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**MEETING THE PERFORMANCE CHALLENGE:
CALCULATING ROI FOR VIRTUAL TEAMS**

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Virtual teams are all the rage these days. The reasons for their prevalence are well known. But when does it make sense to operate virtually versus face-to-face (FTF)? Answering this definitely requires knowing what the costs and benefits of virtual teams are, i.e., their return on investment (ROI). It also requires understanding how virtual teams' objectives relate to the company's strategy.

At its core, ROI is a very straightforward concept. Evaluating ROI for a project simply means measuring the benefits relative to the costs. Yet, as with most things in life, the devil is in the details: calculating ROI in practice can be quite difficult to do. Despite this difficulty, or perhaps because of it, there is clear demand for tools to carry out the task. While ROI and related valuation concepts long have been applied to capital spending decisions, their use for teams is much more the exception than the rule.

This chapter presents a framework for applying ROI in the virtual-team context. ROI is typically calculated by comparing the benefits relative to the costs of one approach versus another. It can be done as a forecast or retrospectively. This chapter examines how to calculate ROI for virtual compared to FTF teams to determine the value of activities that have already occurred. We begin our discussion by explaining our rationale for these choices. We then describe the various outcomes, processes and design factors that may differ for virtual and FTF teams. Of primary importance is deciding which to include in an ROI calculation, and how to assign monetary values to them. Finally, we apply that framework using cases derived from three virtual teams, and discuss the usefulness of the ROI approach vis-à-vis the company's overarching strategy.

THE COMPARISON SCENARIO

What should the comparison scenario be when considering ROI for virtual teams? Do we want to know the ROI from working in a virtual team versus a FTF team? Do we want to know the ROI from work performed by a virtual team versus the work not happening at all? Are we looking to forecast what the expected ROI is as a resource allocation tool, or do we want to use ROI in a “backward-looking” sense to evaluate the worth of work already done for performance management and other purposes? These are not idle questions because the elements needed to determine ROI can differ significantly from one case to another.

Forward-Looking Versus Backward-Looking ROI

For forward-looking ROI, alternatives representing best case, worse case and most likely outcome scenarios should be considered for appropriate contingency planning. This means forecasting the different outcomes that are likely to occur, determining the costs and benefits that would occur in each case, and calculating a different ROI estimate for each scenario.

The details of how to conduct such forward-looking ROI are no different for virtual teams than they are for FTF teams, and are covered in detail elsewhere (see Levenson, 2002, for a discussion). So we focus our attention here on backward-looking, or retrospective, ROI – calculations that ask what value was derived from a team’s activities after they have already happened. That still leaves the question of looking at virtual team relative to FTF team ROI, or at virtual team ROI as a standalone concept. That distinction frames our discussion in the chapter.

Choosing Between Virtual and FTF Interaction

In many cases, operating FTF is not a viable option. Teams are put together with geographically dispersed members for a good reason, and it is either impractical or infeasible to co-locate everyone while the work is being done. The continued move toward globally organized work is one of the underlying trends that has helped foster the rapid spread of virtual teaming. In

such cases where team members are located in different continents, bringing them together for extended FTF work is either extremely expensive, or it means that they cannot perform their other non-team related responsibilities while away from their home base of operations, or both.

While operating FTF may be impractical except in rare circumstances for such teams, it turns out that operating virtually can be quite inefficient because of the difficulties of using electronically mediated communication and the current state of capabilities offered by technology. This is one of the reasons that kickoff FTF time is so critical for virtual team success (Duarte and Snyder, 1999). What emerges is not an either/or choice of doing the work entirely virtually or entirely FTF, but instead a continuum of choices over how much of the work on a given team will be done virtually v. FTF. In this sense, asking what the ROI is of operating virtually v. FTF is quite relevant, even for teams that are geographically dispersed across multiple continents. We discuss two such examples below of teams that occasionally met FTF with members from the United States and Europe. In those cases, managers balanced the coordination benefits of meeting FTF versus the travel costs.

When geographically dispersed team members reside in the same country, operating FTF is more of a viable option that should be considered carefully, not haphazardly. We discuss one such example below. In this case all of the members were located in the U.S., but the locations ranged from one side of the country to the other.

Of course ROI is only useful as an aid to decision making, not a substitute for it. The best-calculated ROI numbers mean little unless interpreted in the context of the firm's strategic objectives and resource allocation decisions over a range of different possibilities. It is for this reason that the ROI from operating more virtually v. more FTF may be the wrong focus in some settings. In these cases knowing the ROI from the team's activities relative to doing nothing at

all may be the most pressing concern. We take up this issue as well as we go through the case examples. But first, we consider ROI in the virtual v. FTF context.

IDENTIFYING BENEFITS AND COSTS

In order to calculate ROI, all of the most relevant costs and benefits have to be identified and quantified. To make the task of examining the benefits and costs of operating virtually versus FTF, we break them into three groups: objective business outcomes, subjective business outcomes, and design/input/process aspects. All of these have the potential to influence a virtual team's compared to a FTF team's ROI. We discuss first how to sort through each element's importance, and then how to prioritize which elements to focus on when conducting the ROI calculation with examples from each case.

Before launching into the discussion, it is important to put this in the context of the larger volume and the costs and benefits of virtual teaming. Our discussion is focused on the *costs and benefits that we think are best suited for considering virtual team ROI*, not all virtual team costs and benefits (broadly defined). Regardless, the research on virtual teams is emergent and ongoing. More importantly, which costs and benefits to consider for an ROI calculation depend heavily on the team's context, charter and stakeholders. As such, only some of the potential costs and benefits highlighted below likely should be considered for the ROI for any particular team.

Objective Business Outcomes

In order to make the task of calculating ROI manageable, we start by considering the team outcomes that are easiest to link to the bottom line. These outcomes are described in Table 7.1.A. They consist of cycle time/timeliness/productivity, quality, and customer satisfaction, all of which can be – and typically are – measured objectively.

Insert Table 7.1.A Here

Regardless of the type of team (work team, parallel team, management team, etc.), improving at least one of these outcomes is always an objective, whether direct or indirect:

- Cycle time/timeliness/productivity. Virtual teams often have more difficulty coordinating their work because of efficiency losses when communicating electronically. Thus productivity may suffer when not working FTF. One exception is when key work can be done asynchronously on a globally distributed team; in this case the asynchronous parts of the work can be done around the clock, with members in different time zones handing off the work to each other at the end of the local workday.
- Quality. There may be a tradeoff between productivity and quality when operating virtually. The same lack of proximity that causes productivity to suffer simultaneously might allow for better quality. This is because key team roles can be filled with the people best suited for playing those roles regardless of where they are located. The drawback is that coordination difficulties might lead the team to compromise on the quality of the output. Both the positive and negative impacts of virtuality on quality need to be considered when calculating ROI.
- Customer satisfaction. Similar to quality, customer satisfaction in the virtual setting may be higher because of the ability to staff the team with the best talent. In addition, the geographical dispersion of virtual teams means that key team members can be chosen for their proximity to important customers/stakeholders. But coordination difficulties have the potential to negate some or all of the benefits in terms of customer satisfaction. Again, for

proper ROI analysis, both the positive and negative impacts of virtuality on customer satisfaction need to be factored in.

