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Strategy and PowerPoint: An Inquiry into the Epistemic Culture and Machinery of Strategy Making

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PowerPoint has come to dominate organizational life in general and strategy making in particular. The technology is lauded by its proponents as a powerful tool for communication and excoriated by its critics as dangerously simplifying. This study takes a deeper look into how PowerPoint is mobilized in strategy making through an ethnographic study inside one organization. It treats PowerPoint as a technology embedded in the discursive practices of strategic knowledge production and suggests that these practices make up the epistemic or knowledge culture of the organization. Conceptualizing culture as composed of practices foregrounds the "machineries" of knowing. Results from a genre analysis of PowerPoint use suggest that it should not be characterized simply as effective or ineffective, as current PowerPoint controversies do. Instead, I show how the affordances of PowerPoint enabled the difficult task of collaborating to negotiate meaning in an uncertain environment, creating spaces for discussion, making recombinations possible, allowing for adjustments as ideas evolved, and providing access to a wide range of actors. These affordances also facilitated cartographic efforts to draw boundaries around the scope of a strategy by certifying certain ideas and allowing document owners to include or exclude certain slides or participants. These discursive practices—collaboration and cartography—are part of the "epistemic machinery" of strategy culture. This analysis demonstrates that strategy making is not only about analysis of industry structure, competitive positioning, or resources, as assumed in content-based strategy research, but it is also about how the production and use of PowerPoint documents that shape these ideas.

Key words: epistemic culture; strategy making; genres; PowerPoint; technology in use; strategy as practice; negotiated meaning
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Introduction

Overhead presentations and more recently PowerPoint[1] documents have come to be a dominant feature in our culture (Yates and Orlikowski 2007). In the case of strategy making within organizations, PowerPoint is the prevailing genre for representation and communication. In consulting, making strategy for clients ultimately leads to the production of "decks" of slides with strategic recommendations. In organizations, strategy development activities culminate in PowerPoint presentations to senior management. Much of business education today involves PowerPoint. Such is the presence of Microsoft's PowerPoint that it has led to a proliferation of consumer guides and how-to books championing its benefits[2] as well as some searing critiques of its use (Norvig 2000, Parker 2001, Stewart 2001, Tufte 2003). Whereas champions have promoted PowerPoint as a simple way to build persuasive presentations, critics (mainly in the popular press) have argued that it constrains expression to certain templates, forces oversimplification, and even edits thoughts. Yet these assessments, whether positive or negative, have focused mainly on the features of PowerPoint software or the characteristics of presentations produced using its features. They have not been made based on an appreciation of how PowerPoint is actually engaged in the practice of strategy making.

To understand the role of PowerPoint in strategy, it is useful to conceptualize strategy making as a knowledge production process that can be examined in much the same way that science in the laboratory has been studied by sociologists of science as a knowledge production process. We can see many parallels between doing strategy and doing science, in that they both occur in knowledge settings having their own expert cultures. Knorr-Cetina (1999) refers to the cultures of these knowledge settings as "epistemic cultures" and argues that their existence demands an examination of the activities that make up expert practice. This approach, according to Knorr-Cetina (1999, p. 10), "foregrounds the machineries of knowing composed of practices," otherwise known as epistemic machineries. Here, culture is defined by the practices that make it up.

In science (and, I suggest, in strategy), these practices that make up culture are both discursive (focused on the communication of ideas) and materially mediated (occurring through texts; see Gieryn 1999, Knorr-Cetina 1999). The study of discursive practices undergirding an epistemic culture therefore requires an examination of the technologies that mediate this discourse (Orlikowski 2010, Schatzki 2005). During the past 10 years, scholars have paid increasing attention to the study of strategy practices (for summaries, see Jarzabkowski et al. 2007, Jarzabkowski and Kaplan 2010,

Whittington 2006), an approach that comes from the view that strategy is something that people do, not just something that organizations have. Recent empirical work has represented strategy making as a dynamic, and specifically discursive, process that is socially accomplished by multiple actors (Ezzamel and Willmott 2008, Jarzabkowski 2008, Rouleau 2005). Less is known, however, about how these practices are materially and, more particularly, textually mediated. Yet because PowerPoint functions as both a medium and an outcome of discursive practices, its use is essential to the strategy-making process. Without PowerPoint, as Rasche and Chia (2009, p. 722) underline, "a strategist would not be a strategist and the practice of strategy would be an impossible endeavor." This leads to the research question, how is PowerPoint engaged in the discursive practices that make up the epistemic culture of strategy making? Asking the question this way treats PowerPoint not simply as an artifact representing, more or less perfectly, an underlying culture, as it would be characterized in traditional culture studies (Hatch 1993, Schein 1990), but rather as part of the machinery that produces strategic knowledge.

