

**Technology Up-Gradation Strategies and Level of Technology Adoption
in Japanese and U.S. Firms in Indian Manufacturing
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FDI in developing countries is sought because it is expected to augment investible resources and, more importantly, it is expected to improve technological standards, skills, efficiency, and competitiveness of domestic industry. It is also expected to bring "relatively" later technology into the industry. However, the question raised in the chapter is do foreign firms from different source countries differ with respect to their level of technology adoption in the same industry of the host country. Studies have found that the costs of intra-firm transfer of technology may differ between different types of technology transferred and between different modes of technology transfers. This gives us reasons to believe that FDI that come from different sources, with different types of technology and different modes of transferring technology, may entail different costs of transferring technology. And this may lead to differences in the extent of technology adoption in the affiliates of foreign firms from different countries-of-origin in the same host country. This issue is of great relevance for small and medium sized firms who in an attempt to upgrade their technology collaborate with foreign firms and therefore need to choose between foreign firms of different countries-of-origin. It therefore becomes important to study the technology behavior of foreign firms with respect to their countryof- origin.

The two source countries of FDI chosen for the analysis are Japan and U.S. and the period of analysis considered is 1994-95 to 1999-2000. The analysis is undertaken at three levels. Firstly, an univariate statistical criterion i.e., Mann-Whitney U test is used to find whether the technology up-gradation strategies differ between the Japanese and U.S. Firms. Secondly, to compare the extent of technology adoption in the firms an index of technology adoption is prepared using the principal component analysis. Finally, an attempt is made to compare the factors that determine technology adoption in Japanese and U.S. firms using panel data estimates.

The results show that technology upgradation strategies with respect to embodied technology, disembodied technology and research and development expenditures differ significantly between the Japanese and U.S. firms operating in Indian manufacturing. It is also found that after controlling for firm-specific and industry-specific effects, not only the ownership of foreign firms but degree of foreign control in a firm also has a significant impact on its extent of technology adoption. Japanese firms are found to have higher level of technology adoption as compared to U.S. firms. Japanese firms that have, on an average, higher control of the parent firm; are larger in size; more capital intensive and more profitable tend to have higher level of technology adoption after controlling for the industry-specific effects. On the other hand, U.S. firms that have higher control of the parent firm and are more export-intensive in nature are found to adopt higher levels of technology. Industry-specific effects are found to be significant for U.S. firms but they are not significant for the Japanese firms.