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Innovation through Global Collaboration: A New Source of Competitive Advantage

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Abstract

Many recent studies highlight the need to rethink the way we manage innovation. Traditional approaches, based on the assumption that the creation and pursuit of new ideas is best accomplished by a centralized and collocated R&D team, are rapidly becoming outdated. Instead, innovations are increasingly brought to the market by networks of firms, selected for their unique capabilities, and operating in a coordinated manner. This new model demands that firms develop different skills, in particular, the ability to *collaborate* with partners to achieve superior innovation performance. Yet despite this need, there is little guidance on how to develop or deploy this ability.

This article describes the results of a study to understand the strategies and practices used by firms that achieve greater success in their collaborative innovation efforts. We found many firms mistakenly applied an “outsourcing” mindset to collaboration efforts which, in turn, led to three critical errors: First, they focused solely on lower costs, failing to consider the broader *strategic* role of collaboration. Second, they didn’t organize effectively for collaboration, believing that innovation could be managed much like production and partners treated like “suppliers.” And third, they didn’t invest in building collaborative capabilities, assuming that their existing people and processes were already equipped for the challenge. Successful firms, by contrast, developed an explicit strategy for collaboration and made organizational changes to aid performance in these efforts. Ultimately, these actions allowed them to identify and exploit *new* business opportunities. In sum, collaboration is becoming a new and important source of competitive advantage. We propose several frameworks to help firms develop and exploit this new ability.

Introduction

The management of innovation is changing. No longer is the creation and pursuit of new ideas the bastion of large central R&D departments within vertically integrated organizations. Instead, innovations are increasingly brought to the market by networks of firms, selected according to their comparative advantages, and operating in a coordinated manner. In this new model, organizations de-construct the innovation value chain and source pieces from partners that possess lower costs, better skills and/or access to knowledge that can provide a source of differentiation. The aim is to establish mutually beneficial relationships through which new products and services are developed. In short, firms increasingly seek superior performance in innovation through *collaboration*.

This new model is being driven by a series of trends forcing firms to re-think traditional approaches to innovation. First, the complexity of products is increasing, in terms of the number of technologies they include. No longer is it possible for one firm to master all these skills and locate them under one roof. Second, a supply of cheap skilled labor has emerged in developing countries, creating incentives to substitute these resources for higher-cost equivalents. Third, different regions of the world have developed *unique* skills and capabilities, which leading firms are now exploiting for advantage. And finally, advances in development tools and technology combined with the rise of open architectures and standards have driven down the costs of coordinating distributed work. In sum, collaboration is no longer a “nice to have.” It is a competitive necessity.

In this article, we report on a study of the strategies and practices used by firms that achieve greater success in their collaborative innovation efforts. The aim was to build on prior work that provides evidence of the value in a more “open” approach to innovation, and to explore an emerging theme in these studies; that firms must consider more than just lower cost when looking at the benefits from collaboration.¹ Our research was

¹ Arguments for the value of a more open innovation process are found in Chesbrough (2003) and Iansiti (2004). The business value of collaboration is discussed in Hansen and Nohria (2004). The need to focus on more than just lower cost is made by Santos and Williamson (2004). Eppinger and Chitkara (2006) discuss how to improve the performance of distributed development.

designed to shed light on how firms can use collaboration to create greater *business value* and to reveal the practices that dictate the effectiveness of these efforts.

About the Research

We conducted semi-structured interviews with managers in firms that are making extensive use of collaboration in their innovation efforts. Our aim was to evaluate *how* firms achieved greater success in these efforts, as opposed to understanding *why or where* they chose to collaborate. Where possible, we captured data on two development projects at each firm; one in which collaboration was perceived to be highly successful and another in which performance fell below expectations. To increase reliability we interviewed multiple managers from each project; each lasting between one to four hours. In total, we talked to over 100 managers from 20 firms, gathering data on over 40 projects. By contrasting the responses, across both projects and firms, we synthesized the strategies and practices that best explained perceived differences in performance.

Collaboration is not “Outsourcing”

Our study revealed dramatic differences in the performance of firm’s collaboration efforts, driven by contrasting approaches to their management. In particular, many firms mistakenly applied a “production outsourcing” mindset to collaboration, viewing the use of partners only as a means to achieve lower costs through “wage arbitrage” – substituting a US resource with a cheaper one of equivalent skill. These firms saw little need to change the way they organized their innovation efforts to facilitate collaboration. By contrast, successful firms went beyond simple wage arbitrage, asking global partners to contribute knowledge and skills to projects, with a focus on improving their *top-line*. And they re-designed their organizations, to increase the effectiveness of these efforts.

