Innovation in the Fast Lane

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In our innovation work, clients frequently approach us with requests or aspirations that seem impossible. "Our products are three years behind our competitors," one of our electronics clients lamented. "We need to catch up now – and, by the way, we don't have the time or money to duplicate our competitor's R&D operation." A major telecommunications services provider came to us saying, "We need to develop a diverse service portfolio for dozens of niche markets. Although we're good at developing and supporting major new services, it takes us forever to roll them out. We also lack the resources and management 'bandwidth' needed to quickly develop these niche products. How can we get additional resources at little cost and with no additional management attention?"

Limits to Traditional Product Development

Sometimes we can address such requests by improving a client's product-development process, hi fact, over the past several years, most major firms have improved their internal product development by implementing highly systematic "stage-gate" product-development processes (in which one step cannot be started until all elements of the previous step have been successfully completed). Although subject to variation, the product-development process typically involves five or so steps, beginning with "concept development," and proceeding through "product-definition specification and planning," "product conception and design," "product development and engineering," and "operations/infrastructure preparation" to "product rollout and value capture." Over the years, we have helped numerous companies implement such processes and have found them to be important, though incomplete, first steps toward effective innovation.Some companies have attempted to improve internal innovation – for example, through improved governance, concurrent product development, and accelerated decision-making. Many leading companies are also looking beyond their corporate boundaries to leverage their product-development activities through the contributions of selected partners, customers, and suppliers.

While companies have benefited from all these methods – and have produced some "big wins" because of them – we have observed that such internal improvement efforts eventually generate diminishing returns. A company's internal resources can be stretched only so far, and no matter how brilliant on paper, improvement efforts will ultimately be limited by the time constraints of managers and the resource limitations of a firm – particularly the human resources needed to staff internal-development core teams. Stage-gate product-development processes also create their own bureaucracies, which can actually encumber the product-development success they are designed to enhance.

The Multi-Modal Innovation™ Approach

Pressed to find answers to our "impossible" client requests, we began observing some of the fastest-growing and most successful product-based companies to see how they were approaching innovation. We found that some of these companies were not using internal product development as their primary engines for growth. For example, Cisco Systems, a leading networking company, has achieved an astonishing 80 percent growth rate over the past 5 years, not so much by being an unusually effective product developer, but through a "spin-in" strategy of acquiring other companies' technologies and products. Taking a seemingly unrelated approach, Thermo Electron, one of the world's leading energy technology companies, has achieved a 23 percent growth rate over the past 10 years, not through conventional stage-gated development, but by "spinning out" internally developed technology to almost two dozen highly autonomous ventures in which it retains a stake. In Silicon Valley, companies are creating all sorts of arrangements to leverage their internal technology- and product-development resources, including technology incubators, ventures, etc.

Why are these companies achieving such spectacular success despite "breaking the rules" of sequential, linear product development? What do these disparate approaches have in common? Most importantly, what can other firms learn from these "rogue companies" to achieve similar results?

To study these questions, we returned to the standard model for internal innovation. We observed that although major companies have long used subsidiaries, partnerships, license arrangements, and, occasionally, ventures to develop and market new products, the rogue companies were doing something far more deliberate, hi one way or another, they were *systematically* seizing on an extra dimension of the innovation process, thereby transcending the boundaries of internal resource constraints that cause bottlenecks in traditional development. Only recently have enhanced commu nications and technology allowed companies (outside unique areas such as Silicon Valley) to operate in multiple "modes" of participation with a variety of other firms as a day-to-day strategic practice. By expanding the internal innovation process map to include this continuum of external "venues," we were able to see what the seemingly unrelated practices of such companies as Cisco and Thermo Electron have in common, and, more importantly, how these companies are leveraging these new innovation resources for growth (Exhibit 1).

As noted above, Cisco has systematically used dozens of strategic technology acquisitions, sometimes even to "short-circuit" internal product development, thereby improving its competitive position and time-to-market for key products and technologies. The company has learned how to select and attract desirable acquisition targets, manage these acquisitions, and capture value from them by leveraging its massive sales infrastructure to quickly grow acquired product lines.

