



INTERNATIONAL JOURNAL OF PURE AND APPLIED RESEARCH IN ENGINEERING AND TECHNOLOGY

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ENHANCING THE ECONOMIC GROWTH OF MANUFACTURING SECTOR THROUGH AN EFFECTIVE MANAGEMENT OF TECHNOLOGY

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Accepted Date: 05/03/2015; Published Date: 01/05/2015

Abstract: There is a huge integration of Indian manufacturing sector due to increase in the competition at open international trade market. However, the Indian manufacturing sectors are more capable to accept such challenges by MOT which is useful to achieve optimum production, effective and efficient work culture and maximum output with the satisfaction of the customer's needs by facilitating the MOT in the manufacturing sector. In the present era the manufacturing industries are facing so many problems, even though they are using the advance technology. In reality the utilization of them are just 50% to 70% which affects the real growth of organization and create the economic complex. This paper tries to find out certain guidelines and resolving multidimensional parameters to assist and facilitate the technology driven practices for the proper implementation of advance technology and improves the wealth creation in the manufacturing sector. This has helped us to generate the questionnaires for the industrial interaction and to study the case studies of few of the manufacturing industries.

Keywords: Technology system / Management of Technology / Manufacturing sector

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PAPER-QR CODE

Access Online On:

www.ijpret.com

How to Cite This Article:

Madhukar S. Pandhe, IJPRET, 2015; Volume 3 (9): 443-451

INTRODUCTION

The manufacturing industries, large organization, medium scale and small scale industries need to achieve optimum production, maximum profit and offer the valuable services to customer.

The industry has accepted the fact that by outsourcing activities organization delivers better value for the customer.

The purpose of this project is to analyze hidden parameters to assist to leveraging the existing technology of manufacturing enterprises. It also identifies the variables for effective value chain management. To prepare conceptual model to link integration technologies adoption, supply chain management, value chain management, management of technology and management strategy.

This conceptual model shall try to find out the value addition of leveraging technology system and technology practices.

2. Methodology and Research:

From the study of literature review, we analyzed that, there is a need to provide conceptual model which link management strategy and find out such hidden parameters which are not considered earlier in integration of technology system and management of technology in the competitive market. This conceptual model will provide guideline and questioner which will help to manage strategy for any organization and how to utilize the available recourses assets and core technology of industry. Also this will help for decision making in adoption of technology for any organization.

The fundamental questions for effective technology management in enterprises:

1. How successful is the firm for achieving the organizational goals?
2. What are the important market place, need and opportunities for technology in products?
3. What is the process that should firm the target?
4. How should be a fundamental technology game plan to meet the future business and technological environment?
5. How can experts be identified and evaluated to implement its fundamental business strategy?

6. How should both financial and non-financial resources be allocated and committed in execution of the program?
7. What are the methods for using the result of integration technology investment?
8. How does the firm use information to manage its business goals and technology approach?

3. Management of Technology

Management of Technology (MOT) is an interdisciplinary field that integrates science, engineering, and management knowledge and practice. The focus is on technology as the primary factor in wealth creation. Wealth creation involves more than just money, it may encompass factors such as enhancement of knowledge, intellectual capital, effective exploitation of resources, preservation of natural environment, and other factors that may contribute to raising the standard of living and qualities of life.

Managing technology implies managing the system that enable the creation acquisition and exploitation of technology. It involves assuming responsibilities for creating, acquiring, and spinning out technology to aid human endeavors and satisfy customer needs. Research, inventions and development are essential components in technology creation and enhancement of technological progress.

A National Research Council Report (1987) of Management of Technology defined it as "An interdisciplinary field concerned with the planning, development and implementation of technological capabilities to shape and accomplish the operational and strategic objectives of an organization.

Why Management of technology now?

The world is changing. As we move into twenty first century, the pace of change continues to increase. New technologies emerge must also shift to cope with the change. This shifts reason why there is need of MOT is.

1. The place of technological change
2. The change in scope
3. Changes in competition
4. Trade Blocs

4. NEW MANAGEMENT OF TECHNOLOGY:

The paradigms: Technology plays pivotal role in the interactions among the individual, society and nature. Technological adventures have major effects on each of these entities and are in turn, influenced by them. Management of technology involves developing an understanding of these relationships and dealing with them in a rational and effective manner. National research council (1987) focused attention on it as hidden competitive advantage.

4.1 Essential Issues in Managing Technology: In the third millennium, we will witness drastic changes in the business environment. There is a search for new paradigms that are suitable for this new environment. A paradigm is a framework of ideas that establishes the general context of analysis. [2]

1) Resources: The efficient utilization of technological resources is a critical aspect of the management of techno-economic enterprises. In a way of life base on technology, the rational and productive use of available instruments, equipment, tools, materials methods, software, skilled workers, information, intellectual assets and financial resources is crucial in providing a competitive posture for corporation.

In highly competitive environment where error tolerance is limited, managers must be equipped with predictive methodologies and decision tools that are reliable, flexible, practical and fast. There is need for new ideas, imaginative methodologies and performance criteria that have been tested in a real life situation.

