries. In 2010 the main motivations of foreign direct investment for Korean multinational firms were cited as entry into new markets and exploitation of resources, while in 2017 the acquisition of advanced technology was pointed out as the main driver of FDI, following entry into new markets. In 2010 these firms mainly invested in Asian countries with low labor costs, whereas in 2017 they invested about 40 percent of their total FDI investment in North America to gain access to innovative technology.

Some papers argue that the proximity of R&D activities and production

activities is an important factor to accelerate innovation. In particular, R&D activities in the production process and design can be highly improved when they are located near the production facilities because they can be readily tested in the production field and market. Therefore, the availability of highly skilled workers, accessibility of high technology, and regulations on innovation become important determinants of a firm's location decisions.

Following this line of trend, some multinational companies brought their production or procurement activities back to their home country to utilize innovative technology and automotive manufacturing. In Europe such reshoring is more active in the high-tech industries such as electrical and optical equipment, computer manufacturing, and the aerospace industry. In particular, the share of reshoring firms is the highest in high-tech industries with 7.5 percent, while the share in low-technology industries is reported as 2.7 percent.

The German federal government introduced the Industry 4.0 initiative in 2011 as part of its high-tech strategy, aiming to strengthen Germany's competitiveness as a manufacturing location. The companies once offshored abroad are now facing the issues of quality control and flexibility and rising wages in the developing countries. Industry 4.0 provides firms with the opportunity to utilize innovation infrastructure and advanced technology. It enables firms to conduct production activities at advanced countries with a higher labor cost by automating factories. In addition, innovative technology such as cloud computing or cyber-physical systems significantly boost efficiency and flexibility in manufacturing processes. Although the reshoring firms are not showing as large of a job creation effect as expected, the purchase of machines and intermediate goods and use of other services will indirectly create new jobs in the home country. Muller, Dotzauer, and Voigt (2017) surveyed 50 German firms with global sourcing and production linkages and found that about 30 percent of firms consider Industry 4.0 as one of the main motivations for reshoring. Dachs, Kinkel and Jager (2017) show that the German firms which employ innovative technology are more likely to choose relocation back to their home country, and that Industry 4.0 has a positive influence on the trend of reshoring.

The government of Taiwan provides incentives for R&D to encourage Taiwanese multinational firms to move production activities back to the home country. The push factor of rapidly rising wage costs in China and the pull factors of industry upgrading, improvement in the investment environment, and incentives for R&D activities in Taiwan are attracting firms once offshored abroad to relocate their production facilities in Taiwan. In particular, government support is being provided for six newly rising industries and four smart industries, and incentives are being provided to 20 industries which have competitiveness over developing coun-

tries to invest in plants and equipment. In addition, the government matches small and medium-sized firms with research institutions to help these firms develop new materials and commercialize them. Firms which choose reshoring to receive government incentives are encouraged to establish R&D centers or invest in R&D activities. As a result, firms seeking innovative technology are increasingly deciding to transfer their production facilities to the home country, and investment by reshoring firms consistently increases in excess of the goal set by the government. As of the first half of 2016, the investment by reshoring firms was already reported at 3,250 million Taiwan dollars, attaining 60 percent of the goal for the year.

The Korean government announced its reshoring policy in 2013 to facilitate the reshoring of manufacturing companies and legislated new laws to support reshoring firms under the aim of facilitating investment, reinforcing manufacturing industries, and creating jobs. The government provides tax reductions on corporate tax, income tax, and customs duty and offers subsidies for land, equipment and employment, but there is no support for R&D activities. As of yet, only 44 Korean manufacturers have returned to the country and the reshoring policy is far from effective or substantial. Some experts criticize the policy because marginal firms rather than competitive firms returned home to enjoy the benefits. In a survey of companies that have returned home or are considering moving production back to the country, they pointed out shortage of excellent workforce and high wage cost as the difficulties blocking a decision to reshore, and insufficiency of incentives for R&D activities are also pointed out as one of the problems associated with reshoring.

To summarize, the aspects of innovation and R&D play important roles in a firm deciding the location of its R&D activities as well as manufacturing plants. In order to attract foreign-invested firms to the country, we need to improve the investment environment and provide a friendly environment for technological innovation. The main determinants of the firm's location decision for R&D activities are the availability of high-skilled workers, cooperation with universities and research institutions, accessibility to related firms, and protection of property rights. In addition, the availability of services for R&D activities such as designing or management of property rights, and the flexibility of regulations in innovative industries are also important factors in firms' location decision for R&D activities. These factors provide insights for reshoring policies in context of technological innovation. The government needs to provide technological support in high-tech industries such as electrical and optical equipment, telecommunications, and the auto industry, where Korea possesses competitiveness in the global market. The government can also form new industry clusters to facilitate the sharing of new knowledge and the latest technology, and suggest incentives for R&D investment and

application of new technology to the industrial field. Lastly, the government can match research institutions with small and medium-sized firms which transfer production facilities to the country to develop differentiated goods and thus exploit new markets. **KIEP**