

## Innovation Without Borders

The classic image of the innovator is that of the iconclast who breaks away from the pack and “thinks different.” Quite surely, that famous advertising byline helped win the computer maker, Apple, ultimate iconic status of innovator as the ultimate iconoclast. Equally famously, Apple Computer made its system incompatible with the prevailing standard: you were either with the nearly 90% of users whose PCs ran on Microsoft Windows or aligned with Apple’s unique system. Apple’s chief, Steve Jobs, had declared his objective to “put a ding in the universe”; he certainly did so by banging into the sides of much bigger competitors: Microsoft, IBM, HP, Dell, among many others.

The Us vs. Them image of the innovator is not limited to Apple alone. The popular idea of the innovator as the “disruptor”—and the many examples of companies on the Web or from emerging markets that have, indeed, disrupted long standing incumbents—has reinforced the competitive facet of innovation. And the metaphors keep coming: making the competition irrelevant; innovate—or die. In fact, it is often remarked that some of the best-known innovative companies hire attorneys with as much zest as in their hiring of scientists and engineers. In the midst of all of these images of zero-sum innovation, the critical role of consensus, cooperation and coordination in most successful innovations may have been overlooked.

Last year, the percentage of successful innovative products that were developed or commercialized with others was as high as 79%. The total return to shareholders for companies that adopted a collaborative approach to innovation was on average 1.6 times that of more insular innovators. Collaboration also led to better outcomes for users of the innovative products: the clinical survival rates of patients who use products from externally sourced programs in pharmaceuticals are twice the survival rates of patients served by products of internally sourced programs.<sup>1</sup>

The importance of outsiders in the innovation process often begins with the very idea that ultimately becomes a winning innovation. The office supplies retailing giant, Staples, had aspirations to boost its sales from highly appealing private label merchandise. One of its hottest recent products is the Wordlock, predicated on the simplest of ideas: people remember combinations of letters that spell famil-

---

*Bhaskar Chakravorti is Partner with McKinsey & Company, working in the firm's Boston office. He is the author of *The Slow Pace of Fast Change: Bringing Innovations to Market in a Connected World* (Boston, MA: Harvard Business School Press).*

iar words more easily than they do combinations of numbers. The Wordlock was not the invention of Staples' own tinkerers; it was the prize winner of an annual "open innovation" contest, InventionQuest, through which Staples invites ideas from all and sundry. In the same tradition, soliciting ideas from the outside, particularly from customers, has come out in the open across industries. The Danish toy maker, Lego, tapped into the creative minds of a group of "lead users" to develop a new generation of its Mindstorms kits. The mining company, Goldcorp ran a competition to unearth new veins of gold on their Red Lake mining property. Seven of the top fifteen drugs in 2005 did not originate in the pharmaceutical company that primarily markets them. An average of 40% of pharmaceutical R&D among the major players is sourced from the outside. This list goes on...

More broadly, some of the most successful and innovative companies in recent years have systematically sought out external partners for sourcing ideas, for commercialization and for expansion into adjacent businesses and new segments. Entire corporate strategies are predicated on a networked model. Starbucks, for example, has established a brand that conveys a holistic experience associated with the enjoyment of coffee. It has done so with a network of partners: Ethos Water, Lionsgate movie studios, Paul McCartney as the early draw for its music label, the satellite radio company, XM Radio, and a host of others, particularly for international expansions. Google relies on content from the outside that it organizes and searches for its users. Much of the innovative content that Google owns, such as Google Earth, was acquired from the outside. Proctor & Gamble transformed an insular organization focused on internally driven R&D to one that follows the mantra of "sourcing 50% of new products externally". P&G has re-aligned goals, metrics and incentives to ensure that managers follow through on these objectives. In addition to giving a high priority to its internal business development group, P&G has established linkages with a wide network of external partners: academia, customers, partners, retailers, individual inventors and technologists, industry peers, ideas exchanges such as NineSigma, bankers, VCs, etc.