Managing collaboration the same way a firm handles the outsourcing of production is a flawed approach. Production and innovation are fundamentally different activities –

while the former seeks to replicate an existing product at low cost, the other seeks to develop something entirely new and valuable. In addition, outsourcing and collaboration have very different objectives. Outsourcing involves procuring a commodity asset or resource at the cheapest price. Collaboration, by contrast, entails accessing globally dispersed knowledge, leveraging new capabilities and sharing risk with partners. It is a much more sophisticated skill. While “outsourcers” achieved lower R&D costs in our study, rarely was this a source of advantage. “We lowered costs, but so did our competitors,” said one manager. “Our process is not differentiated at all.” By contrast, “collaborators” leveraged partners to create new sources of value. As Mak Agashe, General Manager for Windows Serviceability at Microsoft remarked, “We use partners to gain access to capabilities we don't possess. They have a huge impact on our ability to innovate that goes way beyond low cost and allows us to achieve significant advantages in time to market, results that we could not realize working with just our own resources.”

Firms which managed collaboration using an “outsourcing” mindset made three critical errors, as compared to more successful organizations:

- They didn't consider the *strategic* role of collaboration, but saw it only as a tactic for reducing cost. As a result, their efforts were misaligned with their business strategy.
- They didn't *organize* effectively for collaboration. Instead, they treated partners like suppliers of parts or raw materials, and managed them using a procurement function.
- They didn't make long-term investments to develop *collaborative capabilities*. Instead, they assumed their existing staff and processes could handle the challenge.

In combination, these errors meant firms systematically missed opportunities to use collaboration for competitive advantage. By contrast, successful firms found that attention to these critical areas generated *new* options to create value that competitors could not replicate. Below, we describe the principles that these latter firms employed.

1: Develop a Global Collaboration Strategy

In many firms, little thought was given to strategy; these companies typically began using global partners to lower costs, and did not evolve from that goal even after executing a half dozen or more projects. The result was a de facto, unarticulated cost-reduction strategy, driven at a departmental or divisional level. Collaboration received little senior management attention; when it did, it was because expectations were not being met.

Leading firms, by contrast, developed an explicit strategy for collaboration, designed to support their business goals. In contrast to organizations that viewed collaboration only as a tool for reducing cost, these firms considered a variety of more strategic benefits, in particular, assessing how collaboration could improve their top line through increased *product differentiation*. Successful organizations achieved this in two ways: first, by leveraging a partner's superior capabilities (i.e., know-how that the firm did not possess internally); and second, by accessing a partner's contextual knowledge (i.e., knowledge that the partner possessed by virtue of its local position). In combination, these benefits comprise the "3C's" of a global collaboration strategy (see **Figure 1; Table 1**).

Figure 1: The 3Cs of a Global Collaboration Strategy

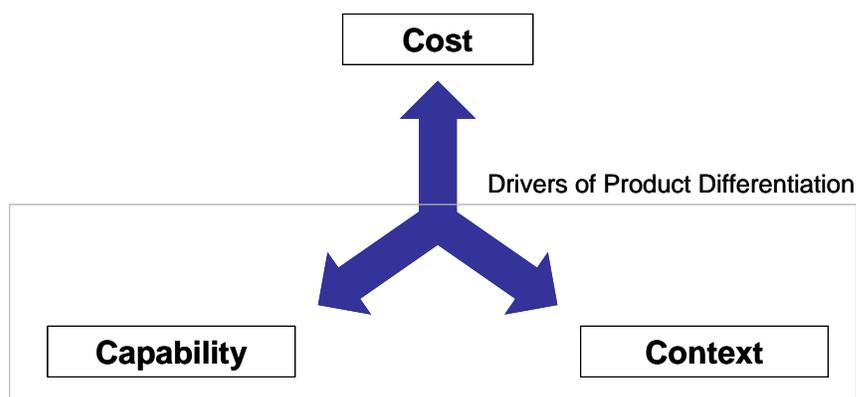


Table 1: The Benefits from Collaboration

Lower Costs	Superior Capabilities	Contextual Knowledge
Low cost labor	Rapid access to capacity	Market access
Low cost materials	Technical know-how	Supplier relationships
Low cost suppliers	Process expertise	Institutional ties
Low cost infrastructure	Domain knowledge	Government connections