This paper addresses this question through the analysis of an ethnographic study of strategy making inside one organization. Direct, in-depth observation of actors making strategy provides a window into the dynamics of day-to-day practice. For the purposes of this analysis, these observations allow us to assess how PowerPoint was used by various actors. Using a genre analysis of these practices, I explore not just the PowerPoint software or documents themselves but more importantly how they get mobilized by actors and mediate interactions between actors (Yates and Orlikowski 2007) in strategy making. Through this approach, I show how the affordances of PowerPoint enabled the difficult task of collaborating to negotiate meaning in a highly uncertain environment, creating a space for discussion, making combinations and recombinations possible, allowing for rapid adjustments as ideas evolved, and providing access to a wide range of actors, no matter how dispersed over space or time. Yet I found these affordances also supported cartographic efforts to draw boundaries around the scope of a strategy, certifying certain ideas and not others and allowing document owners to include or exclude certain slides or participants and control access to information. Cartography in the world of ideas is similar to cartography of the physical landscape: drawing maps and defining boundaries help people navigate otherwise uncertain terrain. These collaborative and cartographic practices shaped the strategic choices and actions taken in the organization.

In the sections that follow, I first discuss PowerPoint and its critics, arguing that its central, if controversial, presence in organizational life justifies an in-depth focus on how it operates in such organizational processes as strategy making. The next section shows that although there has been little scholarship on PowerPoint per se, studies of epistemic cultures and machineries as well as genres-in-use give us analytical purchase in understanding the dynamics observed in the field study examined here. Results presented in the next section suggest that the use of PowerPoint cannot be characterized simply as effective or ineffective. Instead, an examination of how PowerPoint was engaged in strategy making in one organization shows that this tool became both a space for collaboration and a focus of cartographic efforts. The epistemic culture of strategy is thus made up of two both conflicting and complementary practices that are mediated by PowerPoint. Collaboration and cartography are two sides of the same coin, where knowledge production must involve both the generation of ideas and their selection. This paper concludes with a discussion of how these insights contribute to the literatures on strategizing and epistemic cultures. I suggest that strategy making is not only about analysis of industry structure, competitive positioning, or resources and capabilities, as assumed in content-based strategy research, but also about how the production and use of PowerPoint documents shape these ideas.

PowerPoint and Its Critics

Although introduced into the market little more than two decades ago, PowerPoint is now used pervasively in organizations. It is the most recent iteration in a long tradition of business presentation technologies (Yates and Orlikowski 2002). The use of graphs as visual aids for management was pioneered most prominently by DuPont in the early 20th century. Their approach was copied by many of their customers and was eventually institutionalized in business (Yates 1985). PowerPoint is the digital-age successor to earlier presentation technologies such as viewgraphs, but its features make it even more predominant in business practice than were prior tools.

PowerPoint is but one of many technologies used in strategy making. E-mail clients, spreadsheets, and word processing programs also are engaged regularly. However, there are two reasons that PowerPoint should be the subject of particular attention. First, PowerPoint has a privileged position among strategy support tools. No matter what combination of technologies might be used to develop a strategic idea, strategy making nearly always culminates in a PowerPoint presentation to senior management. Thus attention to the development as well as the delivery of these documents is essential. Second, PowerPoint is not only a set of texts but also a tool for creating those texts and a presentation genre (Yates and Orlikowski 2007). Although PowerPoint presentations were initially intended only for in-person presentations, enabling technologies such as e-mail, WebEx,

or NetMeeting[3] make it possible to conduct presentations with geographically or temporally dispersed audiences and even to decouple documents from the live performance entirely (Stark and Paravel 2008, Yates and Orlikowski 2007). The documents operate in multiple forms: they are projected in slide shows, printed out for handouts, distributed via e-mail, etc. There is a notes section for recording more information than can be contained in slide. A variety of materials—spreadsheets, tables, graphics, videos, and sound files—can be incorporated from other sources. The program provides a wide array of presentation templates and clip art. Unique among technologies used in strategy making, the slides in PowerPoint are modular, and therefore strategy makers can cut and paste them from one document into another.

A vast array of books, training sessions, newsletters, and online help sites provides users with tips and tricks for taking advantage of these features to "plan the perfect presentation," and Microsoft even promotes "PowerPoint MVPs" who are "experts recognized by Microsoft for their helpfulness, depth of knowledge, and passion for technology" (Microsoft Office Online 2006). Yet despite PowerPoint's ubiquity, there is a growing wave of criticism about its effects. Norvig (2000), echoing an earlier critique of overhead presentations by Rigden (1990), excoriates PowerPoint by showing that Lincoln's literary Gettysburg Address might have been reduced to a few bullet points in the era of PowerPoint. Tufte's (2003) tract on PowerPoint criticizes a cognitive style that, he argues, foreshortens evidence, leads to the extensive use of "chart junk," and forces a linear presentation. The effect, according to some, is "death by PowerPoint" (Felder and Brent 2005). PowerPoint has been subject to many spoofs in cartoons that portray PowerPoint as a tool for achieving false productivity or even as a potential tool for torture (see an example in Figure 1).

