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OPEN INNOVATION: FACTS, FICTION, AND FUTURE

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In This Publication

Executive Summary	2
Introduction	2
Moving Open Innovation from Concept to Reality.....	4
Open Innovation Requires Corporate Culture Changes.....	6
Types of Open Innovation Networks.....	8
Expectations	11
Selecting Open Innovation Partners.....	12
Conclusions: The Future of Open Innovation and How to Leverage It.....	13
About the Authors.....	14
About Nerac	15



EXECUTIVE SUMMARY

Open innovation offers a significant opportunity to leverage intellectual resources from outside the company. In fact, despite the number of resources available internally, the very largest companies have the greatest need for open innovation because of a natural tendency for institutionalized thought associated with any large entity.

Beyond just another business fad, open innovation attempts to create new sources of ideas and solutions with the potential of influencing every aspect of business activity. However, open innovation is often ill-defined, and as a result, implementation can create confusion. Oftentimes, corporate culture and policies need to change for open innovation to succeed.

To make the most of open innovation, companies should integrate it into all stages of activity, from early-stage product ideation and R&D to late-stage marketing and sales. Companies will realize the greatest benefit by maximizing open innovation in all stages of business activity. This expansion of scope calls for more strategic thought on how innovation networks are built and how they function.

INTRODUCTION

Open innovation is carving out a permanent place in the business world. Championed, among others, by Henry Chesbrough, author of Open Innovation: The New Imperative for Creating and Profiting from Technology, the concept is that companies should make much greater use of external ideas and technologies in their businesses, while letting other companies work with their unused ideas. Propelled by competitive product differentiation, companies striving for growth are eager to expand their innovation efforts, but they are not eager—or able—to commit funding to expand internal innovation capabilities.

Emboldened by the potential for leveraging outside sources of innovation, some companies have aggressively and successfully carried out the concept, while many others have simply dabbled. The reality is that no company was successful at implementing and operating the now-familiar Total Quality Management systems by dabbling in them with a couple of part-time employees. Likewise with open innovation, companies need to make a commitment to instituting it.

Meanwhile, the business world is just now beginning to discern best practices from these efforts, which will enable newer practitioners to recognize greater returns with fewer pitfalls.

Despite the buzz surrounding open innovation, few companies can point to concrete results from their efforts. There are the usual suspects that explain the limited results:

- Not-invented-here syndrome.
- Poor management focus and endorsement.
- Lack of process for finding, vetting, and leveraging outside sources of innovation.
- Concerns about intellectual property rights.

However, a deeper evaluation reveals a disconnect between the theory of open innovation and its actual implementation and execution. Currently, most companies focus their efforts exclusively on product innovation and usually only at the early product design stage. For example, a company making a new pet food may explore new approaches to meat by-product processing or

flavoring technologies through open innovation, but they may not consider other innovations downstream in the product lifecycle, such as packaging, cross-pallet shipping, or cross-promotion strategies, which may benefit from the knowledge of supply chain partners.

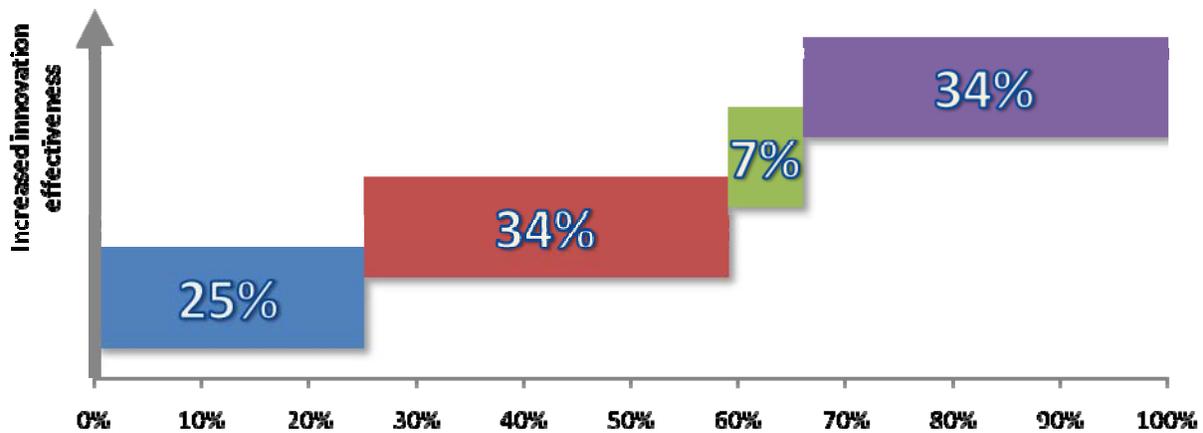
In addition, most exercises of open innovation during the product design stage tend to lead to "innovation to specification" where a distinct problem and acceptable solutions are specified to innovation partners in hopes that they find a solution that fits inside the defined box. Lost from this exercise is the sharing of the design team's larger mission, which would allow and encourage innovation partners to think "outside the box," dramatically increasing the odds of discovering truly disruptive technologies that can be leveraged.

