Lecture –12

Managing Technology

Model Questions

MEANING OF TECHNOLOGY

There are two definitions of technology. A very broad definition is that technology is the application of knowledge to solve human problems. A narrower definition is that technology is a set of know-how, processes, tools, methods and equipment used to produce goods and services. Know-how is the knowledge and judgment of how, when and why to employ equipment and procedures.

We must become managers of technology, as Peter Drucker argues, not only users of technology. For example, the United States has halted the construction of new nuclear power plants, because of the potentially dangerous environmental impact. A business, too, must choose the technology it uses not merely be driven by market and competitive forces. Also government has a role in ensuring that technologies used by business ultimately meet the needs of society at large.

PRIMARY AREAS OF TECHNOLOGY

Within an organization, technologies reflect what people are working on and what they are using to do that work. There are three primary areas of technology. Operations managers are interested in all three aspects of technology:

- Product Technology
- Process Technology &
- Information Technology

Product Technology:

Developed within the organization, Product technology translates ideas into new products and services. Product technology is developed primarily by engineers and researchers. They develop new knowledge and ways of doing things, merge them with and extend conventional capabilities and translate them into specific

products and services with features that customers value. Developing new Product technologies requires close cooperation with marketing to find out what customers really want and with operations to determine how goods or services can be produced effectively.

Process Technology:

The methods by which an organization does things rely on the application of process technology. Some of the large numbers of process technologies used by an organization are unique to a functional area; others are used more universally.

Information Technology:

Managers use information technology to acquire process and transmit information with which to make more effective decisions. Information technology pervades every functional area in the workplace. Office technology includes various types of telecommunication systems, word-processing, computer spreadsheets, computer graphics, email online databases, the internet and the intranet.

TECHNOLOGY AND THE MANAGER

What should a manager know about technology? After all, shouldn't the choice of technology be left to the scientists and engineers who have spent their lifetime considering technology? How can a manager master the intricacies of technology and make a proper decision?

We all make technological decisions in everyday life when we buy appliances, automobiles and electronics for our homes. For example, when we buy a refrigerator, we are interested in the arrangement of its interior shelves, how long it will last and how much electrical power it uses. We are not interested in the BTU cooling rating of the compressor and the frequency of the defrost cycle. In other words, we concentrate on the performance characteristics of the technology, not its technical details. While these attributes affect the performance of the technology, it is the performance itself, not the details, that is of interest to managers.

Technology choice is an extremely important decision and one that is of interest to managers in all functions. These decisions not

only are technical in nature, they affect capital, human resources and information systems. Thus all managers should be interested in the choice of technology and how it affects the business as a whole.

TECHNOLOGY CHOICE

Aversion to capital investment is a common problem in industry. This problem is apparent in wornout factories, antiquated offices, and lack of integrated information systems, which are no longer competitive. Management seems to be more aware of the dangers of too much capital investment than too little.

What is needed is a technology strategy to obtain the right amount and type of technological investment. A technology strategy begins with a business strategy and operations strategy that describes the vision and mission of the firm. For example, if the mission is to be a lowcost producer, the technology strategy should be aimed at developing technologies that enable low cost, and new technologies should be evaluated on their ability to

lower costs. On the other hand, differentiated products, the technology strategy, the technologies developed, and the evaluation criteria should be oriented toward product differentiation.

A technology strategy sets an overall framework for development of new technology to support the mission. It ensures that technologies are not merely developed and justified one at a time, but implemented as part of a coherent strategy over time. As a result, the technology is integrated and provides a competitive advantage not easily imitated. Many firms justify their technology one proposal at a time and do not have a comprehensive technology development strategy.

Lack of investment in industry can sometimes be traced to improper use of capitalbudgeting techniques. Frequently, hurdle rates4 are set beyond the true cost of capital in order to keep out the so called bad proposals, to manage risk, or to reduce the capital required. For example, the hurdle rate may be set at 30 percent for new investments when the true cost of capital,

including risk adjustment, is only 20 percent. As a result, the firm will not make new investments and gradually its technology can become inferior to competitors. While the problems with low hurdle rates are well understood, the corresponding problems with high hurdle rates are not nearly as well recognized.

When technological alternatives are evaluated, they should be considered with respect to the donothing alternative. In other words, what happens if no investment is made and the competitors make the investment instead? The loss in cash flow as a result of not making the investment should be credited to the investment, since it is a direct result of the decision being made. Frequently, companies do not consider the loss of cash flow; thus they tend to under evaluate new investments.

Finally, capital investment often does not consider the revenue effect of new investments, since it is difficult to estimate and results in "soft numbers." Revenue effects can result from increases in quality, faster delivery, or more flexibility, which the customer may be willing to pay for or which may attract new customers. Revenue

effects should be credited to the newtechnology proposal even though they may be difficult to estimate. Ignoring revenue effects is to assume they are zero, when in fact they may exceed the cost savings from the investment being considered.

As students of finance and accounting know, improper use of capitalbudgeting techniques can lead to a systematic disinvestment by the firm when the investments are not credited with the proper cash flows or when hurdle rates are too high. It is important to use net present value techniques correctly so that the right amount of new investment is made, not too much and not too little. The three most difficult areas to address are proper hurdle rates, crediting the donothing alternative, and revenue effects.

Furthermore, investments should support a comprehensive technology strategy aimed at achieving or maintaining a competitive advantage. Managers in all functions should work to develop a technology strategy that considers not only operations issues but human resource effects, financial considerations, and market impacts. Developing a technology strategy on a

crossfunctional basis will ensure that all of these factors are properly considered.

Model Questions

1. What do you mean by Technology?
2. What are the Primary areas of Technology? Discuss.
3. Show relationship between Technology and the Manager.
4. What should be considered regarding Technology Choice? Evaluate.

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