

## Extending innovation beyond the corporate boundary

Authors: Amy Muller  
Strategos Institute  
2460 Sand Hill Road  
Menlo Park, CA 94025  
Tel: 650-233-1100  
Fax: 650-233-1112  
<mailto:amuller@strategos.com>

Liisa Välikangas  
Strategos Institute  
2460 Sand Hill Road  
Menlo Park, CA 94025  
Tel: 650-233-1100  
Fax: 650-233-1112  
<mailto:lvalikangas@strategos.com>

**Abstract:** The corporate boundaries that matter today are the boundaries that define and contain the corporation's innovation searches. This article examines how innovation can be extended outside the traditional corporate boundary. After identifying several factors that are driving extended innovation—and, in so doing, changing the value-creating nature of the firm—the authors present extended innovation strategies for companies in either mature industries (where the industry structure is established) or emerging opportunity spaces (where the competitive structure and industry dynamics have yet to crystallize). In mature industries such as retail, new ideas are most likely to be found in the “white spaces” between companies. Companies should pursue these opportunities through cross-company alliances that recombine assets and competencies. In emerging spaces such as biotechnology, where the locations of opportunities are unknown, companies should pursue explorative collaborations that emphasize low-cost probing and learning.

### Author Biographies

**Amy Muller:** Amy Muller is a principal at Strategos where she focuses on strategy innovation in the technology and consumer-goods industries. Prior to joining Strategos, Amy was a Director of Corporate Strategy at AT&T, where she evaluated the economic and technical drivers of the communications industry.

**Liisa Välikangas:** Liisa Välikangas is director of research at the Strategos Institute. Her research pursuits have included world competitiveness at IMD in Switzerland, leadership and organizational change at Keio Business School in Japan, organizational learning at Stanford, and innovation and knowledge management at SRI Consulting in the United States.

Note: This paper presented at Strategic Management Society Annual Conference, San Francisco, 2001.

Trying to get outside the box? Sometimes the box is your company. But companies can extend their search for innovation beyond the corporate boundary and even beyond the industry boundary. Such so-called extended innovation, we suggest, increases the potential to explore new business opportunities in both mature and emerging industries. Indeed, past research has shown that a desire to innovate and learn within an extended network of industry partners has already motivated several alliances in the biotechnology industry (Powell, 1996).

Today's industries are increasingly technology- and knowledge-based. Product development cycle times grow ever shorter. And waves of new entrants such as Home Depot, Southwest Airlines, Kia, and South Beach lay continual siege on incumbents such as Sears, United Airlines, General Motors, and Coca-Cola. In response to these changes, companies do seem to increasingly recognize the need for greater innovativeness. For example, we note radical innovation processes such as GameChanger in Royal Dutch/Shell, EDS Innovates in EDS, and NTRI (non-traditional innovation) in Baxter International. However, these innovation processes are all predominantly inward-looking. Considerable opportunities lie also in extended innovation.

We suggest that, to ensure survival in an era of discontinuous change, companies need to introduce the same variety of innovative thought inside the organization as exists outside. No single firm can command the capacity for this breadth of innovation. However, the capacity for such innovation may derive from the connections between two or more firms in an alliance or network. Moreover, we believe that traditional notions of an industry's boundaries unnecessarily deter productive innovation [1]. In contrast, non-traditional notions of cross-industry collaboration can stimulate innovation.

For example, consider this challenge to the traditional notion of the computer industry's boundaries: IBM recently entered into biosciences with its investment in supercomputing for the study of protein folding. And, as an example of cross-industry collaboration, Motorola has forged partnerships with NEN Life Sciences Products, Orchid Biocomputer, and the Mayo Clinic among others to explore biochips and DNA arrays for applications in life sciences.

This article further explores possibilities for such extended innovation in two industry contexts: mature industries in which the competitive structure has long remained unchanged or is highly consolidated; and emerging spaces in which the competitive structure and industry dynamics have yet to crystallize.

Within mature industries, the industry structure reflects past opportunities. For example, corporate boundaries reflect judgments about where companies have identified their most lucrative business opportunities, including which business processes to outsource. Within emerging industries, in contrast, the industry structure remains in flux until companies have pinned down clearly sustainable business opportunities.

