Panel: The CEO Perspective: Leading Technology Management

I. Introduction

The strategic alternatives for gaining competitive advantage -- or one could more accurately say these days, competitive SURVIVAL -- are well known and extensively analyzed: low cost producer, first mover, fast follower, product differentiation, niche marketing, etc., etc. The competitive structure of an industry; ease of entry & exit, vendor and customer power, capital or labor intensity and so on are likewise familiar to both business people and MBA students. But before we relegate strategy to the simple task of evaluating these factors and choosing the path they happen to make obvious, it is worth pursuing this matter of determining factors a step or two further. What in fact are the forces behind the forces, so to speak, that shape and reshape this competitive domain within which each business leader attempts to chart a path toward success -- i.e. some form of advantage. They are: economic forces (such as cost of capital, monetary fiscal policies, etc.); changing demographics (e.g. the baby boomers) and societal values (e.g. families); governmental action and regulation (environmental regulations, space and defense programs); and technology. These forces not only shape the competitive environment, in today's world they produce a rate of change in that environment that is, almost overwhelming (illustrate) (that change from Cold War confrontation to Soviet collapse) growing population density, etc. Only a moment's reflection however, is necessary to realize that technology is the change factor which is most readily available and amenable to creative management action -- to executive leadership. Social, economic, demographic change result from factors far beyond the control of any individual firm. We simply must respond to those things. Even with regard to governmental policy where business has a clear responsibility to
participate in policy making, the individual firm is unlikely to have a significant influence on decisions. Technology, on the other hand, is available both from the world at large and from the minds and skills of the firm's employees. Indeed, it is technology that enables effective responses to all those other forces. This, the #1 executive task, is clear and straightforward -- to capture and utilize this vital force of technology more rapidly and effectively than one's competitors.

II. The problem in that regard, is not a scarcity of technology. It is exactly the opposite! It is the overwhelming rate of growth and increasing rate of global diffusion of technology. Economist Richard Nelson has shown that it isn't how much money an economy invests in R&D, but rather on what that determines economic growth. And it is exactly the same for a company. To produce any product or service requires many different technologies. There are never enough technological resources, people and money, to do all the things that "have to be done" to stay competitive. So we argue and prioritize, stretch and defer, urge and exhort, and hope.

Partly this is the way things are. But partly, it's a result of the way we think about technology, and its relationship to competitive advantage. The technology, product or service feature, the production or delivery process which differentiates a business today .... we all know in a general way that that will change .... others will catch up and even leap frog and surprise us. But the reaction is almost always to simply add to the burden -- keep doing all the things we have been doing, and try to do more -- add product or service features, invest in tools or new processes, and so on.
This phenomenon results from the lack of clarity with regard to understanding technology evolution, and the simple fact that what's sufficient for competitive differentiators today, in the future will only be the price of admission to play the game. Prolonged pursuit of fine tuning the source of today's competitive advantage will only lead to long term strategic failure. That sounds pretty obvious, but in practice it's not so obvious at all.

The strategically vital understanding is to be able to predict when that will happen. No better example exists than the computer and micro-electronics industry over the period from World War II to 1985. Much has been made of the failure of the computer mainframe manufacturers to fail to recognize that the change in underlying semi-conductor technology was very rapid in the decade from 1975-1985, and thus they failed to move from mainframes to personal or desk top computers. That is worse than a misplaced analysis -- it is misleading in understanding technology change in general.

(Trace the evolution of competitive differentiators and computers. In the beginning nothing could be one; over time various components became commodities; memory, peripherals, logic, operating systems. Note the difference the new entrants such as the PC manufacturers, and the mainframe companies. Not technological change per se, but continued focus on technologies no longer sufficient to the task of competitive advantage. The irony of IBM. Net/net, as the spectrum of technology grows you can't continue to do everything.)
III. A common reaction to the maturing of the technology(ies) which are the driving force of industry evolution is to move toward "more value-added." One reason for this is the cost pressure that develops as lower value-added products becoming more commodity-like, e.g. semi-conductor memory. At the same time, as technology matures, more applications become feasible and attractive. So there is a natural pull toward applications. An equally valid strategy, however, is to choose to compete at the commodity level point of the food chain. It is only a question of employing the right expertise and having the capital to do so. The worst possible strategy is to attempt to do both. This seems obvious enough but in the real world, as technology matures, companies find themselves, de facto, in this straddled position. Moreover, it is not unlikely that the company actually has some competitive advantage some "core competencies" in both areas (e.g. disk drives -- DEC, IBM). In short, on the surface, both business common sense and technological logic tell us not to abandon past investment (in what is no longer a competitive differentiator, but is merely a commodity component), while at the same time making the technological investment necessary to move to higher value added products and ultimately into services. Intel - 1980-81; abandon DRAMS? Not! 1985 - crisis - YES!

Put slightly differently, through the process of technology evolution a defacto "make or buy" decision with regard to technological expenditure has been made as "make." Such make or buy decisions with regard to technology of course arise from circumstances other than the evolutionary one I just described. The important point I want to make is that given the nature of technology and its evolution, the strategic choice is not make or buy, but rather make, buy or collaborate. It takes foresight and
courage, however, to undertake such collaboration in advance of the time when it's an obvious alternative (Glen Haney quote). What exactly does technological collaboration mean? 1982 - the technology that is critical [to computer systems] is micro-electronic design. "To knowingly put that technology in the hands of one's competitors is unthinkable."

IV. Technological Collaboration is a form of strategic alliance. "Strategic alliance" is so overworked a phrase today - meaning almost anything from a long-term supplier - customer contract to hostile takeovers, that it is essentially meaningless in describing a strategy. "Technological collaboration" is also a very broad term. However, it can be defined as an activity involving two or more companies, the output of which is something to be incorporated in a product or service of higher value-added. And that has very precise strategic meaning.

Whether the collaboration is simply basic research, development of commonly needed tools, the manufacture of a commonly needed product or service; whether the formal arrangement is merely contractual or establishment of a jointly owned legal entity, the guiding strategic principal must be that the output is something to which each partner will separately add proprietary technology. This is the key to successful collaboration.

A decade ago technological collaboration in the computer and semi-conductor industries was the province of a few hardy experimentalists. Today it is a way of life (Quote EN 56/22/95). The growth and health of these segments of the U.S. economy is in no small way the result of that fact.
V. Conclusion

Technology utilization is dependent both on the rate of generation and diffusion and on the absorptive capacity of any society. Technology is being generated at an ever increasing rate. There are smart, capable people everywhere on our earth. There are also people with needs, the desire to succeed and the ability to innovate.

So technology diffusion and thus global competition is increasing and will continue to do so. To succeed competitively will require the ability to forge collaboration with others to have access, economic access, to the technologies which allow you to get into the game, so that you can concentrate proprietary efforts on that technology that will win.