Nerac recently has been receiving an increasing number of inquiries regarding open innovation. To quantify the state of open innovation practices, the research and advisory firm surveyed its client base. The results, which are illustrated in Figure 1, reinforced earlier observations:

- Most companies responding that they are pursuing an open innovation initiative are at very early stages of implementation. As might be expected, these early-stage activities are full of trial and error.
- The initiative is usually limited to one individual, or a very few, who usually have other responsibilities. The greatest challenge to a radical departure in SOP is having the critical mass needed to gain momentum. The necessary cultural change can only be accomplished through a wide understanding of open innovation principles throughout the organization.
- Few companies have a point of contact whose principal function is innovation implementation. The lack of principal point of contact usually makes implementing and coordinating open innovation even more challenging.
- Companies are more frequently encouraging staff to find answers outside the organization, a strong departure from not-invented-here syndrome.
- Companies are expanding to multiple innovation network models, rather than focusing on just one.

Figure 1

Range of Open Innovation Practices among Nerac Clients



- Conceptual only, encouraging staff to find answers outside the organization
- A point contact for open innovation has been defined who has other responsibilities
- A point contact for open innovation has been defined whose principal function is implementation of open innovation strategy
- Multiple points of contact for open innovation has been defined per department, business unit or technical focus

MOVING OPEN INNOVATION FROM CONCEPT TO REALITY

Open innovation should occur throughout the entire innovation lifecycle, not just during product design. For simplicity of discussion, we organize the innovation lifecycle into four distinct stages: ideation, product design, production, and distribution/sales. (Readers should liberally re-categorize these stages based on their own business structure.) Companies should benefit from innovations that result in both revolutionary and evolutionary technology disruptions: those that directly impact product mix and design as well as incremental improvements to operational effectiveness such as shipping, product packaging, and marketing programs.

Figure 2
Innovation Lifecycle



Ideation

The first stage, ideation, deals with the conceptualization of new products or services. Characterized by brain-storming, it is unstructured, encourages extravagant solutions to problems, and involves professional critiques of many, partially thought-out ideas. In this stage, open innovation can have great impact because disruptive technologies often come from thinking “outside the box,” a key ideation objective. However, the unstructured nature of the ideation stage does not align with an overly structured innovation network approach in which participants do not have a close, trusting relationship with the company. (“Trusting” is defined as prior legal agreement on the ownership of intellectual property.)

Product Design

The product design phase is the sweet spot for open innovation, where most discrete technical problems arise and require resolution. As opposed to the ideation phase, product design is more closely linked to written specifications and customer requirements, which means that discrete problems can more easily be defined and posed to multiple innovation partners.

Production

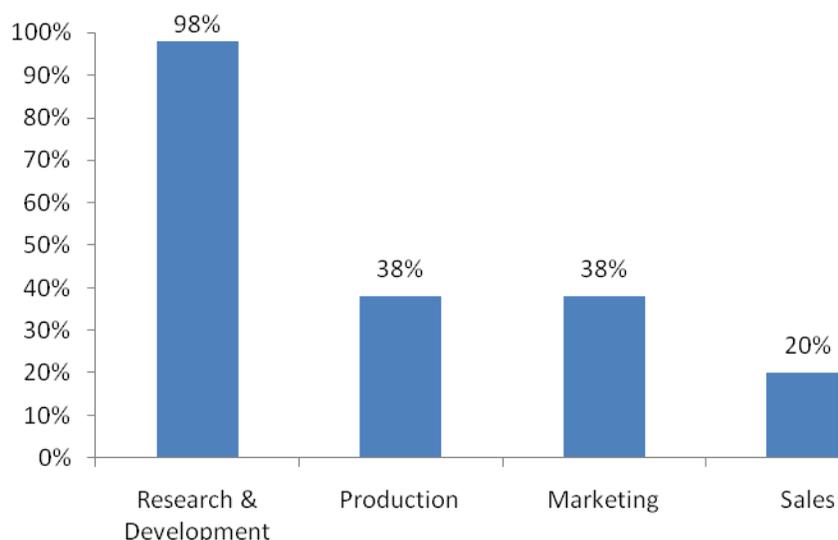
The production phase provides opportunities for suppliers to contribute to innovation. They can share best practices from similar customers and can contribute during the design phase to ease production problems ahead of time. Often these innovations lead to reduced production costs or manufacturing flexibility, both of which are profound competitive advantages. Improving any industrial practices from shop floor control to manufacturing execution systems are fair game for open innovation. Success in reducing the production bottleneck can be significant for the entire company.

