Today’s general managers find technology and innovation increasingly important to their overall management role. As a key resource in nearly all businesses and organizations of the 1990’s, technology has become pivotal in today’s competitive environment. Stewardship and leadership of technology through thorough integration in corporate strategy will promote competitive advantage and success. Managers must be able to develop, obtain, allocate, and apply this valuable resource effectively. Today’s managers must also be able to assess and exploit the firm’s capacity for innovation to facilitate corporate strategy implementation. To accomplish these tasks, managers should develop a set of “tools” to help them achieve their goals in today’s technology dependent environment.

KEY CONCEPTS AND THEIR RELATIONSHIPS

Scientific research is the pursuit of as yet undiscovered knowledge and results in inventions and discoveries whereas technology is the application of new knowledge. Basic scientific research is the generation of/search for new knowledge about our world and results in discoveries. Applied scientific research is geared toward solving a specific technological problem and results in inventions. Inventions and discoveries have no commercial value in and of themselves. Putting inventions and discoveries to practical use results in technology. Technology itself also has no commercial value as it answers the “can it be done” question, not the “can we do it for profit” question. However, technologies combined with other technologies form the foundation for product development. Technology mixed with the commercial world creates technological innovations, new products, which can be exploited for profit.

Technological entrepreneurship brings together the technical and commercial worlds and is the foundation for the technological innovation process. Entrepreneurship recognizes and exploits a commercial use of a product/service/delivery method. Technological entrepreneurship recognizes a potential market for an applied technology, which leads to technological innovation and new product development. Technological entrepreneurship includes activities of product, process, and market development, which results in technological innovations.

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Figure 1 above depicts the interrelations among key concepts of technology and innovation. Technological entrepreneurship bridges between the technical and commercial worlds melding markets and inventions to develop products, which are technical innovations. Combining these innovations and administrative capabilities, technical entrepreneurship sets the foundation for successful organizational management.

INTEGRATING TECHNOLOGY AND STRATEGY

Organizational strategy is a result of the organizational learning process and is management’s direction for the firm that is reflected in it’s product market mix, core competencies and values, product market areas, use of resources, and human resource development. Strategy must be backed by the capability to employ it. Strategy sets the roadmap for the way in which the firm will take advantage of it’s strengths and opportunities while avoiding or minimizing its threats and weaknesses. Organizational strategy is defined not only in management’s beliefs and vision, but also in its actions. It is not only what is professed, but also what is employed that defines a firm’s strategy.

Technology should be an integral part of today’s organizational strategy. The firm’s products and services reflect its strategic use of technology and technological innovations. Technology can provide a firm with competitive advantage if strategically applied to the product market mix. Figure 2 below depicts one method of mapping strategic use of technology based on specific market products. Each cell represents the degree to which each product incorporates one or more of the firm’s technologies with each * representing the firm’s relative strength versus the industry state of the art.

<table>
<thead>
<tr>
<th>Technology 1</th>
<th>Technology 2</th>
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<th>Technology K</th>
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<tbody>
<tr>
<td>Product A</td>
<td>*</td>
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<tr>
<td>Product B</td>
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Figure 2

A firm’s competitive and strategic position can be analyzed by a matching of its business and technology portfolios. Figure 3 below depicts the matching of technology and business portfolios. Products that fall within the upper left corner of the business portfolio are high in competitive position and high in industry attractiveness. Those that fall in the upper left corner of the technology portfolio reflect those where the firm has a strong technology position and the technology is deemed highly important. Ideally, a firm’s products will fall within the same quadrant in both matrices. However, a product could be high in competitive positioning, but the firm has a weak position in the technology in the product (depicted below, product A vs B). Discongruent products reflect a need for further assessment of the firm’s strategy and strategic effectiveness.

A firm’s competitive and strategic position can be analyzed by a matching of its business and technology portfolios.

Technology plays a part throughout the firm’s value chain. Firm’s can maintain a competitive advantage anywhere along the value chain and technological innovation can lead to this competitive advantage. Designing a technological strategy requires that management review each part of the value chain, assessing opportunities for innovation to achieve competitive advantage, and determine sourcing of the innovation.
ASSESSING INNOVATIVE CAPABILITIES

A firm’s capacity to innovate must be evaluated to identify barriers to innovation and facilitate proactive changes in technological strategy. The innovative capabilities audit is used to assess the potential of existing innovative capabilities and can help the general manager develop a plan for future innovation. The audit should address the firm’s history of innovation in product/service/delivery areas, the fit between the firm’s current business strategies and innovative capabilities, and the firm’s needs for future innovative capability. These audits can be performed at both the strategic business unit and corporate levels. Figures 5 and 6 below depict the variables that should be assessed in a capability audit. At the conclusion of the audit, the firm should have a solid understanding of its position with respect to technological leadership, scope of innovativeness, rate of innovativeness, and market entry timing.

CONCLUSION

Management of technology, strategy, and innovation are key tasks of the general manager, his or her leadership in these fundamental areas is critical to the success or failure of the organization.