ISBN : 81-87053-57-9
*Synergy of R&D and Marketing*
© NML Jamshedpur, India (2003), pp.173-179

# Transfer of know-how, the need for a holistic approach

P. N. CHAUDHARY
*National Metallurgical Laboratory, Jamshedpur-831007*

**Abstract** : Experience shows that many products and processes developed in the laboratory do not see the light of day due to lack of a holistic approach. The scientists who develop know-how are often satisfied with the publication and patents. Their efforts do not mature in the form of technology because the development of technology is a group activity where the involvement of entrepreneur is also needed. The good work done by scientists remains in the archives of the laboratory in the form of reports due to lack of a systematic approach in its commercialization. The paper discusses various factors, which inhibit the development of know-how into a marketable technology, and the factors, which hinder its transfer to the user's place. It also suggests ways for effective utilization of R& D efforts.

**Keyword** : *Technology transfer, Detailed project report, Feasibility report.*

## INTRODUCTION

Research Scientists produce usually know-how in the laboratory. The output of their effort is mostly patent, publication and technical reports. Once the report containing know-how is submitted they are excited by another idea. Thus, the know-how generated is shelved at different stages during the course of development of technology. Most often these know - how do not mature in the form of marketable technologies due to inadequate engineering and marketing support.

The transfer of know-how from the laboratory to industry takes place in two stages-vertical transfer and horizontal transfer.

Vertical transfer is the transfer of technology within the laboratory itself from the idea stage through bench scale experimental work and pilot plant study to the project report preparation. Factors that inhibit vertical transfer are as follows:

- Incomplete communication
- Management reluctance to take risks
- Occasional conservatism
- Disinclination of scientists to work in factories/ shop floor
- Incompleteness of scientific and economic data
- Geographical separation of research from production units

Whereas Horizontal transfer is the transfer of know - how from R&D laboratories to units which are administratively independent. Important factors[1], which affect horizontal transfer, are :

- Lack of faith in indigenous science/technology
- Scale and level of development in relation to the production unit to be set up and.The needs of the entrepreneur
- Guarantee of performance
- Resistance to change by production units
- Lack of proper project engineering facility at laboratory
- Lack of capital
- Artificial cost price structure
- Mental attitudes and Innovation Quotient (IQ) of the receiving organization
- Lack of adequate scientific and technological data base
- Credit sharing

In view of the problems associated with transfer of know-how, it is usually found that scientists do not pursue research beyond bench scale. This paper discusses a systematic approach required for transfer of know - how to industry.

The various steps needed in the development of a marketable technology are shown in Fig.1. Any successful attempt for commercial exploitation of these know- how require back up of feasibility analysis[2] followed by detailed analysis provided by a Detailed Project Report (DPR).

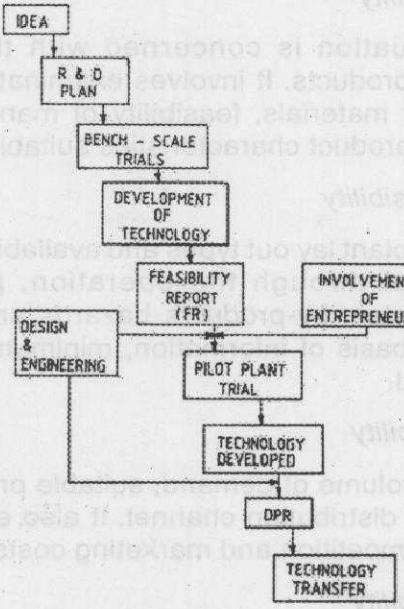


*Fig. 1 : Steps in technology development*

## Feasibility Report

A feasibility report (FR) is an aggregate of economic and technical information, which will permit a proper appraisal of the cost and benefits of committing resources to a project. The preparation of feasibility report requires a team effort. As a general rule the members of the team should be selected in a way so as to cover major substantive fields of the projects. The team leader's res-ponsibility is to plan, organize and coordinate all the activities. The following inputs are needed for the preparation of FR as shown in Fig.2

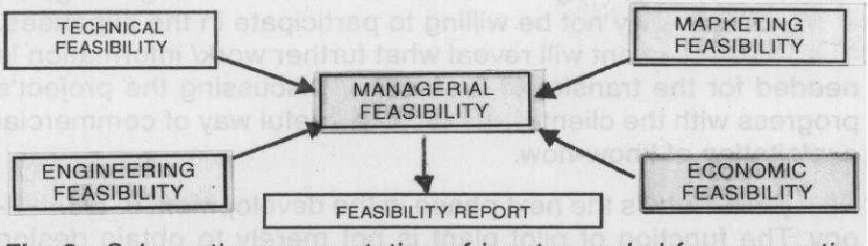


*Fig. 2 : Schematic representation of inputs needed for preperation of a feasibility report*

*Technical feasibility*

Technical evaluation is concerned with the suitability of processes and products. It involves examination of availability and cost of raw materials, feasibility of manufacturing steps, equipment and product characteristics suitable for the market.