Distribution/Sales

The distribution/sales phase of the product lifecycle model involves shipping, sales channel strategy, merchandising, and similar factors that can have a dramatic effect on the success of a product, often a more important factor than the actual product features themselves. Some of the most innovative products and services achieve their success at this stage.

Figure 3

Departmental Involvement in Open Innovation Efforts



An analysis of our survey's open innovation activities by department clearly supports the evidence of open innovation taking place at the early stages of product and technology development, as illustrated in Figure 3. Over time, we expect more functions to become involved in open innovation to support the entire product lifecycle. Further, we anticipate that companies that integrate open innovation into multiple functions will have the most demonstrable successes.

Because innovation is often considered an "ivory tower" function, residing mostly in the ideation and product design phases of the product lifecycle, targeted innovations are usually discrete, narrowly defined solutions to technical problems. When these discrete technical challenges are presented to a group of potential solutions providers, generally known as an innovation network, those in the network have only a cursory understanding of the ultimate problem being solved. As previously described, the partner innovates only to meet the requirements—"innovation to specifications." Thus, open innovation has a limited ability to generate disruptive solutions that provide clear and convincing value. Disruptive technology is more likely to result when the greater context and mission of the company are shared with innovators so that they can "innovate to mission."

OPEN INNOVATION REQUIRES CORPORATE CULTURE CHANGES

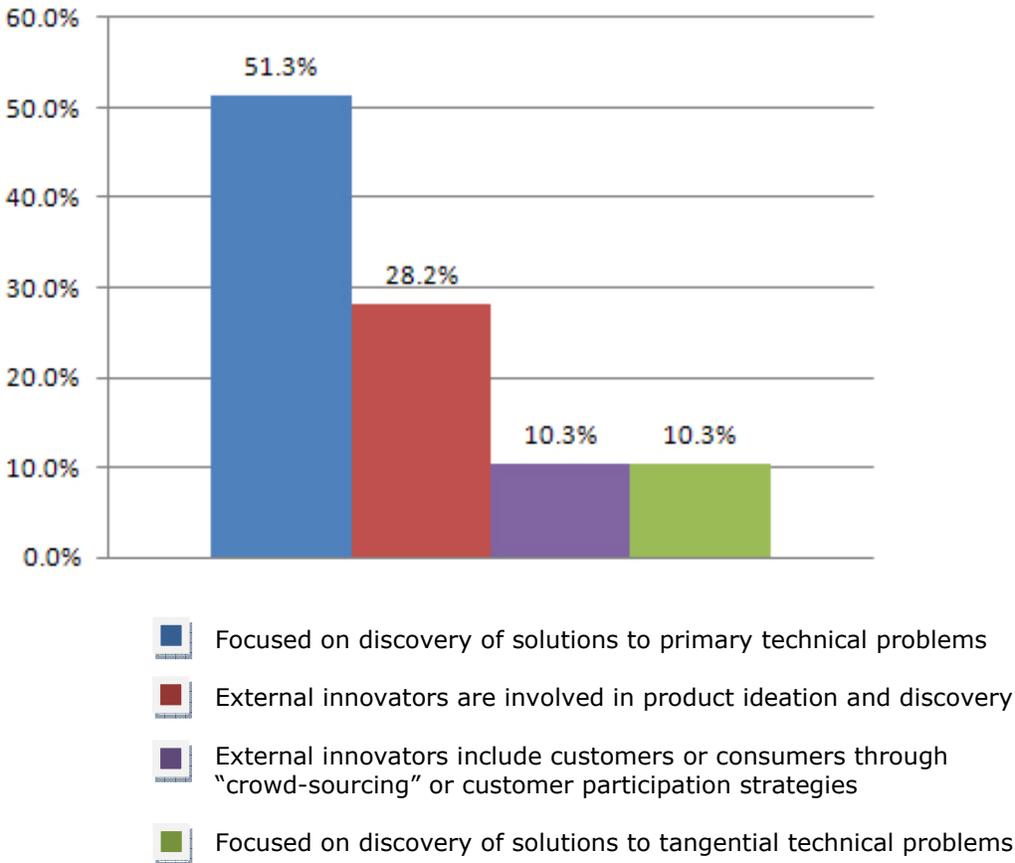
The ramifications of disappointing results promise a downward spiral for the future of open innovation. Successful use of open innovation depends upon cross-functional support. Those within a company who oppose the effort, based on "not invented here" or other objections, use open innovation failure to justify relying on internal efforts in solving the most important and visible challenges. Their objections are bolstered by very credible arguments:

- Identifying and educating outside channels of innovation costs more time and effort than solving the problem directly.
- The process naturally limits the targeted problems to those that can be succinctly defined and described, whereas most of the toughest problems are conceptual and cannot be articulated in summary form.

- Disruptive technology rarely results from resolving a discrete problem and more often results from the innovator’s understanding of how the product or service solves a problem for the ultimate customer.

Therefore, without a significant cultural shift, open innovation too often remains within the internal R&D domain, focusing heavily on technical problems. The results of our client survey support this conclusion, as illustrated in Figure 4:

Figure 4
Internal vs. External Open Innovation Orientation



In short, open innovation success often depends upon a more comprehensive strategy, paralleling the path taken in the adoption of Total Quality Management. Organizations should look at the entire innovation lifecycle for opportunities to leverage outside innovation and to establish multiple innovation networks to contribute appropriately to each stage.

TYPES OF OPEN INNOVATION NETWORKS

Open innovation networks vary significantly based upon such factors as network size, vetting levels, solution provider qualifications, confidentiality needs, business relationships, intellectual property protection considerations, and upfront resource investment and potential return on investment. Based on those characterizations, open innovation networks fall into one of three categories: non-qualified, pre-qualified, and business partners, which can include suppliers and customers.

Non-Qualified Open Innovation Networks

Solution providers in non-qualified innovation networks are vetted only superficially before they are added to the network. Examples include Innocentive (www.innocentive.com) and NineSigma (www.ninesigma.com). One advantage of non-qualified innovation networks is size; they tend to be large with many participants around the globe. In addition, they are maintained and administered by third-party companies for a relatively small cost. Discrete problems are typically summarized in a problem brief and are submitted to the innovation network in a bid-for-solution process. Bounty fees are then awarded to successful solutions.

Non-Qualified Open Innovation Networks	
ADVANTAGES	DISADVANTAGES
Easy to establish through third-party	Tends toward innovation against detailed specification; bounty hunters must pre-qualify themselves
Extremely large number of innovators	Transparent problem briefs signal strengths and weaknesses to competitors
	Administration by R&D staff often more work than solving internally
	Major concerns over intellectual property ownership; innovator unlikely to share disruptive technology
	Limited to product design phase

Pre-Qualified Open Innovation Networks

Some companies, for example Proctor & Gamble, have gone to great lengths to create pre-qualified innovation networks of solution providers to ensure that they have the capabilities and sustainability appropriate to the challenges they may help address. The networks are managed so that confidential information and intellectual property are protected. They may include current suppliers, experts in particular fields, independent research and engineering companies, or virtually any other entity that the company thinks could add value to its innovation efforts.

For those companies with the resources to dedicate to such an effort, pre-qualified innovation networks are extremely powerful. Because the company is large and recognizable, it draws interest from the best and brightest wishing to participate. Most companies, however, lack the resources to establish and manage a pre-qualified innovation network. A better alternative is to explore other pre-established and pre-qualified innovation networks through organizations such as Nerac, university consortiums, trade organizations, and technology park incubators.

Pre-Qualified Open Innovation Networks	
ADVANTAGES	DISADVANTAGES
Directly Created	
Moderate number of vetted innovators	Directly managed pre-qualified networks are expensive and resource-intensive
Intellectual property issues are handled upfront	Difficult for all but the largest companies to implement
Support innovation-to-specification as well as mission innovation	
Leveraged through a 3rd Party	
Large number of vetted innovators	3 rd Party involvement adds a layer of administration
Intellectual property issues are handled upfront	
Support innovation-against-specification and mission innovation	
Reasonable for any size company	

Business Partners

Companies often ignore one of the most promising forms of open innovation: their existing business partners. Too often companies subconsciously define an appropriate innovation partner as one that is much smaller than they. These partners often lack resources to exploit technologies on their own, and do not have sufficient market presence or resources to capture the true value of their technology contributions during negotiations. However, this thinking excludes powerful and resourceful business partners that have technical and market research resources that smaller partners lack. And they think bigger, which means an increased chance of discovering disruptive technologies. Naturally, there’s the potential that they might steal ideas. So you want to choose partners that have a strong incentive to “stay in their own sandbox.”