Lowering R&D Costs

Reducing R&D costs was the number one priority for firms using partners to innovate. Firms in our sample reported between 10-30% reductions in cost, as compared to their performance prior to partnering. But savings were often lower than expected, due to the added costs associated with the need for greater coordination.² Firms using an outsourcing mindset sought to lower costs through “wage arbitrage,” replacing US resources with cheaper ones of equivalent skill. Leading firms however, lowered cost in a different way. Rather than swap one resource for another, they “reconfigured” their operations to optimize performance at the *system* level. While the decisions they made, in isolation, sometimes appeared to add cost, these firms understood the need to change the way they organized to maximize the value of collaborative efforts.

Consider SemCo, a leader in the contract manufacturing industry, which designs and develops electronic components and systems for own-equipment manufacturers (OEMs). When SemCo built a semiconductor plant in China, it did not replicate the design of its US facilities. While substituting US staff with Chinese staff would yield lower costs, SemCo saw a bigger opportunity in revisiting how the facility would operate. So it recruited a huge engineering staff – an order of magnitude greater than the US – and devoted them to process and product improvement. The result: a facility with the highest productivity of any in their network, *independent* of wage levels. Substituting one worker for another merely yields a one-time saving that can be easily copied. Semco, by contrast, built the capability to lower costs systematically over time.

² It is often noted that the wage difference between a US engineer and an Indian or Chinese engineer is in the order of 3:1-5:1. However, rarely is this wage difference realized in its entirety, given the added costs needed to effectively run a distributed project.

Leveraging Superior Capabilities

Leading firms focused greater attention on how to leverage partner capabilities. We observed two broad types of capability in action: First, the ability to rapidly bring online large amounts of *capacity*, allowing firms to lower time to market and increase responsiveness, while avoiding the cost of full-time staff; and second, the ability to access unique *competencies*, technical know-how and/or process expertise that firms did not possess internally. Successful firms sought partners with a blend of both abilities, giving them instant access to a repertoire of skills not available in-house. As one manager recalled, “It takes us nine months to find and hire a new employee. But using our partner, we staffed up in two weeks, accessing a skill that we don’t have internally.”

Microsoft used the capabilities of a partner to dramatically improve agility and quality in one business unit. This unit provides periodic updates to customers – billions of downloads every quarter. Testing for these updates includes operating system, hardware, chipset and 3rd party application testing. It spans 5 operating systems covering millions of lines of code. Microsoft’s partner helped apply “Lean” manufacturing techniques to this process, streamlining and prioritizing tests and re-designing tasks to allow staff to work in parallel. For one of the projects, the team improved time to test by 90%, lowered costs by 70% and reduced “failure” rates to near zero.

Accessing Contextual Knowledge

An increasing focus for many firms was gaining access to the knowledge and relationships that a partner possessed by virtue of its *position* in a local context. In our study, examples included partners who possessed a deep knowledge of local firms with specific production skills, relationships with university faculty in a new research area, and contacts with the government officials who approved market access. These benefits, being based upon the knowledge and relationships that come from a local presence, were difficult to value. As a result, many firms tended to underestimate their impact.

Consider NewCo, a firm that designs enterprise servers sold to OEMs like HP and Sun. To complement its US staff, NewCo established an Owned Development Center (ODC) in Taiwan and teamed with a partner in India. In one recent project, the firm was having difficulty in meeting the target cost due to the high price of one particular component. So NewCo asked its ODC to leverage its knowledge of different local manufacturer's costs and capabilities to solve the problem. The organization eventually located a new supplier that could source an equivalent component at lower cost. In this case, the value of the ODC was *not* in providing better capability; it came from superior local knowledge.