Less fancifully, Scott McNealy, CEO of Sun Microsystems, banned the use of PowerPoint in his organization in the mid-1990s, stating,

> We had 12.9 gigabytes of PowerPoint slides on our network. And I thought, "What a huge waste of corporate productivity." So we banned it. And we've had three unbelievable record-breaking fiscal quarters since we banned PowerPoint. Now, I would argue that every company in the world, if it would just ban PowerPoint, would see their earnings skyrocket. Employees would stand around going, "What do I do? Guess I've got to go to work." (McNealy 1997)

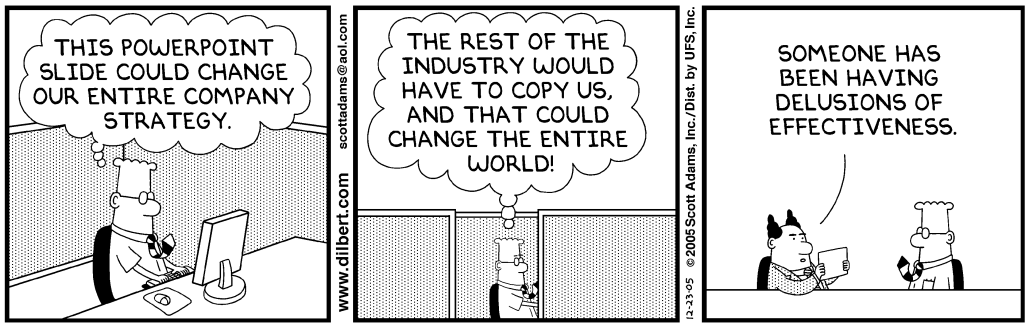
The Columbia Accident Investigation Review Board report on the 2003 Columbia shuttle explosion included Edward Tufte's analysis of a NASA PowerPoint slide entitled "Review of Test Data Indicates Conservatism for Tile Penetration." The report concluded

> It is easy to understand how a senior manager might read this PowerPoint slide and not realize that it addresses a life-threatening situation. At many points during its investigation, the Board was surprised to receive similar presentation slides from NASA officials in place of technical reports. The Board views the endemic use of PowerPoint briefing slides instead of technical papers as an illustration of the problematic methods of technical communication at NASA. (Columbia Accident Investigation Board 2003, p. 191)

The bullet point mode of presentation, although useful for summarizing more complex information for briefings, failed in this case to convey the tacit and specialized knowledge associated with a complex technology.

These critiques point to the possibility that the use of PowerPoint can detract from the fundamental task at hand, be it managing a business or solving technical problems on a space shuttle. Any optimism about PowerPoint on the part of its critics mainly takes the form of exhortations to circumvent its limitations and turn presentations into performances (Gabriel 2008). Carried forward to the domain of strategy, these concerns about PowerPoint highlight the risks of strategy making being obfuscated by the technology used to support it, but such conclusions miss the essential dynamics of the operation of PowerPoint in the machinery of strategic knowledge production. These critiques of PowerPoint tend to focus on the specific technical enabling (and constraining) features of the software tool and the strengths and weaknesses of the documents themselves. This limits our

Figure 1 Dilbert's View of PowerPoint



Credit. DILBERT © Scott Adams/Dist. by United Feature Syndicate, Inc.

ability to see how PowerPoint works within the discursive practices of strategy making. In the next section, I draw on research in the field of science studies to suggest that PowerPoint can usefully be viewed as part of the machinery that makes up a particular epistemic culture of knowledge production. I also argue that analyzing PowerPoint not as a static object but rather as a communication genre-in-use will help explore how this epistemic machinery functions.

Analytical Lens for Understanding the Epistemic Machinery of Strategy Making

This paper turns our attention away from whether actors make "good" or "poor" use of PowerPoint technology and toward how these actors mobilize it in their discursive practices, in order to shed light on the epistemic culture of strategy making and the epistemic machineries that make it up.

Epistemic Cultures and Epistemic Machineries

Epistemic cultures are the cultures of knowledge production. They comprise the set of "arrangements and mechanisms . . . which, in a given field, make up how we know what we know" (Knorr-Cetina 1999, p. 1). From this definition, one can draw out three essential features about this idea of culture that make it distinct from traditional definitions of culture as norms or values (see Martin 2002): first, an epistemic culture is made up of patterns of activities or daily practices; second, these practices are specific to particular fields; and third, they generate and certify knowledge. Research on epistemic cultures extends a long line of scientific laboratory studies (see Latour and Woolgar 1979) by examining how the underlying "machineries" of knowledge production and consumption operate (Gieryn 1999, Knorr-Cetina 1999). These epistemic machineries involve "objectual practice" (Knorr-Cetina 2000)—expert work takes place in interaction with artifacts—and it is these interactions that produce knowledge (see also Bechky 2003, Carlile 2002).