### **Drivers of extended innovation**

Several contemporary factors are driving extended innovation:

- ◆ Reduced transaction costs, with resulting disaggregation of business units and focus on capabilities such as innovation
- ◆ Recognition of the value of intangible assets
- ◆ Software tools for knowledge management and collaborative working
- ◆ Research that indicates that firms who form alliances are more likely to innovate
- ◆ The growing number of cross-industry knowledge networks
- ◆ The speed with which value chains migrate, which sometimes necessitate a rapid recombination of assets by established companies

Among these drivers, a decline in transaction costs—the consequence of B2B marketplaces, supply-chain integration, and outsourcing—may be the most significant. Reduced transaction costs weaken the economies of scale that companies formerly derived from aggregating business processes such as innovation, manufacturing, sales, and distribution. When transaction costs are negligible, companies have the freedom to disaggregate these processes into stand-alone businesses.

This trend toward disaggregation has been under way for some time. The Ford Motor Company used to make its own tires and even owned rubber plantations in Brazil during the 1920s and 1930s. More recently, the 1980s exposed the organizational deficiencies of conglomerates such as ITT Industries. And in the 1990s, organization around strategic business units began to outlive its usefulness, giving way to a need for separate businesses that are organized around capabilities such as innovation, manufacturing, assembly, design, brand management, customer service, distribution, inventory management, and so on.

For example, General Motors recently disclosed plans to make the company's internal software applications available as a service to other companies. By so doing, GM is exploiting a competence in enterprise software applications. The company believes that it has sufficient applied knowledge in applications such as inventory management to challenge the software industry's incumbents. Indeed, GM may have more applied knowledge of inventory management, for instance, than Oracle, SAP, and PeopleSoft combined.

Thus, disaggregation leads to new growth opportunities (the provision of software services by an automobile manufacturer, in this case) in perhaps unexpected businesses. Of course, it also leads to competition from unexpected places. Extended innovation is a means to identify these opportunities and competitive threats.

The recent recognition of the value of intangible assets is another driver of extended innovation. Historically high price-to-book ratios of corporations today reflect this recognition. In an increasingly knowledge-based economy, intangible assets such as patents, brands, and intellectual capital require management as much as do tangible assets such as buildings, machines, and inventories.

The availability of software tools for knowledge management and collaboration further drives extended innovation. For example, the latest Web-based tools from AristaSoft support cross-company product development. And also notable are results from a quantitative study that shows that firms who form alliances at a high rate are more likely to be frequent product innovators (Kelley, 2002). Alliances that introduce a firm to more distant technological and geographic contexts are more likely to provide access to new and unique knowledge. But alliances between firms in a similar context merely duplicate preexisting relationships and add little value to either firm (Rosenkopf, 2001).

The proliferation of knowledge networks suggests that companies are now seeking ways to acquire this kind of new and unique knowledge. The Toyota Production System, for example, illustrates the value of networks as a source of external knowledge (Kogut, 2000). Cooperation in this complex network of automotive assemblers, parts suppliers, and subcontractors has generated organizational innovation and productivity improvements that helped to place Toyota at a competitive advantage over U.S. automakers.

The speed with which industry value chains now reform is another driver for extended innovation. Ten years ago, value in the personal-computer industry, for example, resided in the assembly of components—a strength of Compaq. More recently, Dell has created a competitive advantage for itself from a shift in industry value to Dell's strengths in supply-chain management and customization. More established companies such as Compaq, IBM, Sony, and Hewlett-Packard have had to scramble to respond to this shift.

The ability of companies to quickly recombine assets becomes imperative in an environment in which value can shift so quickly. An established insurance company, for example, might face a threat of disintermediation by an online competitor. If the established company excels at back-office operations such as claims processing, it might be able to recombine its assets to sell back-office services more profitably than it currently sells insurance policies. As Exhibit 1 suggests, firms can combat the threats and explore the opportunities that value migration presents by searching for innovation with less regard to corporate boundaries or traditional conceptions of an industry.