Thinking Strategically

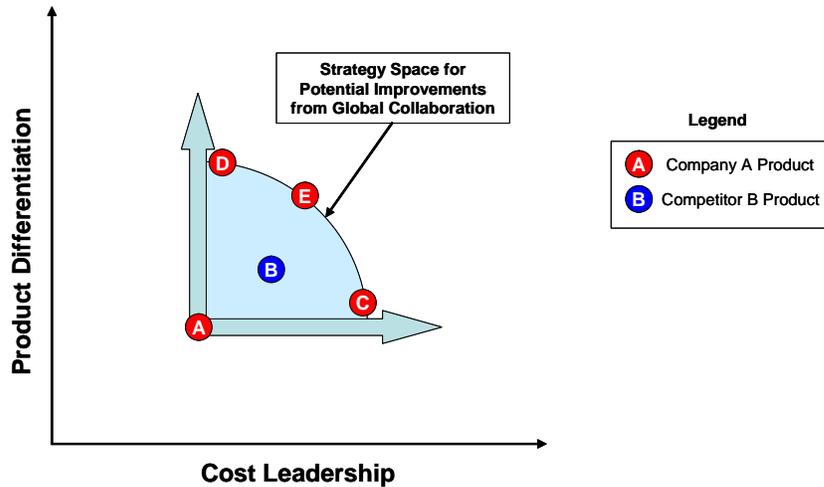
Viewing collaboration through this broader lens highlights how it can be used to support a firm's strategy. It forces managers to understand the competitive implications of partner selection, by assessing their merits along *multiple* dimensions, instead of only one. And it helps firms understand *where* to use collaboration, in terms of the parts of the innovation value chain where a focus on cost versus differentiation is most appropriate.

To illustrate, consider the strategies of two firms – A and B – depicted in **Figure 2**.³ Initially, firm B has a dominant position, with lower cost and superior differentiation. But firm A has identified opportunities to improve its position through collaboration. It can move along the horizontal to position C, achieving lower cost, or along the vertical to position D, achieving superior differentiation. Or it can move to position E, which is superior on both dimensions.⁴ In essence, collaboration has the potential to move firm A to the “frontier” of the space joining C, D and E. Contrast this with a firm that views collaboration only as a way to lower cost; this firm sees only one position to move to. While this may be a good choice, this firm does not see that it is not the *only* choice.

³ We use the classic dimensions of strategic positioning – low cost and product differentiation – as discussed in Porter (1985).

⁴ Note that position E cannot match the cost of C or the differentiation of D due to trade-offs between these performance dimensions.

Figure 2: Collaboration Supports a Firm’s Business Strategy



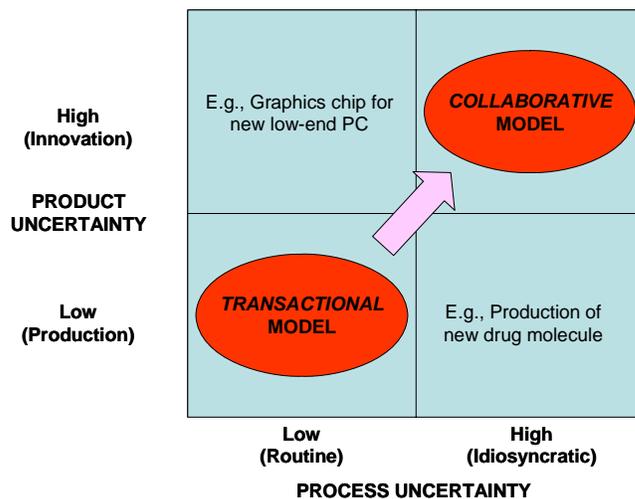
While successful firms often used different terms to those above, all had developed similar methods to align collaboration efforts to their business strategy. Collaboration received visibility at a senior level, and was an integral part of the strategic-planning process. Increasingly, the focus was not on wage arbitrage, but on using partners to increase *business value*. These firms grew more sophisticated in the use of collaboration over time; by contrast, poor performers remained stubbornly focused on cost.

2: Organize for Collaboration

The second area separating leading firms from others was how they *organized*. Firms that viewed collaboration through an outsourcing lens adopted a “transactional” model. They focused on how to break up the innovation value chain and specify in detail the deliverables required from each part. In procuring these parts, the selection of partners was driven mainly by cost. These firms treated partners like “suppliers” and adopted organizational structures, management policies and contracts reflecting this mindset. By contrast, successful firms recognized the uncertainty in their innovation efforts and sought mechanisms to overcome it. This required a more “collaborative” model.

