

Research Initiative from Engineering Management and R & D Management to the Management of Innovation: Innovate Success of Today and Tomorrow

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Abstract

With in the industrial nations for more employment and for the progress of economy more successful and faster innovation processes became one of the most crucial concern. The process of innovation begins with an invention that is basically the outcome of any research and it continues with applied development and research with the assumptions of a prospective marketing, with usual marketing and production. The process of innovation ends with success in complete market. An optimal technology transfer and R&D-management is required for the progress in this field. Some criteria, experience and ideas are discussed in this paper.

Keywords- *innovation management, R&D management, management and technology.*

1. INTRODUCTION

Rather than simply managing the generation increasing the managing knowledge is the main concern of R&D (Research and development) management [1][2]. Through continuous innovation for industry competitiveness better knowledge management is the key factor of success [4]. In the past research development the processes of R&D management the model of first, second or third generation for managing the research as a tool, concept and technique. In the firm creation and diffusion of knowledge is the major focus of these models [5]. External knowledge of firm can also manage with R&D Management and it also include the management of technological dependencies and complementary skills.

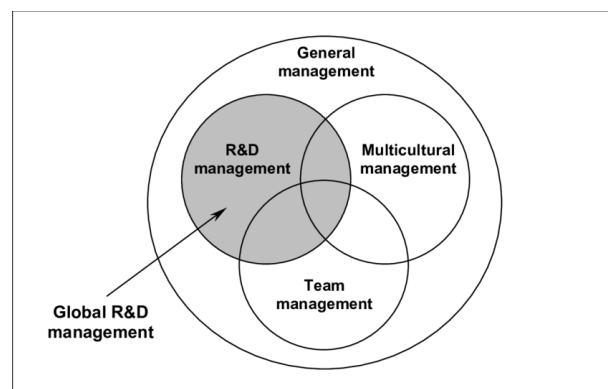


Figure 1: Role of R & D management

Saad, Erickon and Roussel [3] defined that the R&D management of third generation have the feature of link between strategies of R & D and corporate. From the first and second generation model

this is the significant departure. For an organization for generating new knowledge this behave like a set collection of researcher oriented tasks [6]. The R & D can defined as a process of developing, diffusing, and generating new knowledge with developing processes, services and products [7] [8].

2. R&D MANAGEMENT

The R&D management is the function of leading and designing processes confirm smooth transfer of new knowledge, manage R&D organizations, and also show that how other departments and groups involved in the innovations [9] [10]. Where the tasks of technology management meet with tasks of innovation management can be defined as R&D management [11] [12].

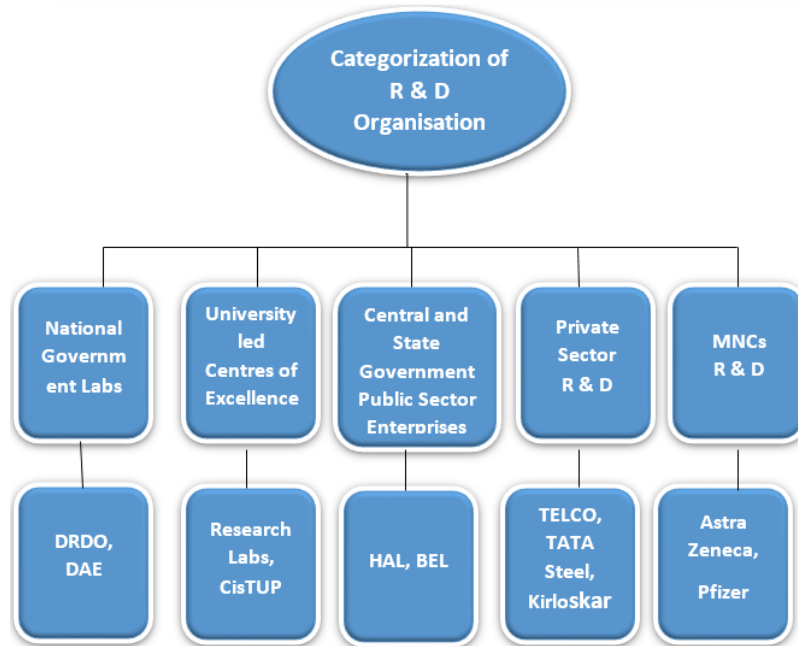


Figure 2: R & D management in organization

3. EVOLUTION OF R&D MANAGEMENT

1950 to mid-1960s it introduced the first generation of R&D. in 1994 [13] Rothwell and in 1966 Andrews, Pelz [14] defied that for all ailments technology was generally seen as the remedy, new industries emerged and the new products were sold. Roussel et al [15] introduced the idea that in first generation more products can produce while more products went out in R&D.