---

#### Exhibit 1—The firm as a value-creating entity

---

##### **Extended innovation in established industries**

In established industries, the industry structure has long remained unchanged. For the following reasons, the innovation opportunities that do exist are most likely to exist in the “white spaces” between companies:

1. Opportunities that fall within corporate boundaries have already been studied and exploited relatively well.
2. The industry structure inevitably lags changes in the marketplace, thus leaving white-space opportunities unexplored.
3. Corporate boundaries and corporate orthodoxies—the deeply held beliefs of managers about the scope and capabilities of their firm—act as blinders that prevent

managers from identifying opportunities outside the company's traditional business. And whereas corporate boundaries are becoming increasingly permeable by means of virtual or Internet technology, free-agent workers, and open-source movements, such boundaries still often serve as relatively rigid business demarcations.

Home Depot is a good example of a company that has exploited extended innovation, exploring white-space opportunities by recombining its own assets and competencies with those of other companies. For instance, the retailer of home-improvement and hardware supplies has leveraged its competence in branding to establish a line of Home Depot-branded tools for young children. Home Depot is selling these toy tools through a partnership with Toys "R" Us, which contributes competence in marketing to children as well as an enormous distribution channel through its stores.

But Home Depot's innovation extends beyond alliances in the retail industry to include alliances with real-estate developer, an insurance company, and a provider of consumer credit. Home Depot is helping real-estate developers in Southern California to publicize their residential developments. In return, the developers allow Home Depot to demonstrate painting techniques, window treatments, landscape design, and other projects at show homes.

In another partnership, Home Depot and insurance company Allstate are collaborating to drive traffic to Home Depot stores while reducing home repair costs for Allstate. Under the arrangement, Allstate insurance adjusters encourage contractors to buy replacement materials from Home Depot stores, where prices are low. The benefits to Home Depot are significant: Allstate paid an estimated \$100 million in claims for carpet damage alone in 2000, and Home Depot can now expect to gain a significant share of that business.

Meanwhile, Home Depot customers can now receive on-the-spot approval for major home-improvement loans in Home Depot stores through an alliance between Home Depot and GE Capital Financial. Loans are available for use on products and services at any Home Depot store. Customers can charge purchases to their Home Depot loan account for a period of up to six months after their first purchase.

Established companies are most likely to undertake extended innovation in pursuit of white-space opportunities when they feel under threat from disruptive technologies. For example, the U.K.-based grocery chain Tesco has purchased a 35% equity stake in GroceryWorks, the online grocery channel of U.S. grocer Safeway. Tesco, which already operates the profitable Tesco.com online grocery site in the United Kingdom, plans to apply its model in the United States through GroceryWorks. In this way, Tesco will contribute competence in combining brick-and-mortar and online grocery retail businesses, and Safeway will contribute assets and capabilities such as established procurement relationships, brand recognition in the United States, and a distribution channel of more than 1500 store locations from which orders will be filled to customers' homes.

**Extended innovation in emerging spaces [2]**

Opportunities in emerging spaces typically lie beyond both a company's existing markets and its existing competencies. In spite of these apparent deficiencies, a company may still choose to pursue opportunities in emerging spaces if they seem to be especially significant or attractive. In those circumstances, the company's approach might be a series of partnerships through which it can access the required competencies while learning about the potential of the opportunity.

This extended innovation provides a means to explore the potential of an uncertain and unstructured space. The cost for a single company to explore this space by itself can be prohibitively high. Indeed, companies need to keep learning ahead of investment to avoid heavy losses from unproven ventures such as the satellite networks (Motorola's Iridium venture) or third-generation wireless (the purchase of European operating licenses by telecommunications companies). Large investments by single companies rarely translate into useful learning about emerging opportunities—more often, the only lesson is about failure and the loss of shareholder capital.

Among the many emerging spaces that merit extended innovation are biotechnology, home networking, e-business, wireless Internet, and wellness. For brevity, we illustrate extended innovation in the case of biotechnology only.

The disparate competencies of biotechnology firms (applied research devoted to the exploitation of specific scientific discoveries), pharmaceutical companies (large-scale production, marketing, and distribution capabilities), and university and government laboratories (basic research) has led to a division of labor between these types of organization (Amburgey, 2001). However, strategic alliances have been able to successfully consolidate the complementary assets of each (Gambardella, 1995).