The need for a different model can be seen by considering the challenge of partnering along two dimensions: The degree of uncertainty over the *product* to be produced; and the degree of uncertainty over the *process* to produce it (see **Figure 3**). Replicating an existing product (i.e., production) involves little uncertainty while developing a new one (i.e., innovation) is far more uncertain. Similarly, some processes are routine and easily specified whereas others are idiosyncratic and rely on trial and error learning. When firms face little uncertainty on both dimensions – the arena of production outsourcing – traditional models work well, given firms can specify *what* they want and *how* it should be made. As uncertainty increases however, a more collaborative approach is needed.⁵

Figure 3: The Challenge of Partnering



Firms that adopted a more collaborative model made different choices in terms of team design, contract structure and intellectual property management. We discuss each below.

Leading firms viewed partners as an extension of their own development organizations, seeking their participation in meetings and including them in internal communications. As part of this philosophy, they required greater continuity in partner staff, in contrast to a transactional model, in which people move in and out of projects. This ensured the

⁵ Economic theory argues that these problems are best resolved by vertical integration, given the difficulty in writing “complete contracts” between firms (Williamson, 1980; Teece, 1986). Increasingly however, this is not a viable solution given the number of technologies in a product is steadily rising, while the particular technologies themselves vary with each new product generation.

“tacit” knowledge of a project’s context was retained, and improved communication between teams. As one manager explained, “It takes time to appreciate the skills of each team member and understand how to work together. When people leave, we have to go through that learning curve again. So we put a premium on ensuring staff continuity.”

Successful firms focused on improving the efficiency of information transfer between teams given the need to jointly solve problems, the specifics of which cannot be predicted in advance. Having a partner liaison manager on-site, though expensive, was viewed as critical for resolving higher-level issues. For day-to-day problems however, direct contact between team members proved more effective, helping to get questions to the right place and resolved quickly. Several firms created a “buddy” system at the start of projects, linking offsite staff to onsite staff with similar responsibilities. By contrast, in projects that tried to manage communication at a single senior level, the transfer of information was often delayed, resulting in expensive rework and reduced trust.

Leading firms also made different choices in the contract terms that governed the funding of projects and payment of rewards. They aimed to align the incentives of client and partner, reducing the need to specify what was required from each in great detail. While service level agreements were common substitutes for time and material contracts, these firms went further, sharing risks with partners and rewarding them for their *top-line* impact. Partners often absorbed costs in return for payments tied to revenues or profits. In some cases, they acquired stakes in the business. As one manager noted, “We ask partners for ideas, so we need to reward their ideas and not just the effort in developing them. We give them a share of the pie, but their ideas make the pie bigger.”

The final area in which firms made different organizational choices was in intellectual property (IP) management. Global partners increasingly develop their own IP – new components, technologies and processes – to improve project performance. Furthermore, collaboration often requires that partners re-use and add to a firm’s existing IP in the search for new solutions. Given these trends, traditional approaches to IP which assume that a firm must develop, own, protect and isolate its IP are increasingly outdated.

While successful firms in our study differed on the specifics of their IP policies, their actions reflected a common shift in values; towards a more open and flexible approach. These firms sought to leverage partner IP, focusing on the cost and speed advantages, which outweighed concerns about the need for control. They developed mechanisms for partners to access their own IP, in a way that facilitated collaboration but ensured the protection of competitive assets. And they shared newly developed IP when the firm and its partners could benefit from its application, as long as the uses were not competitive.

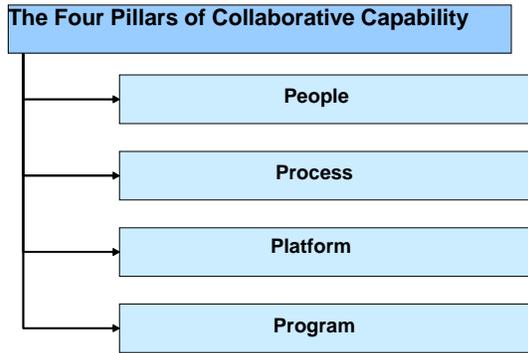
INSERT VIGNETTE ONE: Managing Intellectual Property

3: Build Collaborative Capabilities

The final area separating leading firms from others was their willingness to invest in developing “collaborative capabilities.” All too often, firms assumed that their existing employees, processes and infrastructure were capable of meeting the challenge of collaboration. But successful collaboration doesn’t just happen – it is a skill that must be learned. Rarely do firms get it “right first time.” Leading firms recognized this reality, and made investments to enhance their performance over time.