*Engineering feasibility*

It deals with the plant lay out types and availability of equipment, flow of material through the operation, process control procedures, wastes, by-products hazards and environmental effects. On the basis of information, minimum economic plant size is estimated.

*Marketing feasibility*

It finds out the volume of demand, suitable price structure and requirements of distribution channel. It also evaluates present and potential competition and marketing costs.

*Economic feasibility*

It constitutes a summary of the financial results that may be expected from the commercial application of the project.

*Managerial feasibility*

On the basis of information provided on technical engineering, marketing and economic feasibility, the advantage of a commercial operation should be weighed against alternative use of resources.

If the results of the feasibility study show that the project has commercial viability, it is necessary to look for a prospective sponsor for financing further activities. In the beginning, an entrepreneur may not be willing to participate in the expenses. But his involvement will reveal what further work/ information is needed for the transfer of know-how. Discussing the project's progress with the clients concern is a useful way of commercial exploitation of know-how.

Pilot plant work is the next phase in the development of technology. The function of pilot plant is not merely to obtain design and economic data but also to produce product on a semi-

commercial scale. Research Laboratory cannot afford to spend money in putting up pilot plant for the all the researches carried out. Therefore involvement of a sponsor who is willing to accept the know-how for funding further activities is necessary. This will help in converting the know-how into a marketable technology. The role of marketing team is vital at this stage in locating the willing partner.

After the pilot plant scale trials, products and processes are fully defined and are available for demonstration. A preliminary estimate for operating cost and plant investment is made. A strategic alliance with engineering organizations like MECON, Dastur and Co, Engineers India Ltd., will help in identifying the requirements of technology transfer to user's place. On this basis of these details, a Detailed Project Report (DPR) is made by the consulting organization, which will give a fairly good idea about the implementation of project[3].

## REFERENCES

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(2) Manual for the preparation of Industrial Feasibility Studies, 1980, Industrial Development Bans of India, Mumbai.

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# *Panel Discussion*

## Technology Assessment

*How do we measure R&D productivity ?*

The outcome of R&D is high value publication, reports, patents, development of a know-how and ultimately a technology with the help of some engineering firm. Once the paper is communicated to a journal it is evaluated by the editorial team. After publication the idea is open to all. Any feedback from reader helps in maturing the idea.

*Why R&D projects succeed or fail ?*

Good planning and teamwork help the success of R&D projects, whereas lack of communication is one of the main reasons of R&D failure. Involvement of entrepreneur is necessary for development of know-how.

*Viewing R&D projects financially !*

Finance is necessary for the support of various activities of R&D. Dr. Ram suggested in his paper that small scale industries are not in a position to support R&D financially unless the technology is fully established. The panel felt that this attitude has to be changed if they genuinely want the support of R&D for the growth of small-scale industries. The SSI's are in business. They incur all kinds of expenses in setting up factory. Then why cut down R&D expenses? They should also provide some fund for R&D which is the basic requirement for development of a new technology.

*Developing new R&D products on time and in time.*

It is often found that R&D personnel are not having regard for the urgency. This mindset has to change. If the work is not completed on time it looses its relevance. The knowledge generated should be utilized at the right time. Time is a competitive weapon. If you do not do it, others will.

*Traps, pitfalls and hurdles in the valuation of technology.*

Dr. Mohan Kumar, panelist said that technologies are two types one which is developed by R&D organizations alone, and the other which is developed along with the user industries. The technology developed for a use can be immediately assessed along with the user. He cited the example of biotechnology. However, many technologies developed after several years of effort cannot be assessed in a short span of time. Market driven factors play an important role in technology assessment and the transfer.

The technologies developed in IIT like institutions are not desired by the industries because the person who has developed the technology may not be available during its implementation. If the developer is a student, he goes away after taking degree. If the developer is a professor, his availability is a problem.

However, it was found that the industrial experience of a scientist has been very helpful in the transfer of a technology.

If the technology is transferred and the licensee refuses to pay the Royalty saying that the technology, which they are using, is not the original technology?

Unless the licensee is granted a separate patent, he is bound to pay the royalty for the technology taken by him.

What should be done when a buyer wants an exclusive right for a technology developed by a public funded organization?

We should avoid giving license on exclusive basis since there is a chance that the technology will be damaged for strategic reasons. However that varies from case to case.


Technical Session : Technology Assessment


Technical Session : Technology Marketing