The willingness to connect with an external network is key in an environment where products and services are themselves increasingly inter-connected. We see trends in this direction for a variety of reasons, either because uses of multiple products are complementary or because information and marketing networks have become so prevalent and play a key role in decision-making and adoption. The greater the inter-connectedness, the greater the need to collaborate with the network into which the innovation must connect. In light of these trends and the clear benefit of innovating "without borders", it becomes critical for an innovator to establish some rules of engaging with a network: whether to and how to play.

In this article, I shall offer a framework for evaluating three stages of the decision to engage with the network from the perspective of a prime innovator, who instigates the change and bears central responsibility for bringing the innovation to market. The approach is organized around three questions:

- Question 1: Should I open the borders and collaborate with an external net-

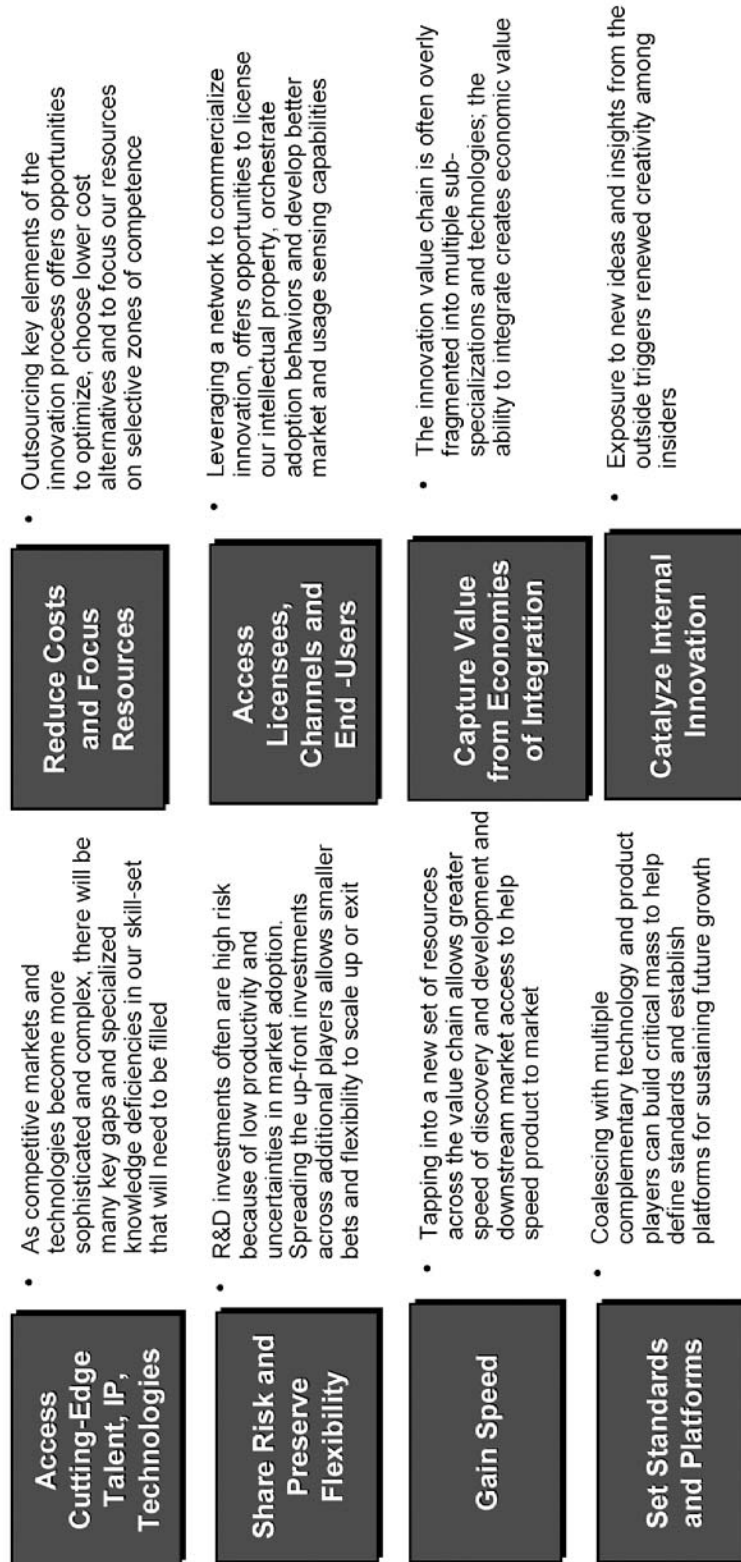


Figure 1. What we need to believe: Value from networked innovation.