The relationship of actors with such artifacts (such as instruments, tools, products, etc.) is central to the notion of practice in analyses of epistemic cultures. Practices are materially mediated. Scholars often turn to the example of a car and driver (Knorr-Cetina 1999, Spinuzzi 2003) to illustrate this relationship. When most of us get into a car, the car is merely a means to an end. Unless it breaks down, the car is absorbed into the practice of driving. In Heidegger's terms, the car is "ready-to-hand" (Heidegger 1962, p. 98ff; Knorr-Cetina 2000). The actor is acting with technology. Said differently, human activity is mediated by artifacts. A technology is not simply an object but rather is implicated in a set of practices. A further example is that of a child doing a math problem (Kaptelinin and Nardi 2006). She does not just add two numbers together. A teacher may give her the problem. It could be written on paper. The child may count on her fingers. She may ask a friend. To understand the process of adding numbers, one must go "beyond the bare bones of the arithmetical processes" (Kaptelinin and Nardi 2006, p. 9) to see the teacher, paper, fingers, and friends. It is in this way that an understanding of the epistemic machinery of knowledge production pushes the analyst to examine the "rich social matrix of people and artifacts" (Kaptelinin and Nardi 2006, p. 9).

With regard to scientific practice, these artifacts are often textual and representational. Latour and Woolgar (1979) describe scientific knowledge production as a network of texts that link actors, their labs, their equipment, and their experiments. Outcomes of experiments are represented in texts such as printouts from lab equipment and are later codified in reports or journal articles. A subsequent wave of research in the social studies of science has showed how such discursive practices work to produce knowledge (Collins and Evans 2002). As a next wave of analysis, Knorr-Cetina (1999, 2000) has proposed that scholars should problematize the objects that are both the mediators and the outcomes of this discursive work.

This idea of tools and technologies as part of the epistemic machinery of a knowledge culture is distinct from the typical understanding of artifacts in culture studies. Research on cultural artifacts in organizations has traditionally viewed them as surface-level representations of the culture (Hatch 1993, Schein 1990). An observer can know the organization by understanding the artifacts within it. Further extensions have recognized that artifacts do not just represent culture but also do work to reinforce it (Rafaeli and Pratt 2005). Objects—such as lab coats for doctors—are conceived of as a means for actors to signal identity, legitimacy, and conformity to cultural norms (Cappetta and Gioia 2005, Douglas and Isherwood 1979, Fiol and O'Connor 2005, Rafaeli and Pratt 2005). As a corollary, the provision of particular artifacts can help socialize new members into a culture (Pratt et al. 2006). In this stream of research, the artifact is treated as fixed, either as a superficial layer of culture or as a tool to be used instrumentally to stabilize a culture. However, if one treats artifacts as part of the epistemic machinery, the analysis focuses instead on how they mediate activity within a culture. Therefore, a view of PowerPoint as a cultural artifact in the classic sense limits our ability to see how it is engaged in a broad range of discursive practices (Kaghan and Lounsbury 2005). Instead, it is worth examining how people act with technology, where the relationship between people and artifacts is one of mediation (Kaptelinin and Nardi 2006, Orlikowski 2007).

Research specifically focused on the practice of strategy making has drawn our attention not only to what actors do (Jarzabkowski et al. 2007, Jarzabkowski and

Kaplan 2010, Whittington 2006) but also, in a few very recent instances, to how they engage with various strategy-making technologies such as plans (Giraudeau 2008), "embodied metaphors" (Heracleous and Jacobs 2008), and meetings (Jarzabkowski and Seidl 2008). These works emphasize that engagement with such pieces of the epistemic machinery is a significant, though often invisible, part of the practice of making strategy, which enables communication, coordination, and control across organizational actors. These initial forays into the analysis of enabling technologies of strategy making suggest that studies in this area must involve not just the technologies themselves but, more importantly, the social world in which the technologies are produced and that they also produce through their use.

Discursive Practices and Genres-in-Use

Research on epistemic cultures suggests that the medium of this social world is discourse (Gieryn 1999, Knorr-Cetina 1999). Epistemic machinery, as has been outlined, is composed of practices and specifically discursive practices. Knorr-Cetina (1999) trains her analytical gaze on the culture of knowledge production in part to explore the symbolic aspects of practice. Correspondingly, we can think of discursive practice as "situated symbolic action" (Heracleous and Marshak 2004). Whereas Knorr-Cetina (1999) focuses on scientific work, research on strategy making has suggested that strategy work is similarly an essentially discursive process (Hendry 2000, p. 957), where discourse is "not only the medium in which decisions are discussed and recorded, but also the medium through which interpretations are developed and expressed and strategic actions initiated, authorized and acknowledged" (see also Ezzamel and Willmott 2008, Jarzabkowski 2008, Mantere and Vaara 2008, Rouleau 2005).

These discursive practices are the means by which actors certify ideas and draw rhetorical boundaries around which ideas will be considered when making choices and taking action. The resulting maps provide direction. Just as geographic maps are drawn to help people get around, scientific or strategic maps help people navigate uncertain intellectual terrain (Weick 1990). However, the drawing of boundaries is not a neutral process: many people are involved, each with their own cognitive frames and interests about where the boundaries should be. Such boundary work has important political consequences: people using the maps must face the outcomes of the choices made based on whose and which ideas achieve legitimacy, whereas people attempting to make these maps must grapple with whether their ideas, and perhaps the practical viability of their own work, falls inside the map and is therefore supported or falls outside the map and is therefore foreclosed. Thus drawing maps is an act against some and for others, and the goal of the map makers (or "cartographers") is to get their claims accepted and their activities funded (Gieryn 1999).