Regardless of the organizational context, no one would argue about the importance of considering each of the outcomes in Table 7.1.A when calculating ROI for a virtual team. However, the same cannot be said for other types of outcomes that typically are associated with teams, and which might be considered as candidates for inclusion in team ROI. The basic problem, as discussed by Levenson (2002), is that traditional ROI calculations focus on benefits as measured by changes in net income or cash flow. Thus other benefits that indirectly impact the bottom line but do not generate a direct improvement in cash flow may be too subjective to measure for those who like “clean and simple” ROI calculations. Thus if the objective is a very conservative ROI calculation, perhaps only the outcomes in Table 7.1.A should be considered.

Subjective Business Outcomes

A fairly strong argument can be made that there are additional potential benefits and costs of a virtual team beyond those in Table 7.1.A. Table 7.1.B describes the leading candidates: creativity/innovation, organizational learning/diffusion of best practices, and the attitudes and longevity of the team members. The literature on teams (Cohen and Bailey, 1997) clearly demonstrates that each of these is an important team outcome that has the ability to significantly impact the bottom line.

The fact that the outcomes in Table 7.1.B are more difficult to measure objectively than the outcomes in Table 7.1.A does not diminish their importance. It does, however, influence the extent to which they can and should be included in ROI. We start here with a discussion of the potential costs and benefits associated with each of these in the virtual team context and then take up the issue of whether and how to include them in ROI later on. These outcomes are:

- Creativity and innovation. One of the most powerful benefits of teams in general is their ability to foster better creativity and innovation through cross-functional collaboration than is possible otherwise. Similar to the impact on quality (discussed above), the ability to include the best role players, regardless of where located, gives a virtual team a clear potential to produce new ideas that can transform the company to the benefit of the bottom line. However, stacked up against this potential is the drawback that creative teamwork is traditionally done FTF. Thus the virtual team benefits from including the best available talent, but often faces an unfamiliar learning curve when collaborating electronically.

Insert Table 7.1.B Here

- Organizational learning/diffusion of best practices. These include improved learning about both changes in the market for the company's products as well as how to best execute the intermediate processes necessary to create those products. Having geographically dispersed members means, once again, that the key role players needed can be included on the virtual team. But perhaps more important is the way that virtuality forces the members to interact with each other. Knowledge management foremost is about developing the capacity to share knowledge wherever it is needed throughout the organization. The main failing of knowledge management efforts is their inability to develop ways to effectively communicate relevant information across time and space. Because virtual teams rely on electronic and asynchronous communication much more than FTF teams, they are forced to try and solve those knowledge management problems in order to get their work done. Thus they have the potential to be much more successful at knowledge management. A large countervailing

force, however, is the fact that existing “off the shelf” knowledge management systems often are not well developed and/or utilized. So a virtual team may spend more time struggling with technology than using it productively. On the upside, the geographically dispersed interpersonal networks and relationships that are forged through working on a virtual team can increase organizational learning at least through the knowledge that the team members use subsequently in other tasks, whether done FTF or mediated electronically.

- Attitudes and longevity. One of the more important benefits of working virtually is the potential to increase commitment and loyalty fostered among team members who otherwise might be forced to relocate to achieve the team’s objectives. And, as discussed above, the relationships developed can be applied to later projects, assuming the extra effort is taken to build the relationships to begin with. The problem here is that the traditional forums for building relationships informally in a FTF context means that those relationships may never get formed in the first place. Even in cases where the team members run into difficulties forming good relationships while working on a given virtual team, the lessons learned might increase their capacity to be successful in future virtual teaming or other electronically mediated collaboration situations (thereby increasing the organizational capacity to develop such networks). On the downside, virtual team responsibilities may be more likely treated as add-ons to one’s “regular” job than FTF team responsibilities.

Design, Input and Process Aspects of Virtual Team ROI

In addition to the outcomes listed in Tables 7.1.A and 7.1.B, other sources of ROI (or lack thereof) include a number of design and process characteristics that distinguish virtual from FTF teams. These include travel costs, use of technology, training/coaching, leadership, communication/decision making, career development, and personnel and related support costs.

Table 7.1.C contains a summary of the issues involved in considering the contributions of each of these factors to virtual team ROI.

We discuss each:

- Travel/FTF meetings. One of the potential benefits of operating virtually is lower travel expenses. This can be a source of major cost savings for teams with geographically distributed members. However, managers often underestimate the amount of travel needed for maximal effectiveness.
- Technology. If managed properly, working virtually can encourage greater and more effective use of technology. The fact that members have to use technology to communicate pushes them to consider using technology in ways that might otherwise be ignored by team members who have little to no spare time for learning new systems. “Necessity is the mother of invention,” or, at least in this case, learning. Yet technology training often is treated as an afterthought, if done at all, so the expenses involved in learning new technologies are frequently underestimated, which can cause budget overruns.

Insert Table 7.1.C Here

- Training/coaching. Traditional ways of training FTF are more expensive to use and/or less efficient if not adapted properly to the virtual context. On the upside, if new ways of training and coaching virtually can be developed, they can be replicated at low cost.
- Leadership. Repeating the quality mantra, constructing a virtual team enables the selection of the best team leader (whether chosen by the team’s supervisors or self-selected by the team) regardless of location. Yet remote leadership poses a number of problems for effective

teamwork. This can be of particular concern if the leader is remote and a large portion of the rest of the team members are co-located (see case example below).

- Communication/decision making. There can be both positive and negative contributions from operating virtually. In some cases, communication and decision making may be best done in person; in other cases virtuality might improve effectiveness. Note that in cases where electronic communication is preferred (such as distributing a memo by e-mail), such options are available to FTF teams as well. Here we are talking about the ways that communication and decision making differ for FTF and virtual teams.
- Career development. Having the opportunity to participate in virtual teams should provide more opportunities to participate in critical organizational tasks. The experience gained could promote career development. Yet if the experience is gained via working with those who are not directly responsible for deciding on a person's advancement, then the "out of sight, out of mind" nature of this kind of virtual teaming might negate the positives gained from the work experience itself.
- Personnel/salary costs. There may be less efficient use of time overall in virtual teams (for the reasons discussed above), so the total personnel time costs may be greater than if the work were done FTF. One possible exception is for global virtual teams where the work can be done asynchronously around the clock. Note that this is a subtle distinction, however. When calculating the personnel costs, what should be included is the total time put into the project. If the total time is the same for a global virtual team, yet that team accomplishes key tasks in less calendar time because of asynchronous work done continuously over multiple time zones, then the team has faster cycle time, but no savings in personnel costs. In reality, though, if such a team is able to meet key deliverable deadlines in faster calendar time, it

likely can accomplish more tasks in the course of a year than a co-located team with the same number of members. In this sense their productivity is higher, which is the same thing as saying the personnel costs per unit of output are lower. Because FTF meetings happen less often, the time a virtual team spends in FTF meetings may be much more efficiently used than the typical FTF meeting for a co-located team.