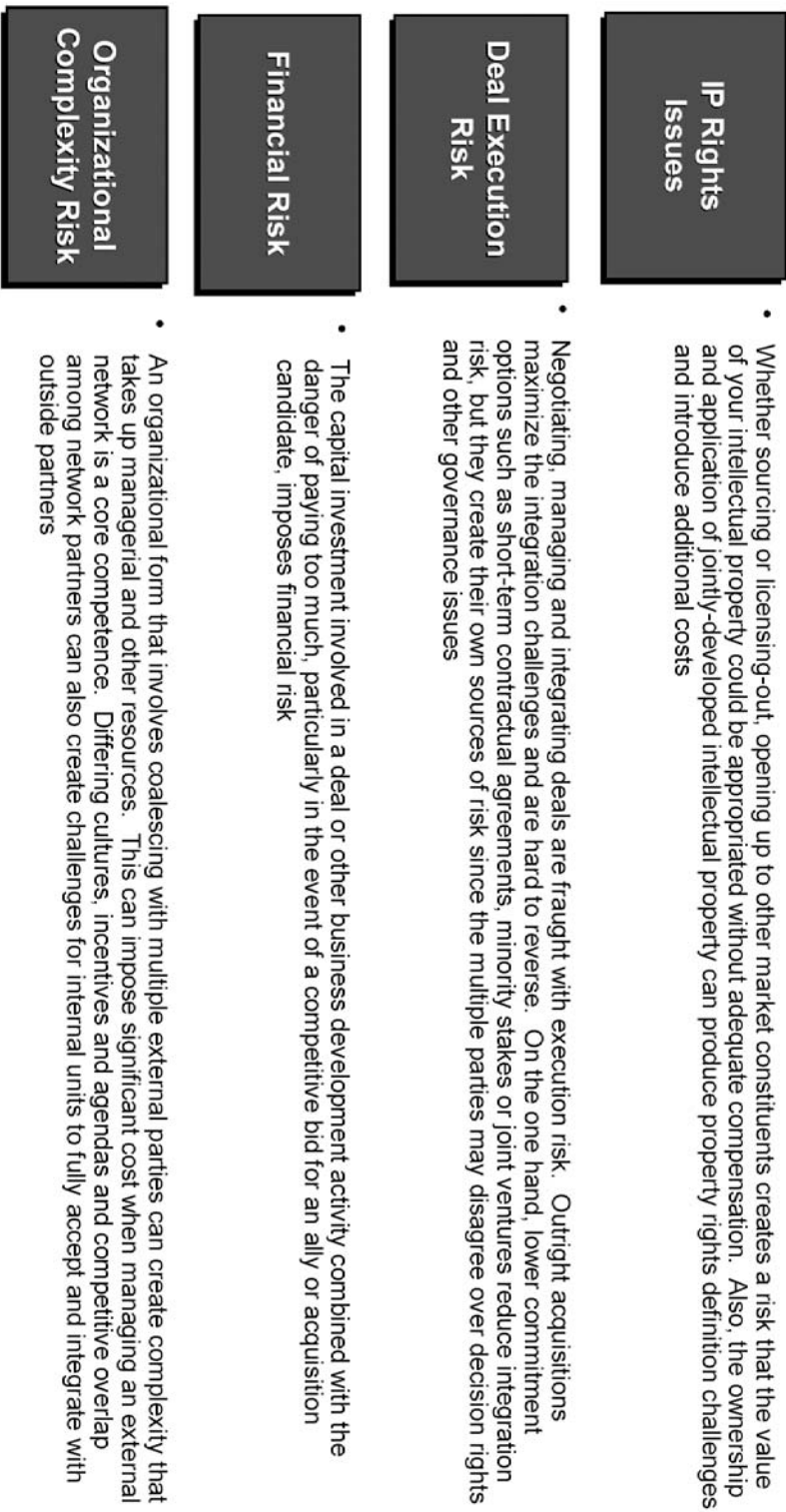


Figure 2. What we need to overcome: Sources of risk in networked innovation

work?

- Question 2: What are the potential sources of resistance in the network to innovation and what motivators and barriers determine the actions that the network takes?
- Question 3: What are my options for overcoming the challenges and engaging with the network to realize value by innovating without borders?

#### TO OPEN OR TO CLOSE THE BORDERS?

Our approach begins with the first of the three questions: the prime innovator must make a decision on openness vs a closed model for realizing the value of innovation. A way to re-frame the question to be addressed is: what conditions must the prime innovator need to believe about how the network adds value? This helps us understand the decision-making process involved in going to the network in the first place.

In our work across a wide range of firms and multiple sectors, we have seen a number of factors that are relevant in driving a decision between “closed” and “networked” innovation. Figure 1 below summarizes the key conditions that the innovator must believe to consider going to the network.

Against these benefits, the prime innovator must consider trade-offs of foregoing a larger share of the value created by innovation and several substantial risks. These risks are summarized below in Figure 2.

As such, these factors offer a checklist for innovators considering the networked vs closed innovation choice. All of the examples from the first section, and the increasing trend towards openness suggest that a greater number of companies are evaluating these trade-offs and deciding in favor of opening up their borders. And as more companies move in this direction there are more “best practices” in place for anticipating and managing the risks outlined above. This also means that when we speak of an “innovator”, only in a minority of situations is that innovator likely to be a single entity. Usually, it is the prime innovator who acts as the catalyst and leads the network, but in some way the entire network contributes in some way to the innovation and to the value created.