Discourse, both in scientific practice and in strategy making, uses various communication technologies or genres—memos, meetings, computer displays, expense forms, training seminars, and, of course, PowerPoint presentations—as resources. Discursive practices occur within these genres. PowerPoint is only one of the technologies in the genre repertoire (Orlikowski and Yates 1994) of strategy makers, but as noted above it is the most universal. Genres (such as PowerPoint) serve as organizing structures or templates for social action that both shape actors' discursive practices (Bazerman 1994, Orlikowski and Yates 1994, Yates and Orlikowski 2002) and serve as the object of work itself (Geisler 2001). In the context of strategy making, the use of genres informs the analyses and discussions that produce strategic outcomes. Because discourse is "textually mediated" (Smith 1990, p. 217), the investigation of genres-in-use becomes a way to understand the discursive practices of strategy making (Levina and Orlikowski 2009). This approach therefore has analytic advantages over the treatment of PowerPoint simply as a cultural artifact used to represent or reinforce an organizational culture because it places the analysis of the technologies and their affordances alongside that of the actors, their goals, and organizational norms of use (Berkenkotter 2001).

Taking a genres-in-use perspective should shed light on how PowerPoint is engaged in the discursive practices that make up the epistemic culture of strategy making and how this in turn shapes strategic outcomes. I examine these dynamics in a longitudinal field study of strategy making inside one organization.

Research Setting and Analytical Approach

This study was based on observations of the Advanced Technologies Group (ATG) of CommCorp,[4] a multidivisional telecommunications equipment manufacturer and prominent player in the communications technology industry. A focus on a single organization is appropriate where the interest is in examining day-to-day activities in depth (Dougherty 2002). The approach for this study was open-ended and inductive, informed by a broad interest in how managers make strategy. Indeed, PowerPoint's role in the organization's discursive practices was not an initial focus for the data collection. However, its use was so pervasive in every aspect of the daily activities of CommCorp managers that I came to regard it as an essential part of the epistemic machinery that made up the expert practice of strategy making inside the organization.

The Setting

The ATG was a longstanding corporate group within CommCorp whose task it was to develop the long-term

technology strategies for the corporation. These strategies were meant to extend beyond the time horizons used by the individual business units. Strategy making involved not just the generation of ideas but also often the development and testing of advanced technologies. Many of the members of the organization were leading experts in various telecommunications fields, often holding multiple patents. The group prided itself in having led the development of several new businesses for CommCorp over the years, many of which had changed the face not just of CommCorp but also of the telecommunications market.

PowerPoint had a pervasive presence in this strategy work. Its use was influenced by environmental and organizational conditions. To start, the environment was extremely turbulent. At the time of the study (2002), the company was experiencing a crisis associated with the crash in the telecommunications market. Organizational participants at CommCorp (and throughout the industry) were faced with a great deal of uncertainty about what direction the market would take and which technologies would be most appropriate in the future. This resulted in myriad interpretations about what was going on and what should be done. It also engendered a high-stakes environment in which strategic choices about investment had important consequences for the survival of the firm and for individual careers. Strategies were developed by means of multiperson projects. To rein in costs during the downturn and to refocus strategic resource allocation, in 2002 the ATG had formalized its review process for approving investments. All investment opportunities passed through a technical steering committee made up of technical personnel and then a review board made up of the group's senior management team that had formal decision-making authority.

In addition, strategy making in the ATG required coordination across a number of domains. The ATG was charged not just with developing technologies but also with making sure that these technologies had relevance to external customers (the market) and to internal customers (the CommCorp business units). As a result, the group included both technical personnel as well as experts in marketing and economic analysis. Coordination across these differences became essential for achieving outcomes. The organization was also highly geographically dispersed, with many of the critical players located away from headquarters. The company made extensive use of teleconferencing technology for audio connections and NetMeeting for sharing documents during presentations. The functional and geographic dispersion put particular challenges on the ATG for coordinating inputs, negotiating differences in understanding, and organizing meetings.

Taken together, these conditions required project members to sort through inconsistent information about the market and technologies, coordinate inputs across diverse groups, and build consensus in the face of different views about the direction the company should take, all in a high-stakes and therefore highly politicized context. These requirements made the use of PowerPoint particularly salient. Actors engaged PowerPoint in all facets of their strategy-making activities. PowerPoint was the only presentation technology used in decision-making meetings. Organizational participants often "sent documents around" to share ideas and get input, and the PowerPoint documents became the focal point for debates.

