STRATEGIC MANAGEMENT OF TECHNOLOGY IN AUTOMOBILE INDUSTRY - A STUDY IN INDIAN CONTEXT

by

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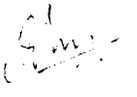
CERTIFICATE

The thesis entitled "**STRATEGIC MANAGEMENT OF TECHNOLOGY IN AUTOMOBILE INDUSTRY - A STUDY IN INDIAN CONTEXT**", being submitted by **Mr ZAFAR HUSAIN** to the Indian Institute of Technology, Delhi, for the award of the degree of DOCTOR OF PHILOSOPHY (Ph.D.), is a record of *bona fide* research work carried out by him. He has worked under my supervision, and has fulfilled the requirements for the submission of this thesis which has attained the standard required for a Ph.D. degree of the institute. The results presented in this thesis have not been submitted elsewhere for the award of any degree or diploma.



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ABSTRACT

The study aims at ascertaining the perception of the corporate world about the strategic management of technology. It addresses questions like What do top and middle management of technology-based or technology intensive organizations expect from technology management strategies ? What instructions, directives, and guidelines are desired in pursuit of a technology management strategy ? How can a corporation maintain its technological supremacy ? How helpful the technology strategy can be in promoting the innovation culture in an organization?

Some of the issues identified are management of technology as a core management function, technology strategy and its integration with corporate business strategy, technological leadership, balancing the technology push and market pull, technological alliances, technology forecasting, technology planning, in-house technology development, adoption of innovations and new technologies, technology absorption, innovation culture, technology transfer models, indigenization of acquired technology, vendor development, technology acquisition from different sources, environmental concerns in technology management, investment in technology, exploitation by technology providers, technology waste, strategic flexibility, flexibility in technological innovations, technology acquisition flexibility, and organizational flexibility. These issues were validated through an exploratory study which was followed by an idea engineering exercise.

The specific objective of the study is to gain insight of the state of art related to technology management practices being followed by Indian automobile and component manufacturing firms, for planning, developing, acquiring, innovating, adopting, and phasing out technology at macro level (i.e. at the industry level) and thereby evolving out strategies for effective management of technology at micro level(i.e. at individual firm level) with an emphasis on flexibility in technology strategy.

Based on the objective and issues, hypotheses and research propositions have been designed. In two guiding hypotheses, effectiveness of technology strategy was found positively related to corporate performance, and flexibility of technology strategy was found positively associated to effectiveness of technology strategy.

The study aimed at covering the technology management function in general and technology strategy in particular of Indian automobile industry. The automobile industry of the country has been divided into three classes for the purpose of study based on the nature of

vehicle they produce and a separate class has been dedicated to component manufacturers(with annual turnover more than Rs 100 million) making overall four categories.

The principles of flexible systems methodology have been used for designing the way to carry out the study under discussion. The study is divided into three different parts which are called as pilot study, macro study, and micro study. The pilot study basically is an exploratory study, which is being carried out to bring out the various issues in the technology management function in general and strategic management of technology in particular in the changing scenario. The study has been done on a convenient sample of seven firms from different industries. The methods of interviewing and observation are used in preparing the case studies which are analyzed using situation-actor-process (S-A-P) paradigm.

The Macro study in the present work has been confined to a particular industry, i.e., the automobile industry of the country. A representative sample of the industry has been taken for data collection. The qualitative data has been collected using interview and observation techniques, and quantitative data has been collected using questionnaire technique. Statistical analysis has been carried out for validating the research hypotheses. Both qualitative and quantitative data have be used for preparing case studies. Six case studies of Indian automobile manufacturers have been prepared. The cases are divided on the basis of technology acquisition arrangements. The firms included for case development are Maruti Udyog Limited (MUL), Hero Honda Motors Limited (HHML), Kinetic Honda Motors Limited (KHML), Tata Engineering and Locomotive Company Limited (Telco), Hindustan Motors Limited - Passenger Car Division (HML-PCD), and Eicher Motors Limited (Eicher). The situation-actor-process and learning-action-performance (SAP-LAP) analysis has been done on the developed case studies. Learning issues have been synthesised to support the research propositions. A framework for technology strategy formulation has been presented.

The micro study is aimed at an organization for in-depth analysis of technology management function and formulation of technology strategy for the same. HHML was chosen for validation of formulated strategy. Technology Portfolio Matrix and System Dynamics model have been used to generate scenarios, identify leverage points, and gaps in the current strategy. A technology strategy has been worked out using the proposed framework.

The study is likely to be found useful by automobile and component manufacturing firms in formulating the technology strategy which has been found as a serious gap in overall working of corporate firms in India. Besides, the study may be found relevant to the automobile firms of developing countries.

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