- Admin and other support costs. A virtual team has more points of contact with different support functions that may be geographically dispersed within an organization. This increases the team's ability to access such resources. But if the team is not co-located with the key resources needed to support it, it may have difficulty getting appropriate and timely responses from support personnel. This can be an issue particularly in cases where the team leader is remotely located away from support functions that are centrally located.

CALCULATING ROI FOR VIRTUAL TEAMS

Having laid out the salient costs and benefits when considering ROI for a virtual team relative to a FTF team, we now turn to the ROI calculation itself. The basic definition of ROI is straightforward:

$$\text{ROI} = \text{B}/\text{C}$$

where B is the benefit and C is the cost. There are a number of critical challenges involved in calculating ROI. These include: coming up with monetary values for things that are difficult to quantify, forecasting ROI ahead of time, creating a confidence interval for the precision of the ROI estimate, and making the link back to the firm's strategy. Our discussion here builds on the framework used by Levenson (2002) to calculate ROI for teams in general.

What should be included in the ROI calculation?

- Only those costs and benefits that are “significant,” meaning they account for a large enough fraction of the total costs and benefits of the team’s work, should be included. The precise threshold to use depends on the team’s context, but, as a guide, Levenson (2002) suggests considering only those costs and benefits that account for at least five percent of the total.
- Additionally, how easy it is to figure out the magnitude and likelihood of realizing the costs and benefits of a particular virtual team outcome or process should be considered. If the likely magnitude is quite small, then it may not make sense to include that outcome or process in calculating ROI.

We cover how to do such prioritizing in the case examples below. But before launching into them, a word about calculating ROI for virtual v. FTF settings.

As pointed out above, there are two different ways to consider ROI for virtual teams: What is the ROI “in a vacuum,” that is, what is the virtual team’s ROI relative to doing nothing at all? What is the virtual team’s ROI relative to what a FTF team could accomplish? In both cases it is necessary to identify the true costs and benefits of the virtual team. Where the approaches differ is the baselines used for valuing those costs and benefits. One way to make the difference clear is to separate out the ROI for a team into two different components and express it in net present value terms:

$$NPV = NPV_{\text{ftf}} + NPV_{\text{vt}} = (B_{\text{ftf}} - C_{\text{ftf}}) + (B_{\text{vt}} - C_{\text{vt}})$$

Where NPV_{ftf} is the net present value (i.e., ROI expressed as a difference instead of a ratio) from doing the team’s tasks in a FTF (co-located) setting and NPV_{vt} is the additional value (positive or negative) from conducting the team’s activities in a virtual setting. In cases where it is impractical to think about operating FTF, this is equivalent to saying that NPV_{ftf} cannot be calculated, which reduces the NPV to being equivalent to calculating NPV_{vt} .

CASE EXAMPLES

We apply our ROI framework to three virtual teams that we studied:

- A scenario planning team for a consumer durables manufacturing company
- A new product development team comprised of members from a consortium of large vehicle manufacturers
- A team charged with integrating the purchasing departments and processes from two companies that had recently merged.

We discuss the first case in detail, and then briefly discuss the other two. We have changed certain identifying information to protect the anonymity of each company.

Case Example #1: Scenario Planning Team

Our first case is drawn from a virtual team charged with doing scenario planning for a consumer durables manufacturing company. The company has expanded globally in recent years, but the U.S. still accounts for a majority of sales. That fact and the need to design products that satisfy local cultural preferences means that scenario planning for U.S. product development is partially segmented from product development efforts targeted at other regions of the globe.

The products produced by the company have fairly long research, development and production cycles – this is not an industry where new variations within a given product line are rolled out every year. Thus scenario planning for how customer needs and tastes will evolve takes place over a five- to ten-year horizon. This particular team was charged with developing scenarios of how consumer lifestyles and preferences would evolve over that horizon in the U.S.

The seven team members were drawn from a number of different functions representing key stakeholders in the product development lifecycle. In terms of geographic dispersion, five of the members were located at corporate headquarters in a central part of the U.S. more than 800

miles away from either coast. The team leader and the seventh member were located on opposite coasts of the U.S., 3000 miles apart from each other. In addition, the team employed a consulting company to help in the scenario planning process; the consultant assigned to work with the team also resided far away from both company headquarters and the two remote team members.

Objective Business Outcomes. Table 7.2.A lists the objective business outcomes for this team. We discuss each in turn.

Insert Table 7.2.A Here

- Productivity. The team divided its work into two distinct parts. The creative brainstorming was done almost exclusively FTF at headquarters at regular intervals; the meetings held in the interim were conducted by telephone and were used primarily for process checks and setup for the FTF meetings. Thus the team minimized the inefficiencies inherent in telephone meetings by deferring much of the key work for the FTF meetings. Thus the virtual meeting inefficiencies resulted in relatively minor cost increases relative to doing all the work FTF.
- Quality. The stakeholders and other “consumers” of the scenarios created by the team seemed happy with the team’s output. However, it was not clear that the quality of the scenarios would have been much different had the team been located FTF. Quality might have suffered had co-location been required for all team members because the remote members, including the leader, could not have participated. Yet, the team’s choice to do the key creative work FTF meant that the vast majority of the work, including the planning and process time done over the telephone, could have been done FTF with about 4-8 additional

FTF meetings at headquarters. This would have significantly increased the travel costs, but not materially impacted the remote members' ability to meet their other responsibilities.

- Customer satisfaction. A key metric for this particular team is whether the scenarios ultimately are integrated into each business unit's product planning and development process. Therefore, it was quite important that the remote members took part because they represented key stakeholders/internal customers for the team, one of which would have no representation otherwise for a major business unit accounting for an entire product line for the company. This was a key benefit of the team's composition, which required geographic dispersion. On the downside, the fact that the leader was remote meant that other key stakeholders had less informal contact with him, which decreased implementation success.

Subjective Business Outcomes. Table 7.2.B details the subjective business outcomes for the scenario planning team.

- Creativity/innovation. The team clearly benefited from greater cross-functional representation enabled by the ability to tap members from geographically dispersed locations. The remote members also were able to bring in perspectives on the marketplace that were not immediately apparent to the team members residing at headquarters, away from the population centers on the two coasts of the country. These team members from different functional and marketplace perspectives engaged in a dialogue that stimulated creativity in their scenarios.

Insert Table 7.2.B Here

- Organizational learning/attitudes/longevity. These were among the most highly rated benefits that arose from the team's work. This took multiple forms: First, traditional team-related benefits from having cross-functional members work together were evident here. Thus working on the team greatly increased the chances for successful future collaboration among the members on other projects. Second, there was significant learning about how to operate virtually. There was almost unanimous agreement that if the team had to do a similar task virtually again, they would be much more efficient with structuring the virtual v. FTF work. These individual learnings positioned the team members as internal experts who could consult on virtual teaming efforts within the company, albeit informally.