Thermo Electron's technology strategy is to create technologies for new markets, form companies around these technologies, and capture value by taking these businesses public while retaining a majority equity share. Using this "spin-along" strategy, the company invests heavily in advanced technology at its R&D center (7 to 8 percent of revenue, in an industry in which many consider 1 to 2 percent to be high), builds strong management teams (mainly from within the Thermo Electron companies) around the most promising technologies, and captures value by issuing equity and debt in spin-off companies. Thermo Electron effectively spawns nimble, entrepreneurial businesses whose managers are largely freed from the corporate bureaucracy and given ample incentives to succeed in the marketplace.

Other firms are beginning to follow these leaders. Xerox, for example (the subject of the book, *Fumbling the Future*), has started its own internal group, Xerox New Enterprises. XNE nurtures promising new technologies that arise within Xerox research labs and have synergy with its product strategy, but still do not fit into any of its existing business groups. Xerox's Market and Technology Innovation Group selects ideas for XNE by screening marketable technologies from any of Xerox's five research centers. XNE then taps the entrepreneurial management talent resident in Silicon Valley to provide die necessary resources to finalize product development and run the new businesses. As does Thermo Electron, the company captures value from the businesses by maintaining a majority interest in all companies while turning the remaining interest over to employees and providing immense incentives for success.

Exhibit 1

Example of Multi-Modal Innovation



Innovation Activity

Motorola New Enterprises was formed with a quite different objective – to identify bold "industry size" opportunities that leverage its parent company's capabilities. MNE's strategy is to develop a vision for its position in several emerging industry areas and then build relationships with interesting early-stage companies. For each industry area, MNE assigns a "Director of Strategy" who identifies and selects investment targets. MNE then provides funding for these companies in exchange for a minority equity stake. Other than providing

contacts for these firms, MNE takes a fairly "hands-off" approach. To capture value at a later date, MNE can either sell its equity stake or possibly acquire the company and its technology. To date, MNE is self-sustaining and has launched one successful IPO – Net Speak, an internet audio software developer.

America Online is dominating the consumer online service industry by using both internal and external resources to develop innovative branded content and services that meet the specific needs of multiple market segments. (The company has abandoned its early attempts to keep content development primarily internal.) Through its Greenhouse unit, the company invested \$50 million in seed financing in numerous start-ups to develop some of its most popular content. It has also made multiple acquisitions, both large and small, to enhance its technology and content and is shifting away from proprietary systems that may hinder product development and sales growth. In addition, AOL has formed partnerships with a variety of companies (including credit-card companies and long-distance telephone providers) to distribute products over its network.

Making It Happen – Implementing MMI

At Arthur D. Little, we are using our Multi-Modal Innovation[™] (MMI) framework to help our clients operate across a continuum of arrangements so that they can rapidly develop and capture value from new technologies and products. We've also begun using the framework to help companies envision how they can more strategically manage their portfolios of internal and external technology- and product-development initiatives – especially those with small entrepreneurial firms, technology incubators, and other powerful, but under-used, emerging innovation approaches. In implementing MMI, we've taken a holistic approach, using Arthur D. Little's High Performance Business framework to examine the strategy, processes, organization, and resources of properly managed MMI businesses.

Objectives. As a first step in thinking about MMI strategy, companies must examine the innovation objectives they hope to achieve. Such goals might include:

- Enhanced product development via a large pool of external sources and partners
- "Special" collaborative or licensing arrangements with selected key developers and partners
- Unique vantages for establishing even closer links with promising firms
- Enabling selected partners to design products customized to complement existing product platforms
- Renewed internal creativity via contact with other innovative firms
- A physical development lab in which partners and internal developers can rapidly test and refine new product ideas
- "Value capture" from internally developed technology that doesn't fit with overall corporate strategy

All these goals are legitimate; each company needs to determine its own specific goals for each of its technology development initiatives in order to develop an appropriate MMI response.

Business Clusters. Because each mode of innovation involves a particular set of behaviors and processes, companies need to group technologies that will follow similar life-cycle paths into "business clusters." (For example, a telecommunications services provider working with a stable of small, entrepreneurial ventures might require separate business clusters for voice and data.) Our research into recent ventures and incubators in Silicon Valley has shown that business-cluster entities have multiple advantages. First, management teams can more easily stay apprised of business-cluster issues and needs. They can also exploit synergies and commonalities among participant firms while customizing support services. Most importantly, they can customize the innovation process itself to the business cluster, maximizing opportunities for creating "win-win" arrangements among the collaborating firms.