#### SOURCES OF RESISTANCE IN THE NETWORK

As more of the innovations of the future require cooperation among multiple players in a network, the motivations of each party in the network must be aligned with creating the innovation and getting it to market. But with each in pursuit of a private objective function and subject to private constraints and privately held information, the alignment challenge is enormous. As a result, the more open the borders are, the wider the network and the more the chances that the innovation will not be realized.

The prime innovator must anticipate this possibility and expect that the misalignment can potentially give rise to several sources of resistance, which can

diminish, delay and even destroy the value of innovation. We outline a few such possibilities below:

- *Chicken-and-egg dilemma.* This situation arises when each party to the network waits on others to make the initial investment and adoption decisions needed to incubate and scale up the innovation. Consider the much talked about future involving a “hydrogen economy”. Automakers, such as BMW with its Hydrogen 7 model, have announced models and plans in the pipeline that use hydrogen as a fuel. Understandably, given the environmental benefits of such vehicles, their successful diffusion can have a significant impact.

Yet, it is highly unlikely that hydrogen powered vehicles will become the standard anytime soon. A key challenge will be the absence of a system of re-fueling stations that such automobiles can use to replenish the hydrogen used up. But such stations will not be built and the distribution networks will not be in place until there is a strong expectation that there will be sufficient demand. In the absence of the stations, the demand will not materialize, and the automakers will not accelerate their plans for rolling out hydrogen powered vehicles. This circular dilemma is a natural outcome of any “two-sided market”, where each side must wait on the other. The challenge gets exacerbated when there are many sides to the market.

