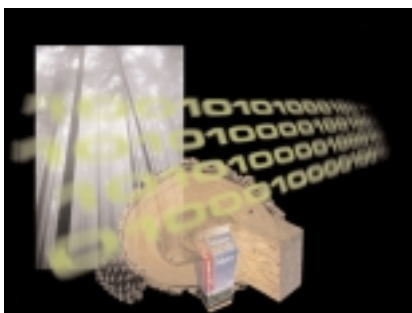




MANAGING TECHNOLOGY— A CRITICAL CONTRIBUTION TO COMPETITIVENESS

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THE MANAGEMENT OF TECHNOLOGY IS CRITICALLY important to industrial companies, because technology affects a company's competitiveness. Technology influences the quality of a company's products, as well as the way these products are manufactured. It affects the company services that can be provided, and the manner in which information is handled and communicated within the company. In short, technology affects every aspect of a company's operations. In addition, although technology in itself is important, it cannot be considered in isolation. The development and use of technology must be managed effectively if it is to provide benefits. The challenge for today's technology manager is to get more out of less (or the same) investment in research and technology acquisition activities. The difference between well-managed and poorly managed technology functions is huge in its impact.

There is no single "best" route to superior R&D. There is no prescription, no computer model, and no mechanical application of rules that will ensure success. Every company, every competitive environment, is unique and in a state of its own unique continuous change. Of importance is the recognition of certain guiding principles and hard won experience in the management of technology, which will be adapted to the specific identity, culture, and will, of the company or organization in its individual competitive arena.

The broad context of technology management covers three major issues:

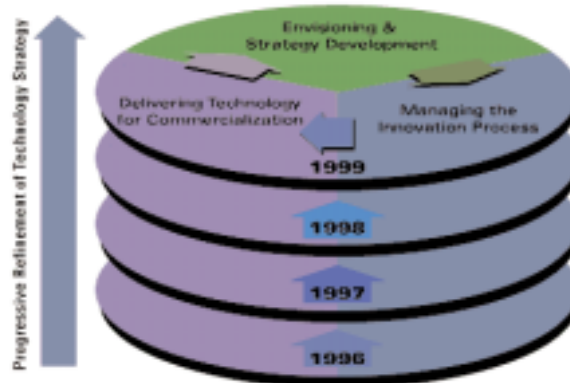
- a) *envisioning and strategy development,*
- b) *managing the innovation process,*
- c) *delivering technology for commercial application.*

These three big topics represent a "technology management cycle," and as a whole contain the elements needed for the "value delivery" of technology (**Figure 1**). Value delivery means maximizing the return on the technology acquisition investment—finding ways to improve efficiency and eliminate waste in the technology management cycle.



1. The "Technology Management Cycle" for value delivery

The technology management cycle also has a time dimension—it is evolving, with progressive refinement of the overall technology strategy each year (**Figure 2**). As new information is developed or becomes available, the big picture strategy will require adjustment. This is most conveniently done at each annual planning cycle. In this way the technology strategy is kept current and "tuned" to deliver maximum value.



2. The evolving management of strategy

ENVISIONING AND STRATEGY DEVELOPMENT

Deciding in what direction a research program should be focused is one of the most important issues to eventual, successful technology development, yet this front-end analysis often gets the least attention. This is probably because it is difficult and time consuming to do it right. It is common practice to follow the herd or listen to an

“expert” in setting strategic goals for research or technology acquisition actions. Consequently, many organizations work on the same things and the chances of coming up with proprietary technology are low. Furthermore, key “trend-break” issues are missed: e.g. the rapid rise in the use of recycled fibers in the 1980s and the dioxin and forestry issues of the 1990s. Future awareness and scenario planning are tools that can be used to inject some discipline into strategic thinking and achieve a common language between all stakeholders. When this is done well, there is a greater chance of being the first to come up with the leading strategic technology or the significant new product. It can also guard against being surprised by unforeseen trend-break events.

MANAGING THE INNOVATION PROCESS

In the management of a research and technology (R&T) program, what is important is its make-up, its balance in priorities, how it is to be funded, and tools to ensure built-in value. The “technology program portfolio” is defined as the mix of individual research and technology programs, projects and services within the whole R&T program. In many medium-sized organizations, the R&T program can have a budget of US\$ 2-5 million per year—a significant amount of money requiring careful planning to spend it wisely. Larger companies, and some institutes, have annual budgets in excess of US\$ 10 million. The development of the R&T program portfolio requires team structures, using well-tried tools, to come up with a game plan that will maximize value for the money to be invested to carry out the technology acquisition or research plan.

Best practice principles in technology management set standards and guidelines for all practitioners in the technology innovation process. Many of these process issues are people skill related—from how to behave in a team environment, to communications, networking, and leadership. These process issues are fundamental to the successful execution of a research project or technology acquisition process. Historical wisdom indicates that the main distinction between successful projects and unsuccessful projects has little to do with the sophistication or elegance of the research or the technology, and everything to do with the people issues involved. Good people skills cannot be overemphasized for their contribution to successful technology development and delivery for commercial implementation

DELIVERING TECHNOLOGY FOR COMMERCIAL APPLICATION

Maximizing value from R&T requires that some form of value measurement be made on a regular basis. Measuring value is a most difficult thing to do because it involves judgment. Keeping a credible R&T System scorecard is important for its health. Costs are highly visible; the benefits should also be visible. Case histories are valuable learning tools. Successes and failures relay important messages that can be used to continually enhance the total technology development process. Case histories also involve “stories.” Stories and associated case histories are a measure of the performance and pride within an organization; they should be encouraged and kept alive—they are the measure of the organization’s IQ. TJ

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COURSE INFORMATION

An 8-week online course, “Managing Technology for Value Delivery,” has been developed by The University of British Columbia, Distance Education & Technology (<http://det.cstudies.ubc.ca>). This course is jointly sponsored by TAPPI and the University of British Columbia, and will be next offered from October 2 to November 25, 2000. You may view a demonstration web site at <http://www1.cstudies.ubc.ca:8900/public/RMTD/>

For additional information, you can contact the course instructor (Procter) at a.r._procter@telus.net or through www.alanprocter.com; or contact TAPPI’s Service Line at 1 800-332-8686 (U.S.) 1 800-446-9431 (Canada), or +1 770-446-1400; Fax: +1 770-446-6947; or by email: serviceline@tappi.org.