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Synergy of R&D and Marketing

Impediments in Technology Transfer

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Abstract : The paper discusses the phases of development of a technology. The technology is a marketable product of science. It consists of hardware and software. Before developing a technology the gap must be clearly identified.This is no need to develop a technology, which cannot be sold. There are 3 components of technology transfer a) Know-how b) Skill and c) Hardware/machinery. The relative contribution of these components in technology transfer has been discussed. Several impediments such as attitude, quality, funding, facilities, Marketing and legal issues are to be addressed in the transfer of technology.

Keywords : *Technology transfer, Impediments, R&D Management.*

INTRODUCTION

Hardly anybody needs a conviction to-day that the "Black Box" called 'Technology' contains the necessary ingredients for a successful development of a country and has probably the highest impact on it than of any other factor of production, e.g. Land, Labour or Capital.

One of the important dimension of technology transfer starts with the appropriations of the technology that is primarily judged with the objective and phase of development which can be sustained over a long run.

The technology Transfer by its definition embodies thefollowing activities :

(a) Initial choice of technology

(b) Appropriate modification to suit local environment

(c) Accumulated store house of human knowledge ever expanding due to advances in Science & Technology

The technology transfer has a number of Constituent elements and most important of which can be classified as -

- Know - how.
- Skill,
- Hardware/machinery or capital goods.

The relative contribution of these three components varies widely from technology to technology due to factor costs of production like capital and labour. These three interlinked components basically represent :

- R&D system & engineering design
- Education system
- Capital goods production system.

The three components, however, have to work within the social and government policy environment of a nation.

On the basis of above analysis there are four forms of transfer processes depending on the degree of above three components

Adaptive Transfer

In this case, foreign technology is adopted by the Domestic Scientific Technology Capability (DSTC) before going into production.

Full Transfer

Here the technology purchased is simultaneously used in production and processed through Domestic Technology System (DSTC)

Full-Adoptive Transfer

This is combination of first two types, i.e. the technology is directly used in manufacturing and also processed through DSTC for upgradation. The next generation products comes through Domestic System.

Pseudo - Transfer

The technology is directly used in production bypassing the Domestic Technology System. T&D system is merely used for quality control and other insignificant work.

The qualitative factor that can induce a transfer may be summarized as below :

External Factors

(a) Relative competitiveness and comparative advantages of Nations

(b) Changing political and economic scenario

(c) Shift in consumer preferences

(d) Financial interdependence

Internal Factor

(a) Technical and marketing factors

(b) Role of technology

(c) Risks involved in R & D

(d) Dispersion and expansion in technology

(e) Protection and exposure of the firms from and to the external environment

In studying technology transfer, it is understood that there is no established quantitative norm which can be applied to assess the effect or the extent of whatever components are involved in the transfer.

It is to be clearly understood that for our purpose we define the technology as an integrated set of objectives involved in the commercial production of physical goods and services. Thus the stress is on marketable products, as Thomson Edison said "Don't invent any thing that cannot be sold"

Thus the impediments can be grouped as follows :

(i) Attitude / Environment
(ii) Quality
(iii) Funding
(iv) Facilities
(v) Market
(vi) IPR related issue
(vii) Legal complexities

DISCUSSION

Technology is a product, the product of the hard, sustained and dedicated effort by a group of knowledge workers. Like any other product, technology also needs marketing. Its true that as a product, technology has many distinctive features which should be kept in mind when one talk about technology marketing as something distinct from product marketing. However there are many parallels between marketing and manufacturing items and marketing of technologies. And we have to really discuss the common points of the initiators of technology marketing and for marketing of manufacture items. If the technology is good, if it can find today or tomorrow the good applications expanded and will yield in lot of entities. There are many parallels between doing marketing of manufactured items and marketing of technologies. For example in marketing management, it is felt that what are marketed are not just products. Marketing management distinguishes among three different entities called a product, augmented product and extended technology. If a technology is to be regarded as a product that means marketing. A technology that has been developed in a laboratory, public or private which has been in a way tested on a pilot scale, and has also been tested to be marketed. The knowledge which has been developed firstly on a laboratory scale, a bench scale or a pilot plant scale, tested and certified as conclined and robust in get profile of such parameters, not all would be a technology which can be in other words, rather could be marketed earlier, then it needs augmentation. Augmentation essentially in terms of you know, for manually, just an ordinary product has to go on with an informative level that tells us how to use it, how to maintain it, which we call it as augmented technology that can be transferred

to a potential users. Thirdly, when this technology is being used, the user just gets into the problems, gets into organisation, the organisation developing the technology, offering the technology. Transfer or marketing the technology should also provide a necessary support to the user in reviewing the bottleneck. Even in terms of providing marketing assistance marketing products and services, which emerge out of technology, being transferred. With this assistance, with this support, the technology becomes extended. One must realise that in ordinary product marketing what we really market are augmented, and in some cases extended product and not products by themselves. Similarly, here one has to think of necessary augmentation and extention of any technology. Extension may even go upto training of personnel who have to use the technology to get full commercial benefits out of it. Maybe that of the organisation offering a technology, he is not fully fit to provide that sort of training provided, then one can tie up with another training institutions. This is number one that we have to be sure about the necessary augmentation and necessary extention of the technology before it is transferred or marketed and depending on the technology. Technology is a brand which can be realised in terms of material, a new plant, new manufacturing technology, maybe new control mechanism, ultimately new product so depending on the technology the necessary augmentation, the necessary extention, they have to be identified and they have to be incorporated or they have to be ensured.