Successful firms targeted investments in four areas: people, process, platforms and programs. We call these the “Four Pillars” of collaborative capability (see **Figure 4**). These investments were typically funded outside the budgets of individual projects, given few projects can justify the levels of infrastructure needed to perform well on their own. In essence, leading firms made a *strategic* decision to invest in collaborative capabilities, and sought to leverage these investments across projects and over time.

Figure 4: The Four Pillar's of Collaborative Capabilities



Developing People

Superior performance in collaboration requires people with different skills, given team members often lie outside the boundaries of the firm, are located in far flung countries and have vastly different cultures. The “art” of management in such projects is in finding ways to exert influence over resources not under a firm’s control. Rather than a focus on deep technical expertise, managers therefore require a much broader skill set, associated with the need to orchestrate and coordinate the work of distributed teams.

Successful firms tackled this challenge through changes to their recruitment, training, evaluation and reward systems. For example, as well as training in technical disciplines, these firms ensured that engineering staff were educated on how to partition work into parts that can be worked on by different teams and how to manage the multiple workflows that result. The emphasis was on “softer” skills, such as communication and motivation, as opposed to discipline-based content. Increasingly, firms invited partners to these sessions, to develop a shared understanding of how best to work together.

The emphasis on developing new people skills was reinforced by a firm’s evaluation and reward systems. Unfortunately, these systems were often poorly equipped for the challenge, given they focused solely on assessing the performance of *internal* teams. For example, while 360 degree reviews for managers were increasingly common, rarely did

firms seek feedback from partners; a critical omission given partner performance is central to effective collaboration. Leading firms recognized the need to assess this aspect of performance, developed metrics to make it visible and rewarded those who excelled. They viewed collaboration as a skill to be learned and took actions to develop it in staff.

Designing Processes

Most projects we observed employed a formal product development methodology based upon a modified “stage-gate” or “waterfall” type process.⁶ These processes are increasingly popular ways to ensure greater control and consistency in the execution of projects. But these techniques, and others that share their roots, are often predicated on the assumption of single-site development. There is a need to re-think how they should operate when managing the distribution of work among a team of global partners.

Distributed development requires a variety of additional activities as compared to single-site projects, related to the division of tasks, the sharing of artifacts, the coordination of handoffs, and the integration of components. Leading firms designed processes to address these activities, taking into account the experiences and preferences of partners. This did not mean that each partner used the same process; rather the aim was to decide how much standardization was needed. For example, in one software project we observed, one team used a rigid “stage-gate” process to develop the core technology, and another used an “agile” process for the user-interface. Weekly and monthly “builds” were used to synchronize the work of both teams. Given each team used a process in which they were skilled, as well as one which fit their goals, the project was successful.

Ultimately, successful firms used a learning-driven approach to process design given their understanding of how to collaborate was in its infancy. Small pilot projects were used to experiment with alternative techniques, the best being chosen for a wider roll-out. For example, German electronics giant Siemens recruited several university teams around the globe to contribute to a project led by staff in its Princeton R&D center. The firm

⁶ A stage-gate process consists of a series of standard phases separated by ago/no go decision points called gates (Cooper, 1990).

tested different approaches to managing distributed teams, gaining insight on how contextual differences (e.g., between Indian and Irish teams) affected performance. The results are helping the firm decide what information to share with teams, how frequently they should interact and what modes of communication are the most effective.

Building Platforms

Leading firms developed technology “platforms” to improve the coordination of work. These platforms comprised four main parts: First, development tools and technologies to improve the efficiency of distributed work; second, technical standards and interfaces to ensure the seamless integration of partner outputs; third, rules to govern the sharing of intellectual property among partners; and fourth, knowledge management systems to capture the firm’s experience on how distributed work is best performed. This collaboration “infrastructure” was leveraged across multiple projects over time. The goal was to promote a long-term view of the assets needed for effective collaboration.

Consider TransCo, a leading transportation firm which undertook a multi-year project involving engineering work by over 50 global partners. The firm needed a platform that ensured the output from different partners was compatible, enabled the frequent integration of components, and facilitated testing of the entire system. Developing the platform was a multi-year undertaking, involving hundreds of staff from the firm and its partners. This effort focused on *minimizing* the constraints on each partner. As one manager noted, “We asked ‘what is the minimum level of commonality in process, data and computing to allow us to work together?’” The resulting capabilities were vital to success – for example, the firm could make global design changes (e.g., to the system’s electrical standards) and have these “ripple through” to all affected components.