Using "Hooks," not "Strings." One aspect of MMI strategy that is particularly foreign to large firms, and which often makes them uncomfortable, is that to form business clusters with small, entrepreneurial firms, companies must use entrepreneurial "hooks" – not "strings" – to attract the best talent. Internal R&D staff may be satis fied with a steady paycheck and challenging work; potential "big-company" partners are often seeking mutual operational or strategic advantage. But since small, entrepreneurial firms usually are seeking "the big score," it's essential when courting them to provide the financial incentives prevalent within the entrepreneurial culture. These rewards might include concept-development bonuses, non-exclusive license arrangements, development support, seed investment, and product revenue sharing, among others. It is critical that these "hooks" be tailored to the entrepreneurial culture of each business cluster.

Companies that try to "tie up" ventures with "strings" such as exclusive intellectual-property contracts often come up empty-handed. The best entrepreneurial firms will either be spooked by such arrangements and take their capabilities elsewhere, or enter into such "ironclad" R&D arrangements and then fail to deliver worthwhile technology – sometimes while sidestepping the arrangement to develop useful technology for their own purposes.

In Silicon Valley and elsewhere, several emerging entities, including idealab!, Onset Ventures, the Software Business Cluster, and Xerox New Enterprises, are exploiting aspects of business-cluster arrangements and entrepreneurial-reward strategies. No company is doing it all – MMI is a radical and new approach to innovation – but the strategic direction is clear.

Creating An Effective MMI Process

When working on internal innovation processes, we encourage our clients to examine these business processes throughout the "life cycle" of a given technology – from the identification of an idea to value capture. Many leading companies have learned to master these processes for internal development, and some are even fairly adept at creating effective processes for working on the occasional joint venture with other large firms. But big companies have only begun to explore the processes for systematically working across multiple innovation modes with such entities as small ventures and technology incubators. We have observed that many companies are still attempting to use a single development process for diverse development objectives. As companies gain experience in working across multiple modes, they will learn to tailor such processes to the objectives of individual business clusters.

One of the most powerful process ingredients for MMI is what we call Integrated Dynamic Electronic Simulation (IDES), which, in real time, allows multiple partners to participate in and contribute to a simulated prototype of a new technology, product, or even entire business. Boeing, for example, completely reinvented its innovation process for the development of the new 777. Using 3-D software, it created an electronic prototype that replaced all drawings and physical mockups. Closely involving internal developers, its manufacturing units, and multiple external partners, including suppliers and customers, all working on the prototype at the same time, Boeing dramatically reduced the time required to design a new plane. While the tremendous advantages of IDES are evident, companies must be very careful in setting up such systems, as they expose all involved parties to a host of intellectual property issues – a major barrier to implementation in many firms.

Organizing for MMI – The Flexible Innovation Network

To implement Multi-Modal Innovation effectively, companies will need to create dramatically new organizations – what we call "Flexible Innovation Networks" (Exhibit 2). Such networks, already emerging in Silicon Valley, are essential for effectively managing the people, money, and technical risks inherent in rapid innovation. At the center of such a network is a small innovation management team, with a role somewhere between traditional R&D management and "business development." It coordinates the activities of internal developers, external partners, incubators, and venture capitalists, while keeping top management apprised of activities. Operational and infrastructure liaisons are essential to such networks, ensuring that knowledge is effectively transmitted from group to group – especially into operations.

Exhibit 2



A Flexible Innovation Network

Conclusion

In developing our Multi-Modal Innovation framework, we've discovered that some of our clients' "impossible" product-development requests perhaps weren't so impossible after all. More importantly, these requests forced us to reexamine some of the most accepted "rules" of product development and innovation and pay more attention to some of the counter-evidence: the bureaucracy of stage-gated processes and the radically different approaches used by a few extraordinary innovators. Most important, by helping companies break the bounds of internal, sequential development, Multi-Modal Innovation offers a radically more effective approach for "innovation in the fast lane."

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