Data Collection

Consistent with a focus on strategic practices (Orlikowski 2010, Rasche and Chia 2009), data collection involved ethnographic techniques (Agar 1980, Van Maanen 1988). The study relied heavily on observations of everyday activities, interviews, and the collection of documentary sources of data. The goal was to get close to the activities of participants (Emerson et al. 1995) to understand the practices of strategy making in the organization. With roots in anthropology, ethnographic techniques have primarily entailed the researcher being physically immersed in the field. With the growing use of modern communication technologies, the meaning of "being in the field" is changing as ethnography goes "virtual" (Hine 2000). This study combined traditional techniques of being physically on the ground with virtual techniques of participation via teleconference and e-mail. The latter was particularly appropriate for an analysis of PowerPoint because such documents were regularly passed around via e-mail, presented on NetMeeting, and worked on collaboratively over long distances.

The data were collected over eight months from April to December 2002 and included more than 80 formal, unstructured interviews; observations of daily project activities; more than 30 formal and informal team meetings; and the collection of related documentation (in addition to PowerPoint presentations, data included spreadsheets, e-mail exchanges, agendas, and minutes of meetings). All but two interviews were recorded and transcribed. I wrote up the detailed notes I took during interviews and meetings within a day. I followed the activities of the Steering Committee and Review Board across all of ATG's projects and also focused in more detail on several strategy projects. This meant that I observed a wide variety of organizational participants in strategy making, from the head of the organization down to junior team members, from engineers to marketers, and from people at headquarters to those in regional locations. The goal of this approach was to compile multiple overlapping sources of data to understand the day-to-day practices of strategy making. For the purposes of this study, these multiple sources of data allowed me to situate the use of PowerPoint in the context of the organizational activities in which it was engaged.

Analytical Approach

The analysis followed the principles of inductive theory building (Dougherty 2002, Eisenhardt 1989, Glaser and Strauss 1967). Although the use of PowerPoint was not identified prior to the research as an area of inquiry, its pervasiveness in the organization and the obvious struggles participants had with its use in their daily strategy-making practices made it an important subject for analysis. For this paper, I use genre analysis to examine the mobilization of PowerPoint documents by CommCorp actors.

The genre analysis proceeded through several phases. In an initial stage, categories identified in prior literature on theories of genres-in-use guided a first round of coding of the data. Yates and Orlikowski (2002) suggest that genres are organizing structures that shape expectations about the purpose (why) and the form (how something is communicated) as well as the content (what), the participants (who), the time (when), and the place (where). Using these categories as a starting point for understanding the practices associated with PowerPoint use at CommCorp, I coded the interview transcripts, field notes, and PowerPoint documents (using ATLAS.ti text analysis software). From this initial coding, I identified several different purposes (proposing an idea, making a decision, sharing information, requesting information, convincing others, brainstorming or generating ideas, directing or setting the scope of a discussion, aligning viewpoints, getting feedback, and gaining support). In each case, the form of communication was noted (whether this took the form of a PowerPoint presentation, a meeting, a conference call, an e-mail, an agenda, meeting minutes, or a Word document). I identified the participants, timing, and location (the who, when, and where). This first round of coding provided a subset of texts for more focused analysis. I then turned to a phase of open coding to identify themes and patterns that connected the purposes, forms, and uses of these texts.

In a parallel analysis, I developed chronologies of several ongoing strategy projects in CommCorp's ATG and matched PowerPoint and other documents to the various stages of the process. This allowed me to track how the production and use of PowerPoint documents contributed to participants' efforts to make strategies and take action. A comparison between these two forms of genre analysis (analysis of themes related to PowerPoint use and analysis of the involvement of PowerPoint in the evolution of strategy projects) elucidated how PowerPoint was mobilized as part of the epistemic machinery of strategy making at CommCorp. I further referenced the literature to hone insights developed from the inductive analysis of field data. Out of this process, I identified two sometimes complementary and sometimes conflicting dynamics associated with PowerPoint use: those of collaboration and cartography. I next elaborate on each.

PowerPoint and Strategy Making

The goal of this study was to understand strategy making as a knowledge production process imbued with its own epistemic culture. The crucial observation that triggered the analyses in this paper was the pervasiveness of PowerPoint use at CommCorp. This communications genre was a central part of the epistemic machinery and discursive practices that undergirded strategy making culture in the company. Resulting, in part, from broad trends throughout the business world and also from the increasing attention to decision-making processes within CommCorp's ATG organization, PowerPoint became the predominant, and often only legitimate, communication genre in the organization's strategy making practices. As one informant said,

> Everyone at CommCorp is a member of the Institute of PowerPoint because that's how you communicate around here. [Hugh, senior scientist, Engineering]

As the ATG was attempting to professionalize its activities—focusing on business cases and investment strategies as well as the underlying technologies—the use of PowerPoint came to symbolize a more businesslike process. As a part of this effort, Theresa, the leader of the Steering Committee, established a template[5] that she hoped would guide the creation of PowerPoint documents to be used in decision-making meetings. The implementation of this decision-making procedure was part of a broad change that Brad, the head of the ATG, was attempting to effect in the organization—moving away from a "lab research" mindset and toward an investment mindset—but the effect was that strategy makers focused as much on the PowerPoint documents as on the ideas contained within them.