From mid-1960s to early 1970s the second generation R&D introduced and in the concept of demand and supply defined with the stable relationship. In 1994 Rothwell [13] proposed that in second generation for increasing the sales volume marketing efforts are emphasis. From the market in favor of ideas neglecting long-term research and short-term demand side were more focus within this environment.

	Industry	University	University-Industry
Main R&D projects	Development and Innovation Projects.	Basic and Applied Research Projects.	Applied research, development and innovation.
Using Project Management knowledge	More internalized project management standards (closer to industrial projects). Important advances in selection models and risk management of R&D Projects.	Project Management unused, it is not considered useful or practical for academia. Lack of knowledge and skills in project management (level 1 in the case study). Lack of support for researchers (administrative support only, e.g. TTOs). Much time spent on management tasks where they are not skilled.	Project Management more internalized in the industry. Lack of maturity in knowledge transfer and low importance of project management. New management in cooperation projects (trust, communication, risk, etc.) and new challenges in addition to those inherent to R&D. TTOs as a positive effect by increasing contact with companies.
Knowledge and Market	Technological and market dependence. Success is measured in economic terms (benefits).	Dependence in knowledge advance and in sources of funding. Success is measured in diffusion (e.g. publications).	Double dependence, each agent seeks different objectives (industry: market; university: knowledge). Approaching their interests: hybrid university and 'scientification' of the industry.
Project Manager and Principal Researcher	Existence of the R&D PM. PR is not mentioned. More industrial projects than scientific, there is just one role.	Existence of PR required at calls for R&D. PM is not mentioned or it is assumed to be the PR + TTO or it will be subcontracted by the PR for some issues (such	Dual leadership for each agent (university: PR; Industry: PM). Financial support to the university by the industry (unbalanced decisions) in exchange

Table 1: characteristics and approaches in R&D projects

In 1998 Morris and Miller [16] introduced cost reduction and cost control factors in R & D management.

In 1973 Galbraith, in 1997 Allen [18], in 1978 Frohman, Roberts [19] defined that by improving and reviewing new technology it can eliminate the wasteful efforts. In 1984 (Roussel [2]), and in 1983 Cooper [21] introduced the portfolio view of R&D. For market success and technical probability is result the several way of balancing the risk.

From early 1980s to mid-1990s the fourth generation was introduced. In 1991 Trygg [22], in 1997 McGrath, Eldred [23], in 1995 Kleinschmidt, Cooper [24] stated that new process of product development was concerned and when striving for speed as success factors parallelization integration of activities were brought forward.

In 1997 Iansiti and West [25] defined that it need to interact the business environment like suppliers, distributors, customers, competitors with R&D.

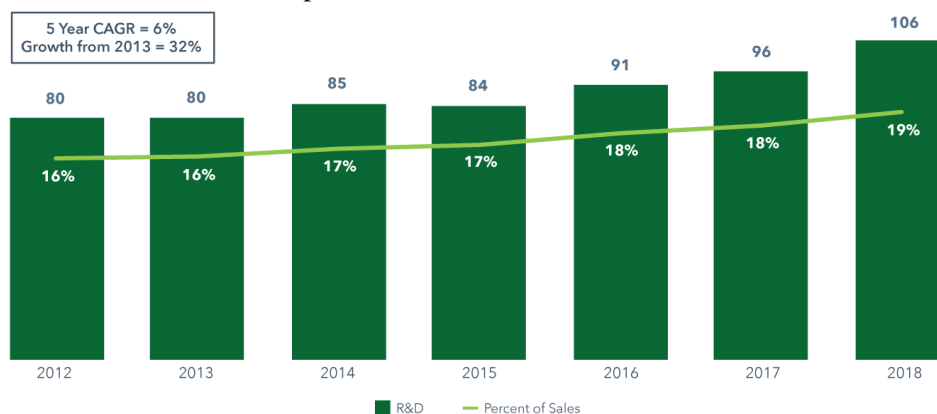


Figure 3: Evolution of R & D

4. R&D STRUCTURE

The R&D structure of a company can represent by its:

1. Innovation culture like for value creation and value capture behavior norms
2. Structure of organization like chart of organization

3. For R&D activities strategic mission like R&D reason
4. Mechanisms for coordination like project planning, allocation of resources

A company's R&D structure is defined by its:

It can consider that R&D structure is like the DNA of a company, towards particular strengths it create natural bias. Within an ecosystem the structure exists, and by activities of multiple industries and companies , market economics, the pace of science and engineering advances it is defined [13].

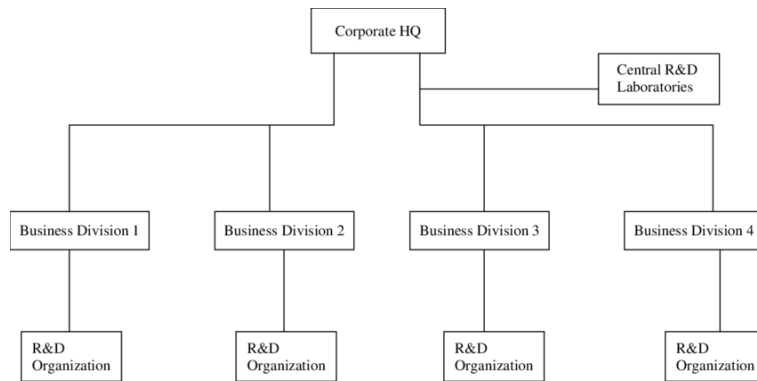


Figure4: R&D Structure

5. INNOVATION MANAGEMENT

In the basic term the innovation means novel or young or new. To make something new the term wuse as innovative for people. A market that is departure from traditional management practices , processes and principles or a removal from a customary organizational type it can defined as management innovation. The innovation mangement performed significantly for making new ideas and technologies in the competitive world of business. It require the recognition of various realities through top management for innovation.



Figure 5: innovation management

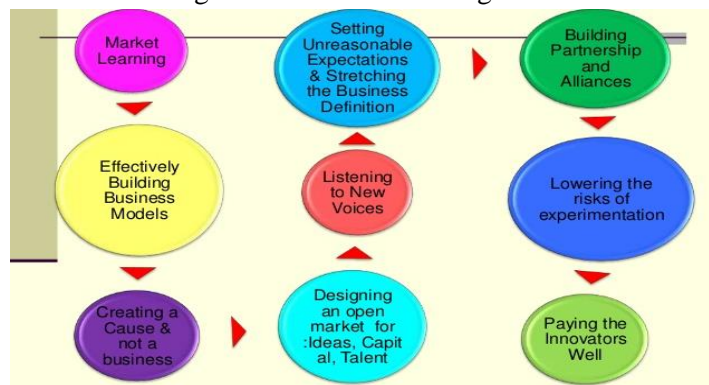


Figure 6: innovation process for organization

Some realities are given below:

1. it encompasses the management of innovation by management of technology
2. for encouraging the innovative work and ideas it requires fostering the environment
3. it is risk taking, proactive and encourages creativity
4. For making the existing products and processes more valuable and better it involves the leading of firm [27].