- *Scale Economies.* Many innovations face the challenge that they are not cost competitive relative to the status quo they are trying to displace. A major reason for this is the fact that because innovations usually involve new and less mature technologies, applications or processes, they cannot benefit from scale economies. No single participant in the network has the incentive to subsidize the innovation which could create the incentives for the remaining participants to free-ride. This causes each party to the network to hang back and, as a result, the innovation loses to the status quo.

Consider the emerging bio-diesels industry. Against the status quo of, say, \$60 a barrel for crude oil, diesel would have a retail price of \$1.60 for a gallon, while bio-diesel from rapeseed and soy would have a per gallon retail price ranging from \$2.20 to \$2.80 today. While these alternatives are expensive, an additional problem is that there is limited headroom for scaling up; the feedstock is limited. If one were to consider other sources of bio-diesel, such as algae, the retail price would shoot up even higher — to \$26.50 a gallon.

- *Conflicting Interests.* The wider the network, the greater the chances that the interests—motivators and barriers—of each participant will be hard to align. The problem is particularly acute when the motivations of two critical parties are directly in conflict. In addition, there are situations where both parties have common motivations but find it in their interests to go it on their own or with their own coalition rather than with entire network.

As an example of the first situation, consider the promise of the emerging field of pharmacogenomics. It will allow genetic profiling and better prediction of

the vulnerability of individuals to specific diseases such as, say, type 2 (adult onset) diabetes. This advance knowledge can help put in place a variety of preventive measures for the individual involving changes in lifestyle and diet and even go on medications that have preventive benefits. However, the difficulty in getting the network to embrace such a beneficial innovation arises from the fact that insurance companies and payers may not have the incentive to pay for such genetic profiling: the individual may not stay on the current health plan or current employment for a long enough period of time the insurers and payors will not reap the benefits from the potential lowering of costs of the individual's treatment later in life.

As an example of conflicting interests between competing coalitions, consider situations where new technology standards have to be developed around innovations and the network splinters. The competition between the standards coalitions prevents them from taking a unified position in competing against the status quo. The next generation DVD media standards wars between Blu-ray and HD DVD are a recent case in point.

The three kinds of resistance we have introduced above leads one to ask about ways to orchestrate the various privately motivated choices to be made by the network participants. How do you encourage the critical participants to act in their own best interests and, while doing so, help speed the course of innovation? I will offer some alternative approaches in the forthcoming section. Before getting there, it is useful to consider a visual tool that simultaneously captures the multi-lateral incentives that must be aligned and the coordination challenge to be resolved.

The tool can best be explained through an application. Consider an innovation that has been notoriously slow in its adoption. It is an eminently strong candidate for innovation without borders. To some degree, it has suffered from all three of the problems posed above of mis-alignment of multiple motivations.

Consider the long-standing problem of getting physicians to use CPOE (Computerized Physician Order Entry). These are systems that allow the direct electronic entry of medical orders by healthcare professionals. The systems have several benefits: including the reduction of medical errors, input for electronic medical records and improved clinical decision-making. A key source of the difficulty in getting CPOE to be adopted is the complexity of the network that is relevant for its success. This network encompasses several participants. On the demand side alone there are: drug and device manufacturers, hospitals and clinics, physicians and nurses, pharmacies and testing labs, insurers and patients. This network is complex and covers only part of the entire universe of participants who would be responsible for adoption. For example, this list does not include suppliers of various technologies, products and services, standards bodies or regulators.

A good starting point for understanding the difficulties in getting CPOE adopted is to ask what conditions would describe a successful "endgame" for CPOE, where there is widespread adoption on the demand side of the market. Consider the following scenario set out as a configuration of conditions or actions

associated with each of the network participants; they represent one configuration of a successful endgame for this innovation. In this scenario CPOE succeeds through investments and sponsorship paid for by interest parties who get to use the equipment as an advertising and branding platform in exchange:

- *Drug and device manufacturers.* A meaningful group of manufacturers act as sponsors of the hardware, software and other system related investments, thus subsidizing the cost. The sponsors' brands or commercial messages are part of the CPOE equipment in exchange. This must be balanced against any potential ethical and legal concerns.
- *Hospitals and clinics.* A critical mass of these institutions complete implementation of wireless networks, CPOE and other complementary IT applications, such as electronic medical records.
- *Physicians and nurses.* Wireless devices, CPOE and other IT applications are adopted and supported by most physicians and their staff.
- *Pharmacies and testing labs.* A critical mass of these institutions adopt and support CPOE and provide partial sponsorship of the application since it reduces their costs.
- *Insurers.* A critical mass of insurers support the sponsorship of the CPOE application and provide incentives to hospitals that implement it.
- *Patients.* A critical mass of patients embrace instant wireless data transmission / CPOE of their sensitive health related information, are not turned off by commercial sponsorship and even act as advocates for its implementation through patient advocacy groups and online forums.

The idea behind this scenario is that the conditions or actions outlined for the participants are mutually reinforcing. These network participants are, clearly, not taking these actions currently—each is locked into a different set of mutually reinforcing actions; hence the slow pace of adoption. How does the prime innovator help break away from the status quo?

We would propose that the innovator assess the total value created by the innovation's adoption and establish a business model that distributes this value in a way that reinforces any motivating factors and compensates for the barriers that each participant would have to overcome to get to the desirable outcome. Figure 3 lays out a tool for doing the evaluation.

The endgame conditions along the top are a set of conditions lined up against each critical participant on the demand side of the CPOE market. These are the conditions we have just outlined above. To understand the underlying factors that govern the actions of each of these network participants, we would need to examine the motivators that drive the participant towards the endgame and the barriers that prevent them from doing so. The upward facing arrows represent the motivators for each participant to get to widespread adoption. Correspondingly, the downward facing arrows represent the barriers to change. When viewed together, we see a snapshot of the dynamic situation and the forces that are in balance.