The central role of PowerPoint was particularly evident in situations when newly appointed managers in positions of responsibility had to navigate decision-making procedures. As scholars have noted, the socialization of newcomers is a process in which the shape of cultures is evident (Van Maanen and Schein 1979). The provision of artifacts is often a central part of that socialization process (Pratt et al. 2006). In the case of one manager recently promoted to lead a major project, his lack of knowledge about how to use PowerPoint stymied his ability to move the project forward. Because one PowerPoint document he prepared was not in the established format and did not contain all of the required information for Review Board evaluation, a key decision-making meeting was postponed. As he explained, "Now people have the idea that, 'I am not going to be able to present my ideas, unless I use PowerPoint.' " He continued,

> Because this is the first [decision-making meeting] I've been through [as a team leader], I kind of rushed through getting the deck together. I found the template for the Review Board at the last minute . . . . After the initial

> problem, I got the template. It was not sent to me [by anyone on the Review Board]. I got the template from [a colleague who was not on the project team] actually. He just forwarded it on to me.
>
> [Hermann, senior manager, Engineering]

This episode demonstrates that the lack of expert use of PowerPoint delegitimated an actor and his efforts. By implication, using PowerPoint signified managerial professionalism. The use of PowerPoint itself produced the legitimacy actors needed to influence the outcomes of the strategy-making process.

In addition, many participants said they felt that the decision-making process was focused on the PowerPoint deck rather than the ideas contained within it. This is consistent with research suggesting that narratives following a standardized configuration are granted more legitimacy than other texts (Barry and Elmes 1997). At CommCorp, preparing for strategy meetings tended to focus on assuring the charts were in place. One project leader suggested that the fairly substantial changes made to a PowerPoint project proposal over a period of several months aimed to "get it in the format. The actual content of the program did not change. It was just the charts, you know." He further reflected,

> What the Steering Committee has become is really just almost a filter for the Review Board. [It] is just to review, to make sure the charts are all in order and the right information is there so that the Review Board does not have to go through too many cycles. I just cannot help but to think that is probably a poor use of all this high-priced talent. [Jack, director, Engineering]

Yet for Theresa, as the head of the Steering Committee, such changes were a way to get the information needed to make a decision. When one project team failed to get approval for its strategic initiative, she told its members,

> "At this stage, you need to fix the deck. Put it in the form we are used to, and I need one chart that says you need 'this many' resources to answer 'this' question." Later the team "had a couple of meetings to get that straight, and then we had a reasonable deck."
>
> [Theresa, leader of the Steering Committee]

PowerPoint was not just the enabling technology for strategy making but the object of the process. Instead of being asked to do a new analysis, a team member would be asked to provide a slide on the topic; instead of disagreeing about an idea, participants disagreed with "charts"; deliverables were described in terms of "chart decks" or "packs" rather than in terms of strategies or decisions. In a similar vein, the strategy-making process was thought about in terms of the number of charts produced. Participants calibrated progress in a meeting in terms of number of charts reviewed rather than clock time, as when one director complained about

> . . . a couple of discussions which could fall under bad meeting management, allowing people to go eight slides deep in detail on a particular topic just because it is interesting to them, not because it is useful for the end goal of the meeting. [Chris, director, Economic Analysis]

Thus we see that in the CommCorp organization, PowerPoint was a dominant communication genre in the discursive practice of strategy making. Moreover, PowerPoint did not serve simply as a vehicle for communication but rather played a central part in the machinery of knowledge production. Progress was measured in slides. Time was measured in slides. Strategic discussions could not take place if the slides to support them were not available or correctly formatted.

On the surface, the experiences of CommCorp managers in using PowerPoint were no different than those of any user, and their criticisms of the technology sound like those levied by Scott McNealy at Sun Microsystems, by Dilbert cartoons, or by the Columbia Accident Investigative Review Board. Yet by using a genre analysis to examine how PowerPoint was mobilized at CommCorp, the study reported here moves beyond these critiques to shed light on the epistemic culture and machinery of strategy making enabled and constrained by the technology. The central finding is that PowerPoint mediated two discursive practices: collaborative efforts to negotiate meaning and cartographic efforts to adjudicate interests.

PowerPoint has several affordances that shaped these two practices. First, PowerPoint offers materiality to strategic ideas. During strategy formulation, the ideas are not real in the sense that implementation has not yet taken place: no technologies have yet been developed, no acquisitions made, no resources reallocated. PowerPoint can display ideas that are not yet real (Stark and Paravel 2008), and such corporeality is consequential because it makes knowledge tangible. Yet because the PowerPoint documents and presentations are incomplete realizations of the proposed strategies, they are also mutable (Geisler 2001). Users can change the documents and the ideas represented within them. In addition, PowerPoint documents are modular. Each slide is a separate entity that can be moved within or across documents or cut without affecting the other slides. Finally, PowerPoint's digital form means that it can be easily transmitted to others, for example, in a live presentation using NetMeeting or as a document through e-mail. Although other technologies such as spreadsheets, e-mail, or word processing software share some of these features, PowerPoint remains interesting as a focus of analysis both because it uniquely possesses this combination of affordances and because it was the predominant genre for strategy making at CommCorp.