These strategic alliances take a number of different forms including innovation-oriented collaborative R&D agreements—an example of extended innovation—and operations-oriented marketing and distribution agreements. Studies reveal major differences between these types of alliance. For instance, one study (Amburgey, 2001) shows that alliances for extended innovation involve more intense interaction than operations-oriented alliances. In another study (Liebeskind, 1996), researchers examined how two highly successful new biotechnology firms acquired scientific knowledge. The study found that the scientists in these two firms engaged in a large number of collaborative research efforts, mostly with universities but also with scientists from other companies. These collaborations extended the scope of organizational learning and facilitated the integration of expert knowledge from outside.

An important question arises: Can biotechnology firms circumvent the need to participate in collaborative research alliances by acquiring intellectual property instead—for example, by licensing patents? Problems with the approach include the following:

- ◆ The firm may gain access to knowledge that is not linked to its current knowledge base and is therefore not useful.
- ◆ Utilization of the acquired knowledge by the acquiring firm sometimes requires the transfer of routines as well as codified knowledge.

- ◆ According to the theory that any asset (including knowledge) that is purchasable in a market cannot provide a sustainable competitive advantage, only collaboration in the research process could provide access to the kind of knowledge that can confer a sustainable competitive advantage.

---

Table I—Partnerships between biotech and pharmaceutical companies

---

### Searching for innovation opportunities

**Mature industries:** Exhibit 2 is a framework or opportunity map that we have created to help companies in mature industries identify opportunities from extended innovation. The map is illustrated by reference to the foregoing example of innovation between Home Depot and real-estate developers [3]. To apply the map to a general case, list the core competencies and assets of one potential partner on the vertical axis and repeat for the other potential partner on the horizontal axis. The cells of the resulting matrix should suggest white-space opportunities for various combinations of assets and competencies.

The ability to repurpose assets may, of course, be limited by the nature of specific assets—a manufacturing facility that currently produces glassware might not readily convert to the production of optical fiber. Likewise, a company’s competencies may not be transferable to a different context if they draw their strength from the particular character of the company. Nevertheless, as assets and competencies become more intangible and knowledge-intensive, issues of asset-specificity and the embeddedness of competencies should become less problematic.

---

Exhibit 2—Opportunity map in a mature industry context

---

**Emerging spaces:** The location of opportunities within an emerging space is unknown. In consequence, companies should pursue search strategies that emphasize low-cost probing and learning to effectively and efficiently cover the space of interest. We acknowledge the difficulty of determining the bounds of this interest space, noting that major innovations often emerge from unexpected sources or have radically different applications from those originally envisioned by their inventors.

One simple search strategy is to look where other companies are already looking for opportunities within an emerging space. Whereas this imitative strategy may create herd-like behavior, companies can benefit from sharing search costs among partners in an extended innovation alliance. (Indeed, evidence of this motivation to share costs abounds among small biotechnology firms, many of which partner with larger and more established pharmaceutical companies in order to gain financing for their research and commercialization efforts. See Table I for examples.)

Companies should also consider participation in multiple search parties to explore different locations of the knowledge landscape. In this way, they can escape any myopic tendencies to focus on one area only.

---

Table I—Partnerships between biotech and pharmaceutical companies

---

## **Toward the extended corporation**

The nature of the firm as a unit of value creation is changing. This change is partly a result of reduced transaction costs in intercompany activities, recognition of the value of intangible assets, and other aforementioned factors (see **Drivers of extended innovation**). More fundamentally though, we believe that the change is attributable to the fact that innovation opportunities exist increasingly outside corporate boundaries—opportunities that cannot be effectively pursued by a single, lone corporation. Rather, exploitation of these opportunities requires:

- ◆ Alliances between firms to recombine assets and competencies in mature industries
- ◆ Explorative collaborations in emerging industries.

Within mature industries, might recombinations be just as effective within a single firm as between two or more firms? They might, yet anecdotal evidence from Hewlett-Packard, for instance, suggests the difficulty of creating radical innovation in a single corporation. Hewlett-Packard's several dozen business units were perfectly placed to exploit recombinatorial opportunities, yet the company failed to mount an effective response to the disruptive technologies of the Internet. Partnering with another firm may have been just as difficult. However, the advantage of such cross-company collaboration comes from its potential to challenge the orthodoxies of each firm and thereby uncover otherwise latent opportunities.