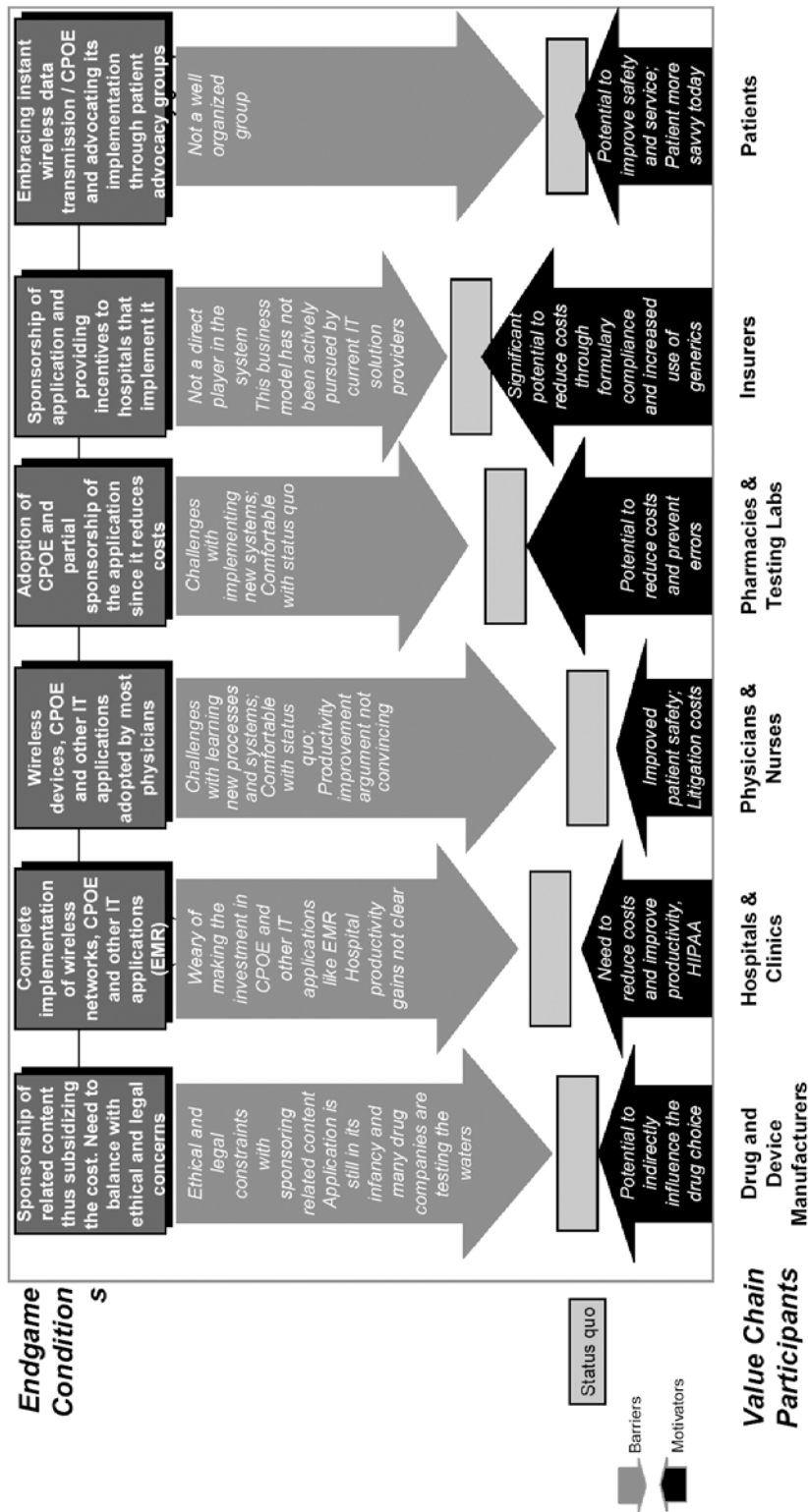


Figure 3. Motivators for and barriers to supporting innovation

## HOW TO GET THERE? THREE WAYS

There are three primary ways for the prime innovator to get networks to act in a coordinated way and get to the desirable endgame conditions. Two of these involve private initiative, while the third requires the prime innovator to seek help from a resourceful participant outside the network—usually the public sector.

### **Approach 1: Integration**

A potential way to coordinate across the many participants and their individual motivators and barriers is to bring them under unified management. The ways to achieve this could involve: vertical integration or horizontal mergers or partnerships.

Consider one of the fastest growing innovative sectors in recent times: the solar (photovoltaic) industry. With the heightened interest in renewable energy sources, this industry has been growing at rates of 40-50% a year. The key participants in the industry can be identified by examining the value chain. Poly silicon is converted to ingots and cut into wafers, which is a key component of photovoltaic cells that help transform solar rays into energy. The cells are embedded in modules and solar panels, which are then marketed, installed and serviced by downstream systems and service providers and installers. There are several other participants that contribute to each of these major elements of the solar value chain, such as technologists and materials providers, as well as government bodies and advocacy groups and lobbyists.

The separate interests of the individual participants of the value chain can act as a potential brake on further acceleration of adoption of solar energy. As an example of the diversity of motivators and barriers to contend with, consider the interests of the upstream poly silicon players. They have been through severe cyclical patterns in their business, where they were left with a glut of poly silicon once the high demand from semiconductor industry had slowed down with the cooling of the high technology industry post-2001. This history would give them reason to pause before adding capacity and making high upfront capital expenditures. In the meantime, the downstream players in the industry cannot keep up with fast pace of consumer demand for solar power because there is not enough poly silicon supply. The market positions of the downstream cells, panels, systems players depend on securing access to precious poly silicon.

How have several participants responded to these conflicting incentives? Many have gone down the path of vertical integration. REC, one of the biggest players in the industry has expanded its footprint and extended across this value chain. Other key players, such as BP, MEMC, SunPower have also expanded their position up and down the value chain.

Similar patterns of integration as a way to coordinate across a value chain has been the hallmark of many other industries in their early stages: automobiles, computing, entertainment and media.