Design, Input and Process Issues. Table 7.2.C contains the remaining ROI issues for the scenario planning team. Key highlights include:

- Technology. This was much more of an impediment to than facilitator of team effectiveness.
- Training. The team incurred significant up-front costs by taking a field trip to evaluate potential consulting partners to employ in the scenario planning work. This greatly increased out-of-pocket costs for travel and the implicit costs of team-member time. But it helped build a strong foundation of shared understanding and common language among the members, which positively impacted the subjective business outcomes (Table 7.2.B).
- Leadership/communication/decision making. In addition to the coordination and lack of access to headquarters-based stakeholders issues created by the remote leadership, there was an additional cost as well – inefficiencies created by an informal leadership style. The team leader and company culture were used to consensus building through open conversation, something that is hard to achieve in a virtual setting. This tendency toward informal

leadership styles needs to be counteracted by explicit planning to create the conditions needed to facilitate such interactions in a virtual setting, something this team did not do.

Determining ROI. Having detailed all the possible costs and benefits to be considered for this team, the next step is to determine what to consider for the team's ROI calculation. The ROI questions include:

Insert Table 7.2.C Here

- What was the ROI to operating as virtually as the team did? Should they have tried to do more work virtually? More work FTF?
- Taking the degree of virtuality as given, what was the ROI from the team's efforts, relative to what the organization would have achieved otherwise?

Taking the second question first, the team's output was clearly important in the company's long-run strategic product-planning process. Senior management were committed to scenario planning as a way to ensure that they properly considered different states of the world that could fundamentally impact the very survival of the company in a competitive environment. Thus, so long as the team's scenarios raised top management's awareness of the possibilities and helped them make better-informed decisions, then the upside potential benefits from the team's efforts were extremely large. However, those benefits would only be realized many years later, long after the team completed its work, and they would only be realized in a diffuse way as they interacted with lots of other inputs in the research, development, production and marketing

processes. Thus assigning monetary values to the team's output based on expected changes to the bottom line was not feasible without resorting to wild guesswork.

What about the other potential benefits from the team operating the way it did? Tables 7.2.A – 7.2.C list a number of other benefits that the team indicated were potentially significant (those with two or three check marks), including greater implementation success, marketplace adaptability, more cross-functional and better organizational learning, and better attitudes on the part of the remote members. In the cases of implementation success and marketplace adaptability, these also were best assigned monetary values by the team's supervisors. The positive impacts on learning and member attitudes should not be minimized. But from an ROI standpoint, it is quite difficult to draw a direct link from these to the bottom line.

In such cases there is a natural inclination to abandon ROI because it is too difficult to calculate the direct monetary benefits. Levenson (2002) suggests an alternative approach: take the issue directly to the stakeholders for further input. The question to ask is, "How much would you be willing to pay for the output [the scenarios] that the team produced and the ancillary benefits [better learning, attitudes]?" If the answer exceeds the costs, then the team produced positive ROI (i.e., an ROI ratio that is greater than one, NPV that is positive).

When working with this team, we did not attempt to ask this question of the stakeholders. But that does not diminish the importance of the communication exercise. Instead of forcing the stakeholders to reveal their valuation of the team's output – a tricky political situation in most cases – the team could produce complete cost estimates and give those to the stakeholders as input for calculating ROI. The stakeholders would then have all the information needed to decide how to reward the team based on the cost measures and their own subjective evaluation of the benefits. They would also then be well positioned to use that information when making future

resource allocation decisions in related scenario planning and virtual teaming situations. In other words, the stakeholders would be able to reap all the benefits that calculating ROI is supposed to produce without forcing the team to produce questionable estimates of the monetary value of the scenarios' benefit to the organization, something better left to the stakeholders themselves.

Take Advantage of Existing Data to Assign Monetary Values

There are other possibilities for assigning monetary value to the benefits. An organization that culturally puts a high value on learning may already have in place initiatives explicitly designed to achieve improved cross-functional collaboration and learning. If the team members were able to compare the expected future learnings from their scenario planning with the efforts that the other learning initiatives hoped to achieve, they might be able to assign a monetary value based on the budgetary dollars being spent on the latter initiatives.

Similarly, drawing a link between improved attitudes and future turnover and advancement is difficult but not impossible to do. It is not cost effective for the team members to conduct an entire study of such links within the organization simply to assign a monetary value to those benefits and the ROI derived from working on the scenario planning project. But organizations often already have such estimates available from prior efforts. Where available, the team members can use those results to project what the bottom line value to the organization of increased commitment/loyalty will be in terms of reduced turnover and internal promotion.

In this particular case, though, no such separate estimates were available that could have allowed the team members to assign monetary values to the improved learning and attitudes. Thus we are left with only those benefits best valued by the team's supervisors. In cases like this where the stakeholders are best suited to value the team's output because of high degrees of subjectivity, the team's role in helping to calculate ROI may lie solely in producing cost estimates. This is still an important and challenging task because the team members are best

suited to determine how much implicit resources were spent in terms of their own time and the unbudgeted time of other departments and support staff. Of course, they may feel inclined to misreport the costs – overestimating in cases where there is pressure to show that the project was worthless, underestimating in cases where their own rewards depend on demonstrating positive ROI. But these incentive problems exist in all ROI calculations.

The subjective nature of virtual team ROI is one reason why those accustomed to thinking about ROI only in terms of impacts on net cash flow might shy away from the methodology we describe here. Yet such critics cannot hide behind the supposed objectivity of cash-flow estimates. It is widely acknowledged that managers frequently manipulate budgetary revenue and cost numbers to meet cash-flow and profit-performance goals. Indeed, such behaviors have contributed to the downfall of entire companies such as Enron and Global Crossing. All ROI estimates, whether based on traditional cash-flow measures or the newer approach we use here, must be viewed as inherently subjective and susceptible to manipulation.

The ROI from Operating More or Less Virtually

Going back to the ROI options available to the scenario planning team, the team itself was much better positioned to answer the first set of questions: What was the ROI to the team functioning as virtually as it did, as opposed to more virtually or more FTF? This is a much more manageable task because it appeared that the benefits from the team's efforts – the scenarios – likely would have been the same under alternative degrees of virtual work. The team members indicated that the quality of the scenarios would not have differed had they been co-located. The main difference in their eyes was that they would have been able to meet the project deadlines without as much time and effort needed. Thus their time would have been used more effectively.

Of course, the downside to doing more of the work FTF would have been greater travel costs, which counteract the implicit cost savings from less time spent on the project. Thus it is

impossible to say ahead of time how the ROI from operating more FTF compared to the ROI from doing the work the way the team did. Consider again the different components of ROI that can be calculated for questions such as these, expressed in net present value terms:

$$\text{NPV} = \text{NPV}_{\text{ftf}} + \text{NPV}_{\text{vt}} = (\text{B}_{\text{ftf}} - \text{C}_{\text{ftf}}) + (\text{B}_{\text{vt}} - \text{C}_{\text{vt}})$$

Asking whether the team would have had greater ROI in a strictly FTF collaboration setting is equivalent to asking whether NPV_{vt} is greater or less than zero, i.e., whether the additional marginal benefit from operating virtually exceeds the additional marginal costs ($\text{B}_{\text{vt}} > \text{C}_{\text{vt}}$). But we already stipulated that the additional benefit to operating virtually was zero ($\text{B}_{\text{vt}} = 0$) in this case because the team believed that the quality of the scenarios would have been no different.

