Technological Innovation In An Uncertain World

By DAVID J. WALLACE

Business may be described as a horse race, but Graham Mitchell, director of the Wharton Program in Technological Innovation, favors the analogy that it resembles a steeplechase rather than a competition for speed. Rivals may gain a slight edge, stumble, recover, leap ahead of the pack in one lap then limp along in another. Managing technology has been a crucial element not just in the information industries but also in biotechnology, medicine and other disciplines.

Mitchell, former U.S. assistant secretary of commerce for technology policy from 1993-97, says that technology has changed companies, employees and executives and shows no signs of slowing. The need to experiment, sample, check and re-check opportunities, spread risk, share rewards and seek global markets quickly are only a few of the marks of a 21st century company. "We must constantly learn by doing. Take several tests or models and evaluate them as you go," he suggests. "In technology you need information that quickly becomes obsolete. And you need the frameworks to help identify whether markets are in an early, middle or late stage and assess the implications. It makes business more exciting than it ever was before." Mitchell spoke to Knowledge@Wharton about the challenge of managing technological innovation in an uncertain business world.

Knowledge@Wharton: What do you suggest for people and companies hoping to prepare for the future?

Mitchell: We are going toward very new directions. The rate of innovation is increasing. We still have a lot to learn about how to sort out what is predictable and what is not. Managing technological innovation is not so much about making a bet on the future as it is about steering the process by which we create wealth. In looking to the future, you need ultimately to get to the point where you can make a significant investment. To do that you need to get in the game--and most corporations recognize there's a small cost of carrying a number of new ideas. It's a little bit like a game of poker where you have to make a small wager to stay in the game. Very few ideas spring up fully developed and market-ready. So over several years, you move ideas along. It's like poker, where you pay to see the next card; you make a small investment for a little more information. As your options become clearer, you bring down the uncertainty to where you can make a major investment. That's a very delicate process.

Knowledge@Wharton: How have the combined effects of technology, management strategy and the global economy changed the corporate landscape?

Mitchell: From the 1970s on, Corporate America became increasingly aware of the impact of technology. The growth of open markets and worldwide quality and performance improvement shifted power from manufacturers and suppliers toward consumers. Customers gained more options than ever before, and the consequences to the producers for getting it wrong were more costly than ever.

Open markets and the pressure to perform to global standards forced companies to rapidly learn and adopt the best product and process technologies from around the world. It became self evident that would-be world-class companies needed world-class competencies and technological capabilities to survive.

Knowledge@Wharton: What lessons have companies learned?

Mitchell: Outsourcing, alliances, creating networks of companies together to find the best supplier or best partner to perform a specific taskÑall these are lessons that companies have learned to remain competitive. Hardly any company writes its own annual report anymore. This is not just because of efficiencies, but also because they want the best of breed.

Knowledge@Wharton: And what's next?

Mitchell: The importance of service has become apparent to companies. Service is crucial not just to manufacturing firms but to all the sectors of any economy. Technological innovation particularly in information is transforming services and the service sector. Similarly, for governments around the globe, sustained economic growth has come to the top of the policy agenda practically everywhere. Technology is a key part of that and now there's a consensus, so we are seeing the widespread introduction of policies to promote innovations all over the world. Although this obviously creates new competitors, the hope is that this is more than off-set by their role as potential new partners in providing access to new markets. It's a very different world than we lived in 10 years ago.

Knowledge@Wharton: Has the proliferation of data thanks to the Internet and niche publishing changed management?

Mitchell: It's unique in the last 50 years to have investors, corporations, and the government all in agreement over the value of new technology. Corporate America learned through the quality movement that technology isn't just an expense. The euphoria over information technology has led people to understand the need for education and multidisciplinary thinking. Technology issues are no longer just relevant to the technical department but also to the finance department, human resources and marketing, all together.

Knowledge@Wharton: Can you defend against technology?

Mitchell: Some traditional businesses see technology as a threat. Clearly, although they are traditional leaders, companies that use technology can knock them off their perch to reach their market in a new way. You also see some companies that have managed to survive by having the courage to obsolete their own products and services to remain leaders. That's very hard. It means you have to have multiple personalities within the business. You must have people who keep you in your current business and also others who are ready to make radical departures. That's very difficult to manage but increasingly necessary as the pace of technological innovation increases.

Knowledge@Wharton: Is the rate of change forcing companies to alter operating habits and adopt new structures?

Mitchell: Clearly as the rate of technological change speeds up we must train a new breed of managers who are more comfortable in this environment. First, managers need some technical knowledge, but in emerging technologies you need to recognize that it is likely to become obsolete very quickly. Second, you need frameworks to identify whether a market is in its early, middle or late stageÑand some of the implications in each case. That helps you decide where you should place your bets. If you have been successful in one area, you may be predisposed to invest in that area in the future. But there may be different markets, different channels or new technologies that are more apropriate. And third, successful managers need to develop the sense that they can be the heros rather than the victims of technological change. I don't think that requires detailed knowledge so much as openness to the future and a sense for people and timing. We must constantly learn by doing. We have to be increasingly comfortable with small-scale experiments that can be refined and refocused to create opportunity.

Knowledge@Wharton: Has the investment boom in technology created unrealistic expectations from either a financial or innovation perspective?

Mitchell: While it is unlikely that all our bets will pay off, I think that the public's expectation that a wide range of new products and services will have improved features and performance at lower cost is very reasonable. Clearly these will provide opportunities for successful investment. There is a surprising degree of agreement within the technical community over what technical progress is likely to be made over the next 20 years or so. I think much of the uncertainty resides in future markets. Clarifying these distinctions is very critical to tomorrow's managers.