### **Approach 2: Power Plays**

Most networks tend to follow the so-called power law. There are economies of accumulating power and influence and a small number of the participants in a network tend to become the hubs or greatest influencers of the actions of the rest. This is particularly relevant in situations with significant economies of concentrating in the channel or in setting or dictating standards. Finding ways to complement the most powerful players' interests gives the prime innovator the ability to focus its resources on a few target stakeholders, ride their coat-tails and maximize the ability to influence and transform large segments of the network.

Consider the strategies of cellular handset makers, e.g. Motorola or Apple, as they pushed their innovative products, the Razr or the iPhone, respectively, to market. A strategy that has worked well has been one of signing exclusive deals with one of the major wireless service providers. Motorola launched its highly successful Razr through a deal with Cingular, which had a dominant share of the US wireless telephony market. Subsequently, Apple did the same with the Cingular's new incarnation: AT&T.

In each case, the power player had much to gain from an exciting new handset given the maturation of the wireless services business. An exclusive deal, even if it is for a limited period, gives the service provider a way to lock up market share with consumers attracted to the new handset. For the handset makers, piggybacking on the dominant service provider's commercial infrastructure and reach is a compelling way to get to market and draw applications providers to the platform created by the exciting new handset.

### **Approach 3: Public Solution**

A final approach to resolving the dilemma is to take the route often used in the event of clear "market failure". This can come about when there is not enough power in the network or no way to establish it through integration or no way to complement the power players. These are precisely the circumstances in which economists make the case for the public sector to play an active role or even take over an industry. Generally, the public sector takes a more indirect role through tax breaks, subsidies and other incentives. The prime innovator can play an important role in educating policy makers and bringing political and economic constituencies together to get the public sector to act.

For an example, we need look no further than the broad set of issues relating to the response to climate change and need for multiple viable renewable energy sources—a current that has been running through many of the examples in this article. The public sector's view must be viewed in a holistic manner. It has the convening power to bring the multiple stakeholders—domestic constituencies, cross-industry players, governments, international and multi-lateral bodies together on the issues, to set local and global standards for emission, construction, environmental impact of initiatives such as urbanization, industrialization, defor-

estation, etc., setting targets for greenhouse gas emissions, usage of renewable energies as a percentage of overall energy used.

Most importantly, the public sector has been providing financial incentives and subsidies for both R&D and for closing the retail cost gap between the renewable energy sources and the traditional sources against which they compete. In the absence of these policy-led initiatives, the response to climate change agenda would have stalled. In fact, the prime innovators would be well served to bring the issue to the attention of policy makers more aggressively if they want to make the many networks we have talked about earlier move in a consistent and value enhancing direction.

## CONCLUSION

Apple Computer, with which we began this article, eventually dropped “computer” from its name.

More significantly, Apple went through an even more profound shift in its innovation model. The lone wolf that “thought different”, Steve Jobs, gave his company a new lease on life with the creation of the iPod and iTunes. Many think of the iPod largely as a marvel in product and design innovation. As much as it is a brilliant example of innovative design and product engineering, the iPod represents an equally impressive innovation in the business model that delivers the product to its many users and returns favorable payoffs to an innovation network that extends well beyond Apple.

Apple worked with a many partners in the product and design of the iPod: small players, such as Red Chair Software, Finlay Software, and many large players, such as HP, Sony, Sharp, Texas Instruments, Hitachi, among others. Moreover, at the core of the iPod and iTunes is an even more impressive innovation: in a business model that cuts across traditional industry borders. It encouraged a music label oligopoly, whose interests were firmly aligned with maintenance of a status quo to sign up to the radically different iTunes model, unbundle the music tracks on their albums, make them available on the Internet and price them at a flat fee of 99 cents a song.

When you innovate across so many borders, you not only re-invent a company but also an reinvent an industry. In this case, arguably, the cross-network collaboration catalyzed by Apple may have saved the industry.

It does make you want to break out in song.

---

1. McKinsey & Company analyses.