What about the other potential benefits from operating virtually? Because the team had (and exercised) the option to operate more FTF when it seemed critical to do so, the positive outcomes listed under the first column in Tables 7.2.B and 7.2.C were not really benefits from operating virtually. Rather, they instead represented benefits from putting together a geographically distributed team that, in turn, had the option to vary the degree to which it operated virtually. Thus determining whether the gain in NPV terms from operating virtually was positive or not comes down to evaluating whether the net change in costs from operating virtually is less than zero ($0 > \text{C}_{\text{vt}}$). If yes, then the team realized positive marginal ROI.

So which costs should be included in that calculation? Again, we consider only those that could be attributed to the team with a degree of certainty, and which were large enough to account for a significant fraction of the costs incurred by the team. In Tables 7.2.A – 7.2.C these include the extra travel costs incurred from operating FTF (including the “on-the-road” team-building), the money wasted on web technologies that were never used effectively, and remote leadership and meeting inefficiency problems. The latter, however, arguably should be excluded

from inclusion as additional marginal costs from operating virtually in this case. Why? Because we are comparing the degree of virtual operation the team used with the alternative of even more FTF collaboration with the same geographically dispersed members.

Had the scenario planning team shifted the work that was done virtually to being done entirely FTF (while maintaining the same membership), that would have necessitated more travel time by the remote members. So the savings in time to make decisions because of virtual meeting and remote leadership inefficiencies would have been counteracted by increased time for travel to the FTF meetings. While these offsetting effects may not have been precisely equal, our sense is that they were close enough to not warrant figuring out which one might have marginally exceeded the other. We are thus left with the extra money spent on travel costs that would have occurred with the extra FTF meetings weighed against the money that would have been saved on the wasted web technologies. If the former exceeds the latter, then the team exhibited positive marginal ROI from operating with the degree of virtuality that they did.

Thus in this case we are able to reduce the ROI calculation for choosing to operate more or less virtually into a simple comparison of two different out-of-pocket cost estimates. But by now the reader should be well aware of the danger in taking that simple inequality at face value. What if it turns out that the estimated additional costs were a negative \$5,000, i.e., the saved travel costs from operating less FTF exceeded the wasted web technology costs by that amount? Is this a “clear win” for their choices? From a performance management standpoint, the answer is probably yes. But from a strategic planning standpoint, we do not have enough information to answer that question.

Suppose the entire costs incurred by the team amounted to \$100,000 in out-of-pocket costs and \$200,000 in implicit time costs for the team members and others who provided services

that supported their work. We could express the marginal ROI from operating virtually in this case as the marginal cost savings over the total project costs: $5000/300000 = 1.67$ percent. This is a very low ROI under normal circumstances that would compare ROI to a hurdle rate that all capital spending projects must exceed in order to justify the cost of capital (i.e., cash).

Note, though, that this is a very conservative ROI estimate. In particular, all the potential benefits that above we deemed too difficult to assign monetary values to are implicitly assumed to be zero. Thus, even when asking what the ROI from a team's past actions was ("backward-looking" ROI), we still have to wrestle with issues of forecasting future events. In this case, the two leading issues are organizational learning and better team-member attitudes. The conservative, worst-case scenario approach might assume zero future bottom line value from the team's efforts on these points. But more optimistic scenarios would do otherwise.

Consider again the benefits from increased organizational learning. Suppose the team forecasted that the insights on virtual teaming gleaned from their work on the scenario planning project meant that they expected future virtual teaming efforts would run more smoothly (in terms of more efficient meeting times, better use of web technologies, etc.). As this organization has been moving to do more and more virtual teaming out of perceived necessity, there is a generally recognized need to improve virtual teaming skills throughout the company. One way to value the monetary benefits from the potential learnings would be to compare them to the insights that would be gained from hiring an outside consultant to facilitate a workshop or series of learnings on virtual teaming. The potential money saved from not having to hire someone in from outside could be used to value the organizational learning produced by the team's work.

Similarly, external estimates of the link between improved attitudes and reduced turnover and recruitment costs could be used to assign monetary values to the benefit the team's work

generated vis-à-vis increased loyalty and commitment on the part of the remote members.

Suppose that the team goes through these exercises and arrives at potential benefits of \$25,000 for organizational learning and \$10,000 for improved attitudes. They also recognize that the chances of each of these occurring differ significantly.

Let us assume that in talking to the HR department, the team discovered that hiring an outside facilitator to give a workshop on virtual teaming was slated to likely occur in the next fiscal year. They then assign a 50 percent probability of realizing the \$25,000 cost savings from not hiring that facilitator. This probability reflects both (a) the uncertainty over whether the facilitator would have been hired to begin with, and (b) their belief that the facilitator would have produced a workshop format better suited for disseminating the virtual team collaboration learnings than they designed on their own.

In contrast, the team assigns only a 10 percent probability of achieving the expected \$10,000 cost savings from improved attitudes. This reflects the fact that the remote team members were not likely to quit had they been forced to do more travelling to do all the team's work FTF.

Putting these together with the earlier cost estimates, we get a very different picture of the team's ROI from operating virtually. One way to combine the different estimates is to do a "probability weighted" ROI calculation. Assuming that the team estimates a 100 percent chance of achieving the originally estimated \$5,000 cost savings, we have

$$\text{Probability weighted NPV} = \$5,000 + (\$25,000) \times (.50) + (\$10,000) \times (.10) = \$18,500$$

This yields an ROI of 6.17 percent, much higher than the estimated 1.67 percent from the cash flow cost savings estimate that considered only travel and web technology costs.

Viewed yet another way, the ROI when including the organizational learning and improved attitudes benefits can seem even higher. The advantage of the probability weighted ROI is that it averages expected future benefits over different scenarios that may or may not occur (which is reflected in the estimated probabilities). The disadvantage is that, in many ways, it reflects a state of the world that will never occur. For example, if the organizational learning benefit is realized, then the bottom line boost to the organization will be the full \$25,000, not the 50 percent smaller value used when calculating the NPV (\$12,500).

One way to account for these different scenarios that makes the link between the estimated probabilities and the ROI calculations more transparent is by using a reporting format like Table 7.3. Note that in the final row we have applied the reasonable assumption that the probability of achieving both the organizational learning and improved attitudes benefits is lower than the chance of achieving either benefit on its own.

Insert Table 7.3 Here

The numbers in Table 7.3 underscore why ROI, even when carefully calculated, at best is an aid to careful decision making, not a substitute for it. Table 7.3 has four different ROI estimates, all of which are reasonable under different scenarios of how events will unfold after the team finishes its work, ranging from 1.67 to 13.3 percent. In addition there is the probability weighted ROI estimate of 6.17 percent. There is no particular reason, without further information on the firm's strategy and budget allocation decisions, to rule any of these estimates out. Instead, the entire range of ROI estimates is best presented to the team's stakeholders in its entirety.