While some firms like TransCo developed customized tools for collaboration, many used off-the-shelf products. In these cases, it was common to ensure that partners used the same version of the same tool, ensuring seamless data transfer. Where this was not possible, significant up-front effort was devoted to defining how integration would be

handled. Failure to do this led to major problems. Consider the troubles at Airbus, in developing its flagship A380 aircraft. Airbus' German and French partners chose to work with different versions of Dassault Systems' CATIA design software. But design information in the older system was not translated accurately into the new one, which held the "master" version. Without a physical mock-up, these problems remained hidden throughout the project. The result: 300 miles of wiring, 100,000 wires and 40,000 connectors that did not fit, leading to a 2-year production delay at a cost of \$6bn.⁷ Yet the cause of Airbus's problems was *not* in choosing different software versions; rather it lay in the lack of an effective process for dealing with the problems this created.

Managing "Programs"

Successful firms managed their collaboration efforts as a coherent "program," in contrast to organizations which ran each project on a stand-alone basis. A program view was critical given collaboration projects rarely met expectations early on, and performance often deteriorated when the scope of efforts was increased. Leading firms did not differ from others in this respect; but they did differ in the *rate at which they improved*. Top performers put in place mechanisms to help improve their collaboration skills over time.

A program view was cultivated by allocating responsibility for all of a firm's collaboration efforts to one senior manager. In large firms, this took the form of a formal VP or director-level position; in smaller organizations, a senior manager added this role to existing responsibilities. This "Chief Collaboration Officer," while not a direct report on each project, was tasked with developing a plan for improving the performance of all collaboration efforts. This involved the creation of a firm-wide collaboration strategy, as well as organizational changes to improve the effectiveness of execution.

The most progressive firms managed the "trajectory" through which they developed skills by carefully selecting the projects that used collaboration. Early efforts were chosen to minimize complexity, with an emphasis on "learning the basics;" more

⁷ Source: BBC News October 30th 2006, < news.bbc.co.uk/2/hi/business/5405524>, accessed June 4th 2007.

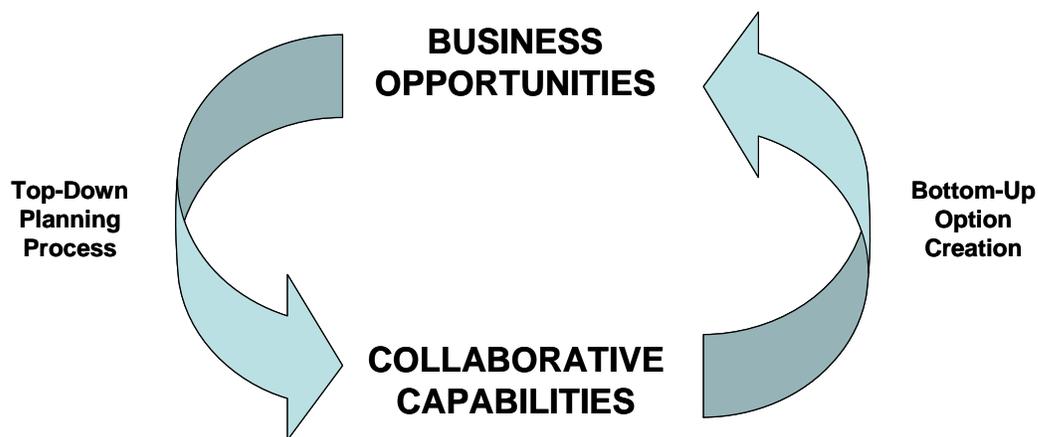
ambitious projects were tackled as skills increased. The focus was on assembling a pool of knowledge to aid *future* efforts, through post-mortems conducted with partners. Hence top performers set up systems to codify lessons learnt from past collaborations; and often linked partners into these systems to benefit from their broader collaboration experience.

INSERT VIGNETTE TWO: Building Collaborative Capabilities

A New Source of Competitive Advantage

Firms that devoted attention to the three areas above – strategy, organization, and capability development – were more successful in their collaboration efforts. For a few firms in our study however, these efforts not only lent support to their existing business strategies, but also led to *new* value creation opportunities. Their investments to build capabilities, in turn, created options to pursue strategies that could not be replicated by competitors; especially those that managed collaboration like outsourcing. For these firms, collaboration had become a source of competitive advantage (see **Figure 5**).