2) Methods of performance Assessment: Traditional measures of performance are sterile and unimaginative. Methods of accounting and financial assessment are biased against technological innovation and underestimate the risk of maintaining the status quo. There is a need to know the extent to which the specific characteristic of a new technology influence methods of general and financial assessment of performance.

3) The measure of performance of a technology: Reliable methods of measuring the performance and competitiveness of specific technologies in the marketplace should be developed and used. Different criteria may need for different circumstances.

4) The measure of Benefits from R & D Activities: Benefits from R & D activities may be manifold. A rational approach to identifying potential benefits and set of measurement criteria for comparing the outcomes of R & D projects should be developed and use systematically.

5) New Tools for optimizing decisions: Since resources are scarce and time is limited optimal allocation of financial, material and human resources is critical.

6) The Business Environment: Within the context of technology by management, interest is primary focused on technological factor, activities and plans. How do external factors affect the creation and introduction of technological change within an organization and how do technological changes that take place within an organization influence the environment?

7) The Integration of Technological and strategic Plans: Technological Planning involves decisions affecting the section of R & D projects, the allocation of resources and time tables for successful implementation. It also involves choosing the technologies to be incorporated into the production process and evaluating whether they should be provided internally or purchased. Each of these options must be addressed in the strategic plan.

8) Increasing the users Influence in the selection and Application of Technologies: There is need for more understanding of the feedback mechanism between the users and the producers of technology and for means of strengthening user influence in the selection and application of technology.

9) Adoption of technology in any organization: There should be some guideline for manager to think about adoption of technology in any industry.

4.2 MOT Guiding Principles for managing Enterprises: Recognizing the new paradigms for managing technology, Betz et al (1995) present eight guiding principles for the management of the modern enterprise. These are; [2]

1. Value Creation
2. Quality
3. Responsiveness
4. Agility
5. Innovation
6. Integration
7. Teaming
8. Fairness

4.3 Technology Development: More easily thought of as internal functional capabilities, varying for resources with marketing, manufacturing, operations and other elements of the organization. A major goal of strategic planning systems for industrial research organizations is therefore to transform (in a mathematical sense) the objective and strategies of the business into core technologies and program priorities for the laboratory, so that changes in business direction will be routinely reflected in the laboratory plans. The transform process must also recognize other complexities. For example in moving from business needs to technical programs, there are frequently temporal shifts, as the most appropriate technical response may take significant time to implement. There is also feedback. Core technical competence, established in the first place to directly support business strategy, often provides the opportunity to extend and change it.

A technology practitioner should do the following:

1. Analyze the firm's internal technologies (products and processes) to identify core competencies.
2. Identify external and basic technology.
3. Identify "Technology Gaps", that is, situations in which new technologies that must be acquired.
4. Review the technology/science push and the market pull.
5. Identify constraints in the process.
6. Review the R & D strategy. Is it consistent with science push and market pull?
7. Check for consistency between core technologies, R & D and marketing?
8. Look for evidences of continuous improvement in manufacturing.

Technology Audit Model:

The model is based on the following six categories;

1. Technological environment
2. Technologies categorization
3. Markets and Competitors

4. Innovation Process
5. Value-added functions

As these six areas indicate a technology audit can become a very demanding and complex process. A checklist can help guide an auditor through the TAS process. A TAS checklist shown in Table Below.

Elements	Company		
	A	B	C
1. Corporate Environment	5	3	2
Corporate Strategy	4	3	2
Goals	4	2	2
Department	3	3	2
Organizational Chart	4	3	3
Teamwork	5	3	3
Culture	3	3	3
Learning Organization	5	4	3
Communication	4	3	3
Reward System	3	2	2
2. Technologies Categorization			
Internal Technologies	3	3	2
External Technologies	3	2	3
Basic Technology	2	3	3
Technology Trends	4	4	4
Innovation in marketing	4	3	3
Te product-service concept	3	2	2
3. Markets and competitors			
Market assessment system	5	3	3
Marketing of technology	4	3	3
Competitors assessment	4	3	5
Benchmarking	5	2	3
4. Innovation Process			
Intrapreneurship	3	2	2
Entrepreneurship	3	2	2
Science push	3	4	3
Market Pull	4	3	3
Break-even-time and Break-even-cost	2	2	3

5. CONCLUSION: The case studies of three different manufacturing companies have been studied here and those have been elaborated as follows:-

Company (A), Company (B), Company (C)

The analysis of these case studies shows that the nature of work is different, need of Management of technology is different in all above three companies

The case study of medium scale and small scale industries shows that, in many cases a company may adopt technology practices, due to the influence exerted by its business partners and or its competitors who does not have technology practices in their organization. Small scale

industries are usually the weaker partners in inter-organization relationship; small businesses are susceptible to imposition by their larger partners.

It is analyzed and concluded that the data which is collected in the form of rating is helpful to understand the strength and weakness of the company. The major problem of the company was facing timely delivery of machines to the customers. Customers are not satisfied because other competitors are able to deliver machine within required time.

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