Occasionally we come across two phrases : Technology transfer and technology marketing. It's a fact that technology marketing involving imports and exports of know-how. Technologies passing across the globe has been rare but even then we have started formally speaking of technology marketing. Is it possible to distinguish between technology transfer for which we used to have the poly-technology transfer Centres of CSIR and technology marketing. At least in one count we can be differentiated in the sense that probably or usually technology transfer is something like a reactive action in which you have already identified the customer or even a potential customer whereas technology marketing has to start first of all with

identification of possible customers. Technology marketing in that way has got some activities in a way of technology transfer. So, the first task is to identify who could be potential customers for a technology that has been developed and has been tested to pilot level or robust effective in terms of costs and benefits in a laboratory. Identifying possible and potential customers is always not easy because may be there are persons who have not invested any amount of money in any industry so far but could be attracted to develop an industrial unit once facilitated by a new technology ending up in a new product or a new service. So, in that way to identify potential customers of new technologies being developed or to be developed is now itself is a very important task which may really not exist in the area of technology transfer.

CSIR, now should emphasize on identifying potential customers, understanding their needs, and expectations of the customers about possible technology evaluation and also market based evaluation. In other way a client based organisation, based on market performance. These two are probably quite important as reflecting customer needs and expectations out of a technology that can be offered to them or can be adopted by them. There are financial, technical, organisational and cultural needs and expectations of different customer or potential customers for new technology before they can be really absorbed provided there are legal considerations which is also critical. Then to identify these requirements and then try to meet them and ultimately to satisfy the customers or potential customers will be the broad framework of activities to be carried out in technology marketing. Firstly to identify needs and expectations of customers and potential customers. Needs and expectations could be technical, financial, organisational, cultural legal as well. The second would be an attempt to meet these needs and expectations and the third would be to assess how customers during usage of the newly developed technology feels. That requires a much remembering satisfaction, dissatisfaction which are latent variables. Latent variables can only be understood in terms of books surrogates or substitutes. The substitutes have proxy measure for what we do call customer satisfaction. As the related

variable becomes a task, results in the third element in technology marketing. But the first two. the first one in terms of activities which are not so scientific or technological in nature. The second being so. The first one being a terms of ability to develop a mechanism by which we can identify. The potential customers may not be spontanous as mentioned earlier could be people who have not started any industrial unit nor even shown any interest to set up an industrial unit. There can be persons attracted only by fascinating products and services which can emerge out of new technologies. There could be people interested in science and technology and have some money power. They are probably not engaged in any industrial activities, they could also be fascinated to become potential customers as well as customers of products and servics who are having urgency or rather need of improved technologies, to come up with better products and services or to come up with products and services with competitive prizes. Again there could be customers who have already demanded in terms of signing of agreements with scientific institution to develop a technology in which one can raise a question of transfer using a particular technology. Their needs and expectations should be understood in terms of what they perceive as a technology of sufficient value. It is not a question of how we do assess or evaluate certain technology developed by us. Atleast the value of quality can be assessed by the people who are involved, developing a technology or by the peer group. And here lies the ability to see what others think of us. To that extent again, there is a parallel between (i) technology as a product and the (ii) manufacture items as a product. Now-a-days not in India but of course in industrially developed countries, product quality is talked of at three levels. One is for the physical quality. It is not physical in the sense related to physics. Physical quality in terms of quality as can be judged right at the time when a product is being acquired by the customer or the user. It relates to all features and qualitatively or even assessed quantitatively. The second dimension of quality is called functional or interactive quality which is revealed as the product is of a durable product like technology which can come up with goods and services. Relatively long life cycle, so, they are also as the 'product' is being used, what you call

functional or interactive quality. Physical quality relates to product or augmented product. Functional or interactive technology relates to standard product. But there is one more important dimension of quality which is called Corporate quality. It is not related to the product, not even to extended product. Corporate quality partly takes into account the extended product but goes beyond that to take an account of what is called the 'Perceived Image' i.e. organisation offering the product has been perceived by the user, the purchaser and the customer. It is what the image of the R&D institution which matters for marketing of certain technology. There are just corporate quality as well, in terms of marketing. So, physical quality, interactive quality and corporate quality, are well known quality dimensions of manufactured items. These three dimensions of quality are equally applicable to technology as well. And one must notice that perceived quality, in terms of interactive quality, gradually leads to our usage and corporate quality as is perceived by the user or the customer or potential customers, they are very important issues to be tackled in marketing of technologies. So, that means R&D institutions, trying to market technologies developed, first of all should try to boost their images. One may argue, but still each of these statements carry some amount of weight.

We have institutions which are likely to coming up with good technologies, they also may have to spend some effort and money as well on boosting their images. To the extent that perceived corporate quality of their technologies could be high in the mind of customers and potential customers. Its not pushing up of their infrastructure. It is the terms of their workers, knowledge workers, easily accessible, being competent, being at the same time responsive to customer needs and expectations. Response is something like empathy. Its quite important. Many of our knowledge workers in our R&D institutions are probably are quite competent in their respective areas. They also need to become quite responsive to customer requests, customer complaints and even customer suggestions. One has to keep this in mind with distinct entities.

Customer suggestions are sometimes quite effective. Customer suggestions if promptly responded to, effectively responded to

results in great improvement in technology that has been originally developed by knowledge workers in some R&D institution. So, institutions have to boost competence, courtesy and responsiveness of their knowledge worker in order to enhance the corporate quality of technologies developed by them and that way help in marketing of their technologies.

There are huge technology gap between the developing and the developed countries. The assimilation of a technology is easier if the gap is less. In India, there is hardly any funding of research by private industries and without adequate funding no advanced technologies can be developed. A technology should be able to solve 90% queries of a purchaser and only then it can compete in the global market.