Another question to consider: Would an outright merger or acquisition be as effective as a strategic alliance to promote innovation? Mergers and acquisitions commonly destroy shareholder value, as reflected in the combined companies' market capitalization, which is often less than the sum of the market capitalizations of the companies immediately prior to merger. In instances where mergers and acquisitions appear to destroy value, we contend that the post-merger company has failed to exploit the recombinatorial potential of its component assets and competencies—presuming that potential ever existed. We will monitor with interest the proposed merger of Hewlett-Packard and Compaq to see whether the merged entity can innovate by combining the assets and competencies of its constituents. [4]

## **Conclusion**

The corporate boundaries that matter today are the boundaries that define and contain the corporation's innovation searches [5]. The two extended innovation strategies that we have discussed in this paper—recombinant exploitation in mature industries and explorative collaboration in emerging spaces—redefine the firm as a value-creating unit, emphasizing the importance of cross-company collaborations for longer-term viability.

Furthermore, the best chances for innovation derive from the negotiation between different sets of values, culture, or knowledge. To this point, we observe that many acquisitions turn sour as an acquiring company imposes its "DNA" on the acquired company, thus destroying much of the target company's value. Anecdotally, a manager in a large U.S. corporation once remarked: "No matter if the start-up is growing 20% a year.

When we acquire the firm, the growth rate unfailingly drops to 4% because that is the growth rate we manage to.”

**Endnotes:**

1. A conception based on close substitutes for a buyer's perceived need is too narrow to allow much radical innovation (Saloner, 2001). And a conception based on complementary products is likely to blind the participants to emerging disruptive technologies (Christensen, 1997).
2. We prefer the term *emerging spaces* over *emerging industries* because the opportunity may exist in an as yet undefined area such as wellness, which does not yet constitute an industry in the conventional sense of that word.
3. The choice of this example is for convenience only. We do not mean to imply that Home Depot applied an opportunity map of this sort to support its own innovation strategy.
4. At the time of writing, this merger is pending approval of the European Commission as well as Compaq and Hewlett-Packard shareholders.
5. In some cases, a corporation's boundaries are defined by a regulatory authority. For example, before passage of the 1996 Telecommunications Act in the United States, AT&T's corporate boundaries were defined by the Federal Communications Commission.

## References:

Amburgey, Terry L.; Rotman, Joseph L. (2001), "Learning Alone or Learning from Partners? Generating Patents in Biotechnology", School of Management, University of Toronto (submitted to the Academy of Management, Washington, D.C. 2001 conference).

Antonelli, Cristiano (1999), "The evolution of the industrial organization of the production of knowledge", *Cambridge Journal of Economics*.

Christensen, Clayton (1997), *The Innovator's Dilemma*, Harvard Business School Press.

Gambardella, Alfonso (1995), *Science and Innovation: The U. S. Pharmaceutical Industry During the 1980s*, Cambridge University Press.

Kelley, Donna; Rice, Mark (2002), "Advantage beyond Founding: The Strategic Use of Technologies", *Journal of Business Venturing*, January.

Kogut, Bruce (2000), "The Network As Knowledge", *Strategic Management Journal*, March.

Liebeskind et al (1996), "Social Networks, Learning, and Flexibility: Sourcing Scientific Knowledge in New Biotechnology Firms", *Organization Science*, Vol. 7 No. 4.

Powell, Walter; Koput, Kenneth; Smith-Doerr, Laurel (1996): "Interorganizational Collaboration and the Locus of Innovation: Networks of Learning", *Administrative Science Quarterly*, March.

