A STUDY OF TECHNOLOGY INNOVATION FACTORS AND PATENT ACTIVITY IN INDIAN INDUSTRY

by

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CERTIFICATE

The Thesis Entitled "**A Study of Technology Innovation Factors and Patent Activity in Indian Industry**" being submitted by Ms Manisha Shridhar to the Indian Institute of Technology Delhi for the award of the degree of Doctor of Philosophy is a record of bonafide research work carried out by her under our guidance and supervision. She has fulfilled the requirements for a Ph.D. degree of the Institute. The research findings presented in this thesis have not been submitted any where else for the award of any other degree or diploma.

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ABSTRACT

The environment in which business and industry operate today has undergone a radical change in the past few decades. Globalization and accession of Member States to the World Trade Organization (WTO) through its various agreements, has fundamentally changed the world economy and manner of doing business. In the knowledge based, liberalized and open economy system, the development of new products and services through technology innovation is critical for firms to respond to market pressures of keeping up with competitors' products. On the one hand, the process of innovation is fueled by knowledge based internet driven economy while on the other, the introduction of the Trade Related Intellectual Property Rights (TRIPS) Agreement under the WTO has been a watershed for innovation in industry in developing countries. Industrial firms in developing countries that hitherto had been content with copying and producing generic goods and services are now being mandated to conform to TRIPS minimum standards obligation provisions. While this is true in general, this is more true for firms in India that have hitherto been sheltered from international competition as a result of quotas and license regime. Innovation, which is critical for survival of firms in today's competitive environment, has strong linkages with intellectual property rights, in particular patents, R&D and technology in firms. In view of the above changed global scenario and the importance of technology innovation and patents for firms in India, it is imperative to understand how Indian firms are coping in these changed circumstances.

The principal objectives of the study are to examine the importance of the internal environment factors such as production, technology and marketing strategies that are imperative for the survival of Indian firms in a globalised competitive environment. It is also important to analyse aspects related to technology innovation, R&D, collaboration, and licensing activity in these firms. This study also examines the extent of patenting activity and patent management issues in Indian firms. The patenting activity undertaken by Patent Agents in India is ascertained with a view to assess their contribution in Indian firms.

In order to study innovation and patenting in Indian firms, the analysis of R&D, innovation and patent activity of firms that are obtaining fiscal benefits for R&D from the government have been taken up. A directory of firms that have received tax benefits on account of setting up R&D Cells has been maintained by the Department of Scientific and Industrial Research, Ministry of Science and Technology, Government of India on its website. Information from these R&D oriented firms and other databases from leading industry associations in the country, particularly Confederation of Indian Industry have been analysed.

This study attempts to develop a theoretical framework to examine the set of factors or knowledge variables associated with innovation that are presumed to have a causal relationship with 'Patents filed' and performance indicators of firms. The theoretical framework is empirically tested through Multiple Regression Analysis for all firms and then for firms based on their scale (size) and industry category.

The findings on the basis of scale (size) of Indian firms appear to support the view that innovation and patent activity is essentially a Large firms and MNCs activity. Industry category analysis reveals that 'Drugs, Pharmaceutical & Chemicals' firms file the largest numbers of patents per firm with the lowest R&D budget as percentage of sales. There are few patents granted and even fewer patents renewed in all scales of firms and industry categories, pointing to the nascent nature of patent activity in firms. It has emerged that only the recently established R&D Cells in firms are actively engaged in R&D resulting in innovation and patenting. This also proves that with the advent of TRIPS mandatory compliances, firms are beginning to establish R&D Cells. R&D budget contributes positively to sales in both Small and Medium firms.

The results of this study enable a deeper understanding of technology innovation and patenting in Indian R&D oriented firms. It also provides a possible road map to other firms that may decide to go in for technology innovation and patenting to compete in the globalized market place.

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