	Imitation	Incremental Innovation	Radical Innovation
Purpose	To create a product or service, new to the customer but already existing in the market	To create a substantially new or improved product or service.	To create a new product or service, absolutely unique in the market
Project Goals and Objectives	Clearly Defined	Clearly Defined	More vague and broader
Uncertainties	Low	Moderate	High
Approach	Reverse engineering. Imitation. Low value added, minimal learning, low innovation potential	Improved price or performance features	Breakthrough R&D

Table 2: Innovation strategy category

6. ENGINEERING (TECHNOLOGY) MANAGEMENT AND MANAGEMENT OF INNOVATION

In general it will utilize the terms management of technology (MOT) and engineering management (EM) interchangeably [29]. Technology and innovations are available in all parts of present day society. we should have been compelling supervisors in a wide assortment of jobs in the organization extending from showcasing to item improvement, management or HR [30]. The profile Innovation and Technology Management mixes genuine development involvement with demonstrated research models to enable you to ace the abilities and mentality it has to understand innovation business challenge [28].

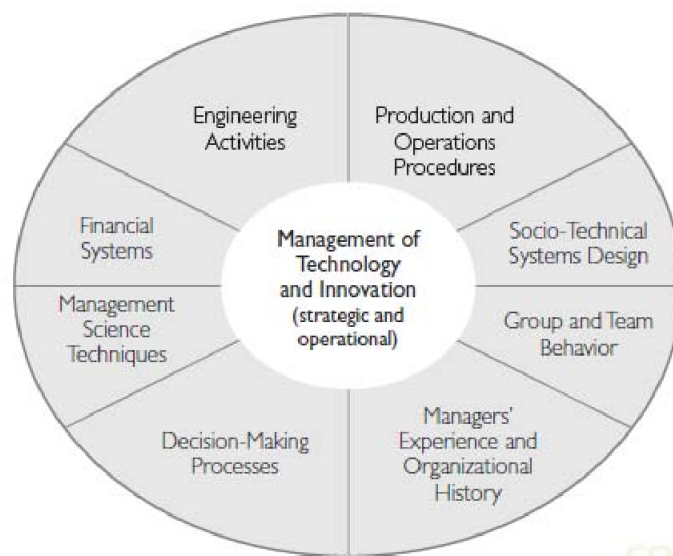


Figure 7: Management of technology and innovation [31]

7. ORGANIZATIONS AND TECHNOLOGIES

The effect of these innovations on the two workers and associations will be significant and the test for directors currently is to envision and improve the effects of these [32]. A scope of variables, including specialized development, the globalizations of business, expanding rivalry and the development of new shopper markets, are driving quick progresses in new technologies [33].

The entire thought of devices, machines and frameworks is to do things all the more effectively, quicker, or superior to anything barehanded people can. Cubicle laborers may right now feel good about their own prospects, however in reality administration occupations-including the most specialized and mentally requesting are the new focuses of innovative development [33]. Organizations may need to offer projects and arrangements that help representatives to more readily adjust their work and family obligations, so as to hold them [34].

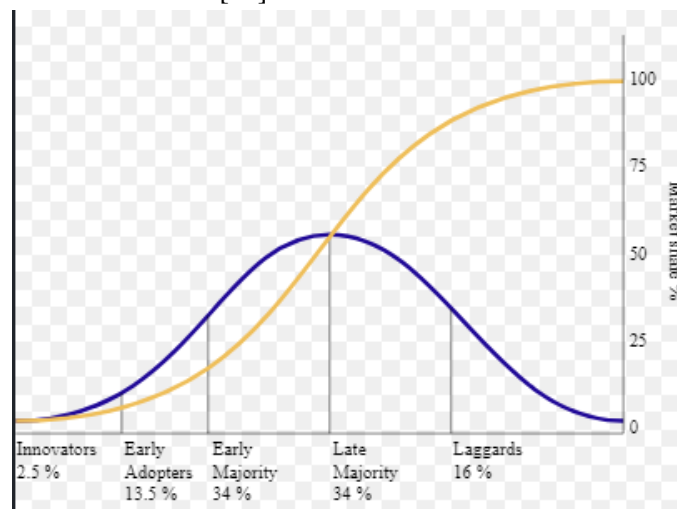


Figure 8: Technology and Innovation graph

CONCLUSION

Rather than simply managing the generation increasing the managing knowledge is the main concern of R&D (Research and development) management. The R&D management is the function of leading and designing processes confirm smooth transfer of new knowledge, manage R&D organizations, and also show that how other departments and groups involved in the innovations. An optimal technology transfer and R&D-management is required for the progress in this field.

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