This discussion has highlighted the complexities involved in both calculating ROI and interpreting it in the virtual team context. We now consider two other virtual team cases whose details differ considerably from the scenario planning team. In the interest of space, our discussion will be less detailed, focusing only on the key aspects that contrast with the first case.

Case #2: Large Vehicle Production Alliance R&D Team

Our second case is a consortium of large vehicle manufacturers from the U.S. and Europe that used a virtual team to design the next generation vehicle. Dividing production process into discrete parts and subcontracting the separate pieces out to different manufacturers is nothing new. But having the design team from the different companies convene virtually is. This enabled the company taking charge of the consortium much greater flexibility in choosing the best subcontractors for the project, regardless of geographic location of their lead R&D personnel.

The two biggest concerns facing the consortium were whether the virtual team members could work effectively together, and whether the consortium could convince potential customers that this new approach to design would produce a vehicle as reliable as what their competitors were offering. Because the scope and volume of production are determined jointly with key large customers in this industry, the commitment of customers to purchase a new vehicle is crucial to its financial success.

Insert Table 7.4.A Here

Table 7.4.A details the objective business outcomes for this team. The subjective business outcomes are in Table 7.4.B, and the design, input and process issues are in Table 7.4.C. Unlike the case of the scenario planning team above, it is very straightforward to

determine whether the design team produced large enough ROI for consortium. While the team experienced a number of technical difficulties associated with virtual teaming that impeded their effectiveness, they delivered a design good enough to win a large number of orders for the new vehicle. Thus, the return on investment to the consortium from using the virtual team was very high.

One reason why the ROI calculation does not necessarily need to go any further in this case is because the virtual team's charge was delivering a design that would win enough initial orders to make their efforts worthwhile. Yet the ROI from virtual teaming in this case goes deeper because of the learnings subsequently applied during the vehicle production process.

Insert Table 7.4.B Here

One of the more interesting benefits was the insights gained into effective use of new technologies for vehicle design. Because of the enormous costs involved in creating and testing a prototype production process, it is much more economical if manufacturers can do a complete markup of the finished vehicle electronically before starting to produce a prototype. Working out design flaws electronically provides the potential for enormous cost savings from avoiding errors that traditionally are discovered only after millions of dollars of costs have been incurred.

Insert Table 7.4.C Here

In this case, the team used a cutting-edge design tool to do a complete electronic markup of the vehicle. While this created additional computer security costs, those were more than offset

by the reduced relocation costs incurred during the design phase. More interestingly, use of the technology changed the dynamic between team members that is typical on new product development teams: the use of virtual technologies to resolve design disagreements made them less personal and more “task-based.” This enabled more objective decision making, which reduced the cost of conflict and allowed the team to focus much more effectively on the goal of producing the best product to fit both customer needs and business/technology constraints.

Insert Table 7.5.A Here

Case #3: Post-Merger Integration Team

Our third case comes from a team charged with identifying efficiency gains from integrating the purchasing departments from two companies that recently merged. The merging companies had headquarters in Europe (a non-native English speaking country) and the U.S. The team was equally balanced with representatives from both.

Insert Table 7.5.B Here

From the most basic bottom-line perspective the team returned significant ROI, finding cost savings of almost \$100 million. On this score alone the team produced more than enough

benefits to justify their cost of working together. Yet, from a performance management standpoint, the savings identified might have consisted only of “low-hanging fruit,” meaning that a more effective team might have identified even greater cost savings. Their high degree of inefficiency in terms of virtual team processes and rework suggest this may be the case.

Insert Table 7.5.C Here

Yet the team’s inefficiencies around virtual team meeting practices provided a potential silver lining to the organization in terms of future benefits. One key benefit centered around developing cross-cultural norms about the use of e-mail, a problem area that caused enormous miscommunication and rework for the team. A second benefit was the relationships forged between individuals on different continents who likely would work together on future projects.

Putting It All Together

As our discussion has shown, ROI can be used to evaluate team performance in both a relative and absolute sense, and to inform strategy and resource allocation decisions.

- In an absolute sense, both the vehicle design and merger integration teams provided significant ROI to their organizations. In contrast, it is too difficult to say for sure what the bottom line impact of the scenario planning team was because of the diffuse nature of the impacts generated by their deliverables.
- In a relative sense, it appears that the scenario planning and vehicle design teams provided higher ROI than the merger integration team. By this we mean that the former teams’

accomplishments probably came much closer to the maximum that could be achieved under ideal circumstances. The latter, in contrast, exhibited clear inefficiencies that inhibited optimal performance. Note that we reached this conclusion from the team members' qualitative assessment of their performance as a virtual team (detailed in the tables), not a numerical calculation of ROI. Trying to forecast what a team's ROI would be under ideal circumstances is difficult and time consuming, making it impractical to do so in most cases.

- The precision with which the ROI estimates need to be calculated for the vehicle design and merger integration teams is much less than for the scenario planning team. The contribution of the former teams' output to the company's bottom line is extremely high. Just as important, both teams' goals satisfied key strategic imperatives at the heart of their companies' ability to remain competitive. Had they failed there would have been immediate negative consequences for the bottom line; having a rough estimate of the virtual teaming costs needed to achieve the substantial expected benefit was sufficient ROI calculation. The scenario planning team also was focused on a key strategic issue, but one with few immediate negative downside impacts on the bottom line. Hence it was subject to much more budgetary scrutiny, creating the need for more precise ROI estimates.

CONCLUSION

Our discussion has highlighted a number of different issues that are important when considering virtual team ROI. First, it is critical to recognize the distinction between forward looking and retrospective ROI. Retrospective ROI is easier to calculate. Yet it suffers a generalization problem: after the fact it can be quite difficult to assess to extent to which a team was successful because of its own efforts versus random luck (i.e., events and forces external to

the team's control that evolved in a favorable way). This is why forward-looking ROI is more useful as a decision making and resource allocation tool.

Second, asking what the ROI of a virtual team is requires an assessment of why the virtual team exists to begin with. In some cases, there are members who represent different geographically dispersed parts of the organization, parts that have to be represented among the core team members because of the information they possess and/or stakeholders involved. In other cases there are people with particular expertise who would not work for the organization if they were forced to move to where the bulk of the other members live (consultants, independent contractors, telecommuters).

One way to recast the virtual team ROI question is to think about the hypothetical example of leaving out a team member with key business unit, divisional or functional knowledge, or links to stakeholders. What does excluding that person do to (a) the ability to accomplish the team's goals, (b) the ability to get the team's recommendations adopted, assuming the goals are accomplished, and (c) the costs needed to achieve both of these? If the answer is, "the work could never be accomplished," then asking the question of virtual versus FTF work ROI is not the right question. Instead, one would have to revert to standalone ROI, and relate the issue back to the team's mission and the company's strategy.

Recommendations for Practitioners

- Use forward-looking ROI for resource planning and strategic decision making.
- Use backward-looking ROI for performance management.
- A range of different scenarios should be considered when forecasting ROI.
- Virtual team ROI can be calculated relative to doing nothing at all (ROI "in a vacuum"), or relative to doing more of the work FTF.