Business Partners As Open Innovation Networks	
ADVANTAGES	DISADVANTAGES
Relationship already established	Must address intellectual property issues upfront
Typically rich in resources vs. small innovators	Tricky competitive issues: Make sure that partners have strong incentive to “stay in their own sandbox”
They think bigger and understand the innovation mission.	
Small incremental administrative costs	

Suppliers

Managing a set of suppliers as part of a comprehensive innovation network requires special care. Suppliers often view open innovation strategies as a threat to their embedded relationships. They have worked hard and loyally to earn their position as a preferred supplier and will resist outsiders’ efforts to address critical problems. Often they have cultivated high-level relationships with company executives, so their efforts at obstruction can be a significant threat to the success of an open innovation strategy. To overcome this, make your objectives clear, provide a mission statement for open innovation initiatives as well as a framework for their contributions (a “how-

to" manual) and insist that they conform. This can become an integral part of the supplier qualification process.

Suppliers as Open Innovation Networks	
ADVANTAGES	DISADVANTAGES
Relationship already established	Suppliers can disrupt each other's open innovation efforts; "turf war"
Inside knowledge of company's strategy; more likely to generate disruptive technology	Suppliers may be selling to your competitors
Supplier relationship mitigates intellectual property issues; suppliers have a lot to lose!	
Small incremental administrative costs	

Customers

Companies have a vested interest in satisfying customers and seeking their input on products and services. However, this process may be ad hoc or tactical, not an integral part of the full innovation lifecycle. By developing more robust strategic, cross-functional relationships with customers, companies can not only leverage customers' expertise but also increase switching costs for a customer to change suppliers.

For B2B companies, customer contributions to open innovation can come from user conferences, customer advisory boards, and product ideation contests. For B2C companies, consumer contributions can come from blog sites, product support web sites, beta users and consumer surveys. Known as "crowd-sourcing," this innovation concept has proven powerful in the case of Subway Sandwich Shops, which not only recognized the value of Jared's idea to turn a fast-food brand into a health food brand but also achieved an innovative marketing campaign that pays ongoing dividends in product sales and corporate goodwill among consumers.

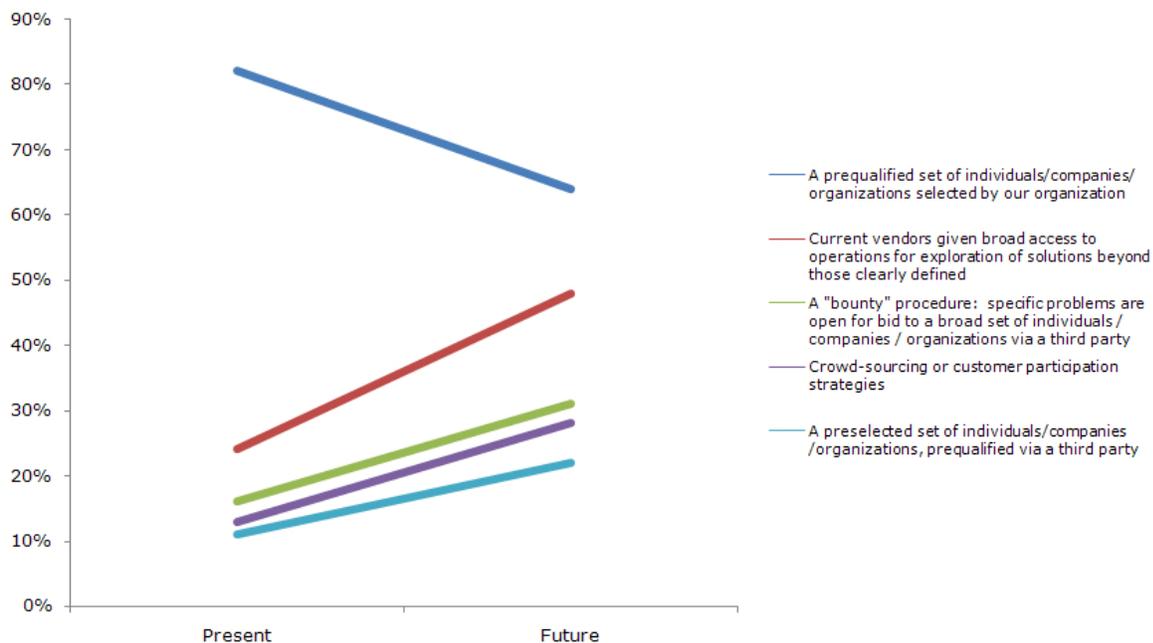
Customers As Open Innovation Networks	
ADVANTAGES	DISADVANTAGES
Vested interest in involving them in product direction	Can be costly unless managed as part of other customer-feedback processes: e.g., user conferences, blog sites, customer advisory boards, beta users, customer surveys
Practical knowledge of your value proposition	
Crowd-sourcing in consumer-oriented business builds customer loyalty	