Figure 5: Collaborative Capabilities Create New Business Opportunities



A striking example of these dynamics was in Boeing's development of its 787 "Dreamliner" aircraft. Boeing builds the most complex commercial product in the world, each project being almost literally a "bet-the-company" experience. The levels of capital investment required and the increasing breadth of technologies that must be mastered – from digital cockpit design to new lightweight materials – have forced Boeing to look at new forms of organization, the aim being to share risk with partners while exploiting the unique technical expertise that each brings to development.

Boeing's approach to the 787 was the epitome of global collaboration. The project included over 50 partners from over 130 locations working together for more than four years. From the start, the aim was to leverage advanced capabilities from this network. For example, in technologies like composite materials, which are being used for the first time for large sections of the airplane, smaller more focused firms had developed expertise that was unique. Rather than replicate this expertise, the firm sought to tap into it, blending it with skills from other partners developing complementary technologies. Furthermore, the relationships it established were not the traditional "build-to-print" contracts of past years. Instead, partners *designed* the components they were to make, ensuring a seamless integration with the outputs of other partners.

In our view, Boeing's source of competitive advantage is shifting; it is less and less related to the possession of deep individual technical skills in hundreds of diverse disciplines. While the firm still possesses such knowledge, this is no longer what differentiates it from competitors such as Airbus, who can access similar capabilities.⁸ Rather, Boeing's *unique* assets and skills are increasingly tied to the way the firm orchestrates, manages and coordinates its network of hundreds of global partners. Boeing's experience is increasingly common across the industries we observed: Collaboration is becoming a new and important source of competitive advantage.

⁸ Boeing spun-off its Wichita plant in 2004, its biggest internal supplier of fuselages and nose cones (Source: *Business Week*, February 19th 2007). The new owners subsequently announced plans to begin selling to Airbus. Boeing's move seems illogical if you consider these technologies "core" to Boeing's competitive position. But it makes sense if you view Boeing's competitive advantage to come from the way that it selects and manages the work of its network of partners.

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VIGNETTE 1: Managing Intellectual Property

More than 200 people from one firm and its three partners were involved in developing software for a new system-on-a-chip design. Initially, all team members had access to the firm’s entire code repository, including much code unrelated to their own work. Realizing the risk of exposing a thousand person-years of code, the firm rethought its approach, creating role-based control so each partner could only access the IP it needed.

Business decisions were first made as to the IP required by each partner, and then each team member was assigned one or more products in one or more roles, each role having access to specific types of artifact (see **Figure V1**). For example, a “designer” might have access to market forecasts, product designs and prototypes. But a hardware tester might have access only to component specifications and prototypes. With this system, the firm exposed only the IP necessary for each partner to meet its goals.

Figure V1: Role-based IP Management

Artifact Type	Product / Version				
	Product A V1	Product A V2	Product B V1	Product B V2	...
Market Forecast	Designer	Designer			
Requirements			Designer	Designer	
Project Design	Designer	Designer	Designer	Designer	
Component Specs		HW Tester			
Prototype	HW Tester	HW Tester			
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VIGNETTE 2: Building Collaborative Capabilities

A major computer company had five global collaboration projects underway, working with two partners. Executives realized that each project was experiencing similar problems in project management, partner management, staff turnover and communication. Yet each was attempting to solve these issues on its own. With this insight, the company made strategic changes spanning all five projects.

- It created a Global Product Development Director responsible for oversight of all global projects. The Director instituted quarterly meetings where project sponsors and program managers shared their lessons learned. By establishing best practices, the company began institutionalizing its global collaboration skills.
- It developed a curriculum to train project managers on managing distributed teams and working in multi-cultural environments. It also arranged a product development methodology course to be taught to internal engineers and those of its partners.
- It implemented mechanisms to aid communication. For example, each partner placed a project manager liaison onsite. In turn, company project managers made more frequent visits to partners. The company began to emphasize staff continuity, securing engineers who had become skilled in its products for follow-on projects.
- It identified initiatives to make partner team members feel more valued. For example, it sponsored trips to the US for engineers, awarded certificates of achievement, and increased management visibility for senior technical staff. These efforts reduced partner staff turnover to 4% as compared to 20%+ on earlier projects.