- Include all relevant costs and benefits, but only those large enough to account for a significant fraction of the total.
- Both objective and subjective business outcomes should be included whenever feasible.
- Design, input and process aspects of virtual team ROI should not be ignored, though they may be too hard to quantify in some cases.

CHAPTER 7 REFERENCES

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TABLE 7.1.A

**IDENTIFYING THE BENEFITS AND COSTS OF A VIRTUAL TEAM RELATIVE TO
FTF TEAM FOR THE PURPOSE OF CALCULATING ROI – OBJECTIVE BUSINESS
OUTCOMES**

	Potential benefits from operating virtually	Potential costs from operating virtually
Cycle time/ timeliness/ productivity	If globally distributed and work can be done asynchronously, then can work around the clock	May be harder to coordinate and accomplish team's objectives when not FTF
Quality	Geographical dispersion means can include the best experts wherever they are located	Will team settle for second best outcome because too difficult to coordinate?
Customer satisfaction	Geographical dispersion allows closeness to multiple customers	Coordination problems can lead to lower customer satisfaction

TABLE 7.1.B

**IDENTIFYING THE BENEFITS AND COSTS OF A VIRTUAL TEAM RELATIVE TO
FTF TEAM FOR THE PURPOSE OF CALCULATING ROI – SUBJECTIVE BUSINESS
OUTCOMES**

	Potential benefits from operating virtually	Potential costs from operating virtually
Creativity and innovation	Geographical dispersion means can include best experts wherever they are located; multifunction input may be easier to obtain	Creativity may suffer when team members have to figure out how to collaborate in unfamiliar setting
Organizational learning / diffusion of best practices	<p>More functions and stakeholders possible, so greater diffusion of learnings from the team's work</p> <p>The interpersonal networks that are developed can increase the capacity for learning from future activities, not just the current team's work</p> <p>Greater use of electronic communication, which is the first step in knowledge management</p>	Knowledge management systems often are not well developed, so may spend more time struggling with technology than using it productively
Attitudes / Longevity	<p>Sometimes allows teams to avoid forced relocation away from home, which increases employee satisfaction</p> <p>Increases understanding of how to work with people across distances and develop relationships that are mediated electronically</p> <p>The relationships developed can be applied to later projects, assuming the extra effort is taken to build the relationships to begin with</p>	<p>Lack of traditional forum for building relationships informally means they may never get formed</p> <p>Virtual team responsibilities may be treated more as add-on than FTF team responsibilities</p>

TABLE 7.1.C

**IDENTIFYING THE BENEFITS AND COSTS OF A VIRTUAL TEAM RELATIVE TO
FTF TEAM FOR THE PURPOSE OF CALCULATING ROI – DESIGN, INPUT AND
PROCESS ISSUES**

	Potential benefits from operating virtually	Potential costs from operating virtually
Travel / face-to-face meetings	Reduce FTF costs by operating virtually	May underestimate travel needed for effective performance
Technology	If managed properly, working virtually can encourage greater and more effective use of technology – driven by necessity	If advanced planning is minimal, expenses may be underestimated
Training / coaching	If new ways of training and coaching virtually are developed, they can be deployed at low cost in other settings	Traditional ways of training FTF more expensive to use, less efficient in virtual context
Leadership	Often able to choose the best person regardless of location	Leadership effectiveness may be hindered by lack of proximity to other team members
Communication and decision making	May have more efficient use of electronic forms of communication	Some types of communication and decision making may be harder to facilitate in the virtual context
Career development	More opportunities to participate in critical tasks, gain relevant experience	“Out of sight, out of mind” might limit career advancement
Personnel / salaries	FTF meeting time may be more focused, more efficiently used	May be less efficient use of time, so total time costs may be greater Possible exception: global teams where work can be done asynchronously around the clock
Admin and other support	More points of contact with different support functions in the organization that may be spread out	FTF interaction by leader may be crucial when dealing with admins and IT support personnel

TABLE 7.2.A

OBJECTIVE BUSINESS OUTCOMES FOR CONSUMER DURABLES SCENARIO

PLANNING TEAM

	Benefits from operating virtually	Costs from operating virtually
Cycle time/ timeliness/ productivity		✓ Meeting and telephone conference inefficiencies resulting in possible lost productivity
Quality	✓✓ Customer surrogates in workshops rated scenarios helpful Not clear that the outcome had anything to do with operating virtually	
Customer satisfaction/ implementation success	✓✓ Team design with multiple stakeholders means more likely that new product development ideas generated from scenario planning would be implemented	✓ Less informal stakeholder contact by remote leader resulting in lower probability of implementing the ideas generated

Key:¹ ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

¹ We made these evaluations of likely economic impact based on data from our interviews of team members and stakeholders. Thus they represent a subjective assessment of the impact of each cost and benefit on the bottom line.

TABLE 7.2.B

SUBJECTIVE BUSINESS OUTCOMES FOR CONSUMER DURABLES SCENARIO

PLANNING TEAM

	Benefits from operating virtually	Costs from operating virtually
Creativity and innovation	<p style="text-align: center;">✓✓</p> <p>Team dispersion enabled greater inputs and creativity beyond benefits created by cross-functional composition of team</p> <p>Greater marketplace adaptability</p>	<p style="text-align: center;">✓✓</p> <p>Team reserved all creative brainstorming work for FTF meetings</p>
Organizational learning / diffusion of best practices	<p style="text-align: center;">✓✓✓</p> <p>General managers could include more functions and stakeholders on team</p> <p>Wanted better organizational learning and potential diffusion of ideas</p> <p>New relationships among team members suggest greater productivity on future projects</p>	<p style="text-align: center;">✓</p> <p>Multiple failed attempts with different knowledge management systems</p>
Attitudes / Longevity	<p style="text-align: center;">✓✓</p> <p>The two remote members definitely appreciated not having to relocate</p> <p>Positive benefit in terms of working together in future</p>	

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

TABLE 7.2.C

DESIGN, INPUT AND PROCESS ISSUES FOR SCENARIO PLANNING TEAM

	Benefits from operating virtually	Costs from operating virtually
Travel / face-to-face meetings		✓ Geographic dispersion: extra trips
Technology		✓✓ Design of a web-based system that was not used due to team member resistance and lack of training
Training / coaching		✓✓ Additional costs for “on-the-road” team-building; in part a response to the geographic dispersion of team
Leadership		✓✓ Distant leadership created some inefficiencies; informal style of leader conflicted with needed added planning to overcome virtuality weaknesses
Communication and decision making		✓✓ Not everyone informed about decisions made at main corporate site
Career development	✓ Knowledge and skills increased for team members working with those from other functions located elsewhere; additional learning for members due to geographic dispersion from contact with outside designers and customers	
Personnel / salaries	✓ FTF meeting time more focused, more efficiently used	✓✓ Extra time costs of inefficient distant leadership
Admin and other support		✓ Added administrative costs created by distant leadership