EXPECTATIONS

Companies have expectations for the types and sources of open innovation they wish to employ in the future. Figure 5 shows that over time the clients Nerac surveyed expect to obtain fewer pre-qualified open innovation partners from their own internal organization and more pre-qualified open innovation partners from third-party organizations. Further, open innovation relationships with vendors will increase in the future, providing them with broader access to internal operations with the goal of expanding the range and depth of technical and product solutions.

In addition, companies expect to do more crowd-sourcing and open bidding. Overall, they expect a more uniform innovation system with more options and flexibility than they have available today.

Figure 5
Trend Toward Leveraging More External Resources for Open Innovation



SELECTING OPEN INNOVATION PARTNERS

The potential for different open innovation strategies varies greatly among companies, owing to the markets in which they participate, the technologies they produce or are dependent upon, the inherent competitive pressures within their industry, and the size of the company. Based on results from Nerac's client survey, the larger the company, the more likely it is to leverage open innovation. Additionally, 81 percent of respondents say that they rely primarily on a set of prequalified individuals, companies and organizations.

This statistic is consistent with the survey's demographics presented in Figure 6 because only the largest companies have the in-house resources to pre-qualify open innovation partners.

Figure 6
Company Size of Survey Respondents

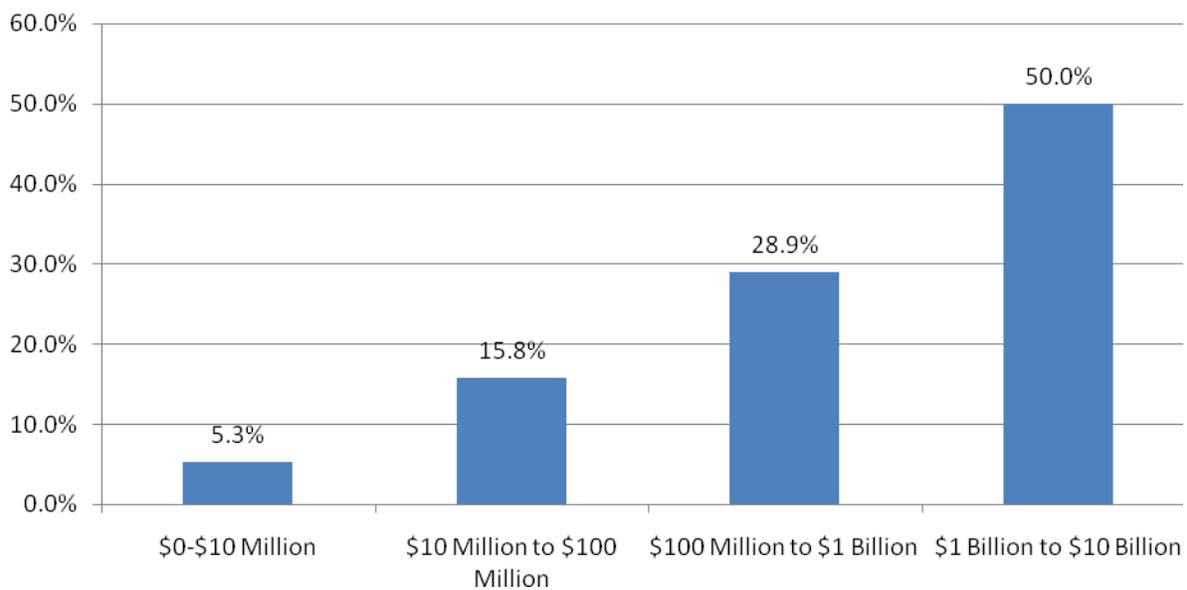
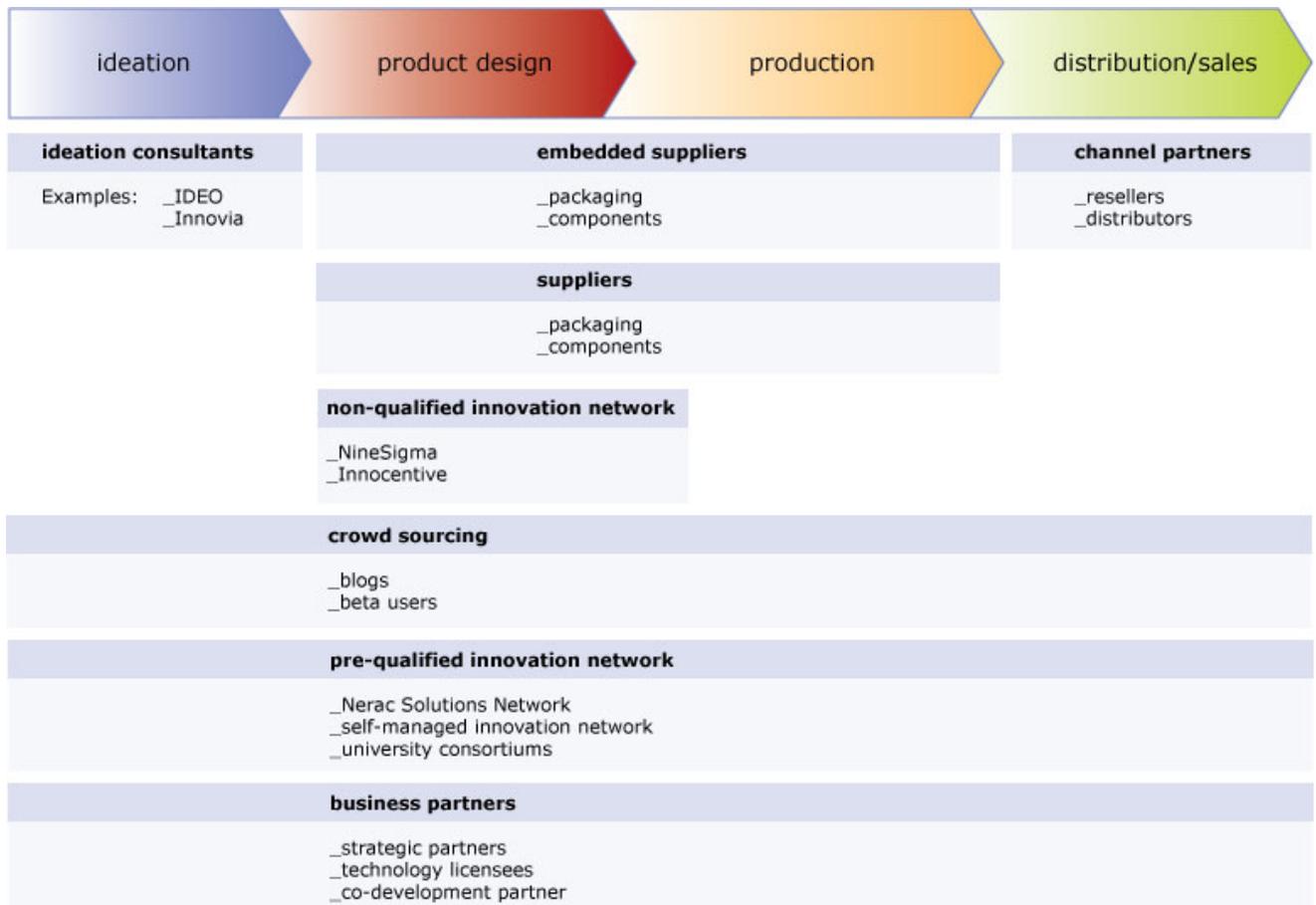


Figure 7 summarizes the appropriate types of open innovation partners at each phase of the product lifecycle, along with non-exhaustive examples:

Figure 7
Open Innovation Partners across the Product Lifecycle



CONCLUSIONS: THE FUTURE OF OPEN INNOVATION AND HOW TO LEVERAGE IT

Open innovation is currently employed, often in only a limited way, primarily during the product design stage of the innovation lifecycle. The perception is that open innovation is a part of this single stage of the innovation lifecycle, which impedes its expanded deployment and realized benefits.