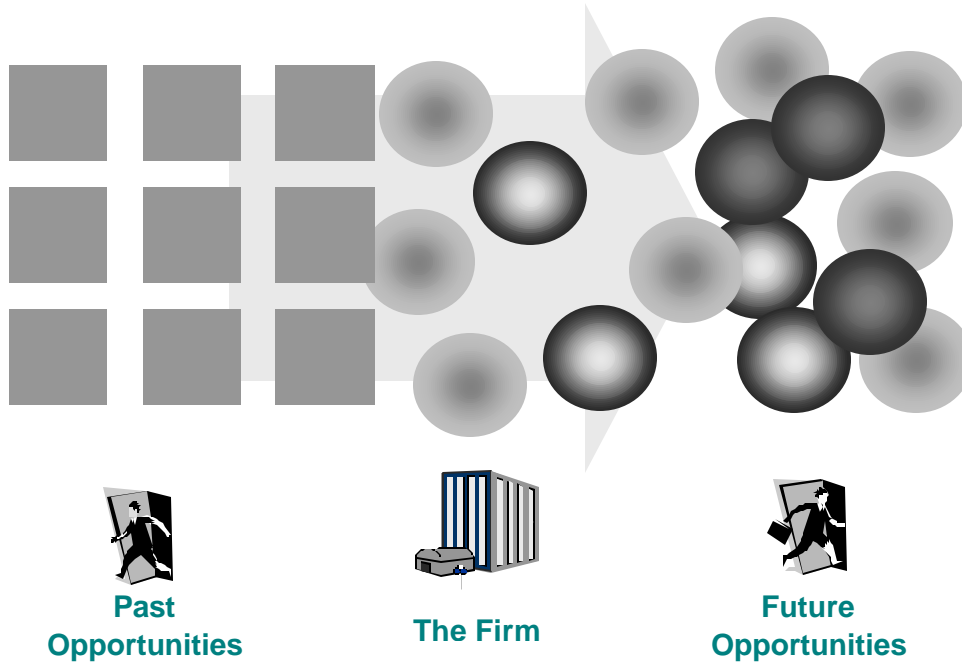
Rosenkopf, Lori; Almeida, Paul (2001), "Overcoming Local Search Through Alliances and Mobility", (publication pending; available via: <http://knowledge.wharton.upenn.edu/PDFs/1017.pdf>).

Garth, R; Shepart, Andrea; Podolny, Joel (2001), *Strategic Management*, John Wiley.

## Exhibits

### Exhibit 1

Caption—The firm as a value-creating entity



End Exhibit 1

Exhibit 2

Caption—Opportunity map in a mature industry context

<b>HOME DEPOT'S STRATEGIC ASSETS &amp; COMPETENCIES</b>	<b>Staff with knowledge and capability in their departments (e.g. roofing, floor covers, painting, etc.)</b>	Home Depot staff members can demonstrate techniques and offer advice to its key demographic.		Real-estate developers can provide settings for Home Depot staff to demonstrate wall papering, flooring, painting, etc.
	<b>Network of large warehouse-style stores with space to promote Home Depot's partners</b>	Home Depot can promote real estate developers in its stores, alleviating high promotional costs that developers usually face.		
	<b>National brand recognition</b>		Real estate developers can promote Home Depot to builders—a major target market for Home Depot	
		<b>Customer base with strong interest in home improvement, home maintenance, yard work, etc.</b>	<b>Established relationships with builders</b>	<b>Availability of show homes and homes that are still under construction</b>
	<b>RESIDENTIAL REAL-ESTATE DEVELOPER'S STRATEGIC ASSETS &amp; COMPETENCIES</b>			

End Exhibit 2

## Tables

Table I

Caption—Partnerships between biotech and pharmaceutical companies

<b>Biotech Partner</b>	<b>Pharmaceutical Partner</b>	<b>Alliance Type</b>	<b>Focus of Alliance</b>
Millennium	Monsanto	Joint venture	Genomics for agricultural products
Genentech	Hoffmann-LaRoche	Development and licensing	Governance and in-licensed products
Targeted Genetics	Biogen	Research	Gene therapy research
Genentech	Eli Lilly	Development and licensing	Recombinant insulin
Millennium	Bayer	Research and licensing	Small molecules for genomics
Allergan	Ligand Pharmaceuticals	Joint venture	Joint venture based on retinoids
Human Genome Sciences	GlaxoSmithKline	Collaboration including 20% equity by GlaxoSmithKline in HGS	Gene sequencing for drugs

End Table I