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

TABLE 7.3

THE RANGE OF EXPECTED BENEFITS FROM THE SCENARIO PLANNING

TEAM'S WORK

Factors included in ROI calculation	Chance of achieving the results	Estimated NPV and ROI, conditional on the results being achieved
Travel and web technology costs only	100%	\$5,000 NPV 1.67 percent ROI
Travel and web costs plus organizational learning	50%	\$30,000 NPV 10 percent ROI
Travel and web costs plus improved attitudes	10%	\$15,000 NPV 5 percent ROI
Travel and web costs, organizational learning, and improved attitudes	5%	\$40,000 NPV 13.3 percent ROI

TABLE 7.4.A

OBJECTIVE BUSINESS OUTCOMES FOR VEHICLE R&D TEAM

	Benefits from operating virtually	Costs from operating virtually
Cycle time/ timeliness/ productivity	<p>✓✓</p> <p>Productivity benefits from implementing the best of the cost savings ideas from each partner</p> <p>Time zone differences between partners create allow for “round-the-clock” work and lowered cycle time</p> <p>Productivity increased by decreased coordination costs</p>	<p>✓✓</p> <p>Coordination difficulties due to geographic dispersion add time and costs to development effort</p>
Customer satisfaction	<p>✓✓✓</p> <p>Customers sufficiently satisfied to award contract</p>	

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

TABLE 7.4.B

SUBJECTIVE BUSINESS OUTCOMES FOR VEHICLE R&D TEAM

	Benefits from operating virtually	Costs from operating virtually
Creativity and innovation	<p style="text-align: center;">✓✓✓</p> <p>Specialized expertise of each partner applied to development effort; for example, metal composites expertise</p>	
Organizational learning / diffusion of best practices	<p style="text-align: center;">✓✓✓</p> <p>Best practices diffused – in terms of both what was developed and the processes, technology used</p>	
Attitudes / Longevity	<p style="text-align: center;">✓✓</p> <p>Ability to remain at home and work on project builds employee satisfaction</p> <p>Apply learnings and the relationships developed to future projects</p>	

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

TABLE 7.4.C

DESIGN, INPUT AND PROCESS ISSUES FOR VEHICLE R&D TEAM

	Benefits from operating virtually	Costs from operating virtually
Travel / face-to-face meetings	<p style="text-align: center;">✓✓✓</p> <p>Extremely large co-location costs if FTF; limited to key personnel for specific time periods</p> <p>Avoid large travel costs for key personnel not co-located</p>	<p style="text-align: center;">✓✓</p> <p>Still have travel costs for key FTF meetings but virtual technology reduces the number need</p>
Technology	<p style="text-align: center;">✓✓✓</p> <p>Large investment in technological infrastructure</p> <p>Additional costs imposed by virtuality: features to integrate the work across organizational and national boundaries; greater technical support; firewall and security costs</p>	
Training / coaching	<p style="text-align: center;">✓✓</p> <p>Training needed on common systems and processes; communications and information technology for collaborative work; team-building and cultural awareness; working virtually</p> <p>Most of the training costs would have had to been incurred even if the development team from the different partner organizations was co-located; much more of a cross-organizational than virtual collaboration issue</p>	
Communication and decision making	<p style="text-align: center;">✓✓</p> <p>Appropriate processes need to be negotiated among partners</p> <p>Organizational and cultural differences create communication mishaps</p> <p>One clear benefit of virtuality: Use of virtual technologies to resolve design disagreements make them less personal and more “task-based,” reducing the cost of conflict</p>	
Admin and other support		<p style="text-align: center;">✓</p> <p>Distributed model might require more administrative support</p>

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

TABLE 7.5.A

OBJECTIVE BUSINESS OUTCOMES FOR POST-MERGER INTEGRATION TEAM

	Benefits from operating virtually	Costs from operating virtually
Cycle time / timeliness/ productivity	<p>✓✓✓</p> <p>Achieved shared cost savings goal of 94 million (but may have been low-hanging fruit)</p> <p>The cost savings could likely have occurred without operating virtually, but close collaboration between partners driven by shared strategic focus</p>	<p>✓✓</p> <p>Meeting inefficiencies</p> <p>Lack of follow-through between meetings created time delays</p> <p>Limits to obtaining volume cost advantages created by decentralized purchasing decisions and lack of integrated system between partners</p>
Quality	<p>✓✓✓</p> <p>Commodity experts from each partner organization work together virtually to develop best practices</p>	<p>✓✓</p> <p>English language fluency an issue, particularly at operational levels</p>
Customer Satisfaction	<p>✓✓✓</p> <p>Geographic dispersion enabled expertise to be located close to the customer base</p>	

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

TABLE 7.5.B

SUBJECTIVE BUSINESS OUTCOMES FOR POST-MERGER INTEGRATION TEAM

Creativity and innovation	<p style="text-align: center;">✓✓</p> <p>Best expertise from both partner organizations applied to procurement issues</p>	<p style="text-align: center;">✓✓</p> <p>Limited face-to-face time and the pressure to achieve quick savings limited creativity</p>
Organizational learning / diffusion of best practices	<p style="text-align: center;">✓✓</p> <p>Substantial learning about the procurement processes in both organizations</p> <p>The relationships developed between counterparts (those from each organization working on the same commodity) could be applied to future commodity issues</p> <p>Greater use of e-mail and adoption of 24-hour response norms to facilitate virtual effort</p>	<p style="text-align: center;">✓✓</p> <p>The lack of shared IT systems and the need to develop a procurement knowledge management system limited diffusion of practices</p>
Attitudes / longevity	<p style="text-align: center;">✓✓</p> <p>Relationships developed across national cultures and language barriers satisfying and important for future work together</p> <p>Avoided forced relocation away from home increasing employee satisfaction and reducing turnover</p> <p>Voluntary temporary relocations to new country / culture satisfying for particular employees</p>	<p style="text-align: center;">✓</p> <p>Communication and language barriers frustrating to employees</p> <p>Lack of follow-through “invisible” until the next meeting; creating time delays and rework; frustrating for employees</p> <p>Additional work created by merger, but no additional resources for team, creating employee dissatisfaction</p>

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact

TABLE 7.5.C

DESIGN, INPUT AND PROCESS ISSUES FOR POST-MERGER INTEGRATION

TEAM

	Benefits from operating virtually	Costs from operating virtually
Travel / face-to-face meetings	✓✓✓ Weekly videoconferencing meetings save travel costs	✓✓ Up level managers still travel to meet FTF with counterparts; no meeting minutes => rework
Technology	✓ Develop norms to efficiently and effectively use e-mail	✓ Need to develop integrated knowledge management system
Training / coaching	✓ Training provided helped team members deal with cultural differences and the merger	✓ Very limited language training Not enough team-building
Leadership	✓✓ Effective coaching by leaders with cross-cultural skills	
Communication and decision-making		✓ Lack of disciplined decision-making processes and tracking created rework
Career development	✓ Procurement knowledge and lateral skills increased by working with counterparts across organizations, job rotation	
Personnel / salaries		✓ Extra time spent due to things “falling through the cracks” – data confusion, lack of meeting minutes, lack of follow-through
Admin and other support		✓✓✓ Requirement for substantial IT support to develop knowledge management system (global procurement system)

Key: ✓ = small impact
 ✓✓ = medium impact
 ✓✓✓ = large impact