With that in mind, companies that are not leveraging open innovation during all stages of the product lifecycle are encouraged to find ways to do so. Implementing and leveraging innovation across the entire lifecycle, inherently spanning functions and other organizational boundaries, can require a fundamental shift in thinking and corporate culture. Specifically, companies that have a collaborative, team-based culture have a distinct advantage in implementing and leveraging open innovation versus those that have more rigid boundaries among functions and lines of business. Typically any significant change to corporate culture requires support from the highest levels.

This cross-functional, trans-lifecycle transformation has begun in the most successful open innovation initiatives. Accordingly, open innovation is giving way to open business models, where all phases of the innovation lifecycle are subject to external thinking. This transformation requires placing each target innovation into the appropriate phase of the innovation lifecycle and establishing specific innovation network strategies for each phase.

Open innovation is yielding significant, measurable successes for companies across industries. Organizations that have not yet ventured into open innovation are encouraged to identify three to five critical business issues that may benefit from an open innovation approach. With these issues in hand, the guidance offered here, and counsel from advisors such as Nerac, a company can become poised to undertake successful open innovation initiatives.

ABOUT THE AUTHORS



Kevin Blackwell

Kevin Blackwell is Vice President of Sales and Marketing at Nerac, as well as a Nerac Analyst focusing on business research areas of new ventures, open innovation, and business development. He brings technical expertise in automotive, test and measurement, computer software, and marketing analytics. Mr. Blackwell's career began at General Motors Corporation, where he helped design the first antilock brake system (ABS) for low-cost automobiles, which set the stage for standard ABS on all vehicles. He received a patent on portions of the design, which was named "Automotive Technology of the Year for 1992" by *Automotive* magazine. He joined National Instruments Corporation in 1994, serving as a field sales executive before joining Bristol Technology Inc., a software company that his brothers co-founded. This company grew from an attic office to more than 120 employees with offices in the U.S., Holland, and India, earning a place on Inc. 500 list and a No. 1 ranking in Connecticut's Fast 50. While at Bristol, Mr. Blackwell founded a division, called Kenosia Corporation, which provided marketing analytics software to the consumer goods industries. The Kenosia division was sold in 2004 and Bristol itself was sold to Hewlett-Packard in February 2007. Mr. Blackwell holds undergraduate degrees in computer science and electrical engineering as well as an M.B.A. from The Wharton School of the University of Pennsylvania.



David Fazzina

Nerac Technology Services Development Manager David Fazzina designs new tools that help clients to understand trends in the development and maturity of new technologies. This program, which has become known as the Emerging Technology Evaluation service, dovetails with the effort to anticipate disruptive technology. Mr. Fazzina is also an analyst who works with clients in metals, ceramics, plastics, and chemical processing industries to uncover technologies and applications that help lower costs and achieve higher performance. From adopting greener methods to streamlining processing, Mr. Fazzina draws together diverse technologies that enhance a client's production and innovation efforts. His background includes frontline experience as a start-up venture principal that co-invented, designed, developed, patented, acquired funding, and marketed a new technology to companies in such diverse industries as water and wastewater treatment and medical sterilization. In his eight years at a ceramic manufacturer, Mr. Fazzina helped grow revenue from \$32 million to \$98 million with an overall output increase of 12 percent. He also recommended

and implemented several technical solutions from computer simulations to equipment upgrades that improved departmental and plant-wide performance. Mr. Fazzina, who holds both bachelor's and master's degrees in metallurgical and materials engineering from Colorado School of Mines, is knowledgeable in materials welding, hard facing, joining, and bonding; metals corrosion protection and inhibition, exotic materials synthesis, industrial automation and control, water treatment, chemical reactor design, and product development. He holds patents for chemical reactor systems and instrumentation off-device displays.

ABOUT NERAC

Nerac Inc., based in Tolland, CT, is a research and advisory firm for companies developing innovative products and technologies. Nerac Analysts deliver custom assessments of product and technology development opportunities, competitor intelligence, intellectual property strategies, and compliance requirements through a proven blended approach to custom analysis: review of technical knowledge, investigation of intellectual property, and appraisal of business impacts. Nerac deploys analysts in diverse disciplines to help clients discover new applications, serving as a catalyst for new thinking and creative approaches to business problems or identifying strategic growth opportunities.

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