Table 1 summarizes how these affordances enabled the collaboration and cartography evident in CommCorp's strategy making. The sections that follow delve more

Table 1 PowerPoint's Function in the Epistemic Machinery of Strategy Making

PowerPoint affordances	Collaboration (negotiation of meaning)	Cartography (adjudication of interests)
Material. Concrete representation of ideas used to demonstrate strategies that are not yet "real"	• Brings ideas to life and offers concrete issues to discuss and debate.	• Certifies facts that are included and approved and delegitimizes that which are not included.
Mutable. Imperfect realization of what the technology strategy will be	• Allows discussions and debates to easily be reflected in changes to documents.	• Is subject to disagreements and debate about what should be included and excluded.
Modular. Possible to "cut and paste" and grow or shrink the document	• Acts as a space to collect ideas. Easy to bring together inputs, add or edit the document as ideas progress, or eliminate outmoded ideas.	• Allows authors to choose whose slides and which slides to include. The "owner" of the deck has power to define boundaries.
Digital. Possible to transmit via e-mail, NetMeeting, etc.	• Enables sharing and inclusion of people, especially those who are geographically dispersed.	• Offers authors of decks the ability to hold them back or share only certain pieces or none at all. Materials can be presented in a meeting but not distributed as a file.

deeply into these complementary and conflicting practices of the epistemic machinery of strategy. By seeing strategy making through the lens of PowerPoint use, it is possible to uncover how knowledge production works in this critical organizational process.

Collaboration

CommCorp participants engaged PowerPoint in a discursive practice that channeled individual knowledge into the strategy-making process, enabling coordination and collaboration. Although it is quite obvious to say that a PowerPoint document is about the communication of ideas (because this is the advertised function of the technology), it is perhaps a more subtle point to say that the technology enabled debate about interpretive differences and allowed for the achievement of agreement around the information being communicated. PowerPoint documents worked as repositories for information and tools for organizing thinking as well as spaces for collaborative work among people from different functional areas, from different offices, or with different viewpoints.

Because of the high uncertainty in the telecommunications market during 2002 and the paucity of information that might clearly point to a plausible strategic decision, actors at CommCorp needed to collect, sort through, and interpret large volumes of data that could provide clues. PowerPoint was seen as a useful space for the compilation of information, where one could, according to Hugh, a senior scientist, "collect a whole bunch of junk and then set up the whole [story] afterwards." The document was also a way to structure thinking and a preferred technology over other available ones. As Hugh explained, "Since [Microsoft] Word is such an unfriendly thing to use, what I do is take the PowerPoint and I use the notes[6] to annotate it. Then, I work editing those things." PowerPoint also allowed for the evolution of a document over time. An actor could easily include new information, edit existing slides, or, in Hugh's words, "throw a lot of stuff out."

PowerPoint was also a means for planning analytical work. In the early stages of one project, for example, the coordinator of the effort said,

> We just mapped out five slides that we wanted to build for the Steering Committee review in July. Whether we get there, I do not know, but it is just a little [guidance] . . . . Here is what we have to do. [Vince, director]

This practice helped the participants focus their work and develop a collective understanding of the project before all of the data could be obtained and analyzed.

The ability to collect information, reorder it, and pull slides from other documents not only facilitated individual knowledge work but also eased collaboration. Many of the PowerPoint documents that CommCorp participants put together were not intended for formal review meetings but were rather "discussion documents" meant for sharing within the project team. One manager noted,

> [Many PowerPoint documents were] educational background data and analysis. They were documents that we could take to various people and talk through in a one- or two- or three-hour session around what led us to draw the conclusions and what the data points were. They were never intended to be packs that were taken into a decision-making forum.
>
> [Susannah, manager, Economic Analysis]

As a result of these kinds of discussions, team members got feedback, sent out the documents to colleagues, made some edits, and eventually distributed them to the full team. This was a highly iterative process. From a junior engineer's viewpoint, project work involved "regular meetings twice a week or so, and it was largely just talking, having meetings, developing ideas on the white board and in PowerPoint. Sort of massive brainstorming activity on what the [technological] features should be and so on" [Stephen, engineer].

To illustrate these points, Table 2 provides a more detailed example of the use of PowerPoint documents in one project called "Savior." The goal of this project was

to formulate a strategy for CommCorp that would move the corporation in a new direction, taking advantage of what team members hypothesized was the increasing likelihood of a convergence between telecommunications and computing. This strategy would require a radically new technology, the shape of which was yet to be established. The core team on the project was geographically dispersed across multiple locations in different countries. They "met" a few times per week via conference call (and sometimes in person) and exchanged thoughts in the form of PowerPoint documents and e-mail commentaries on these documents regularly (often multiple times in a single day).

Table 2 shows the evolution of one team's internal working document and another document intended for presentation to the Review Board. In documents 1–8, we see multiple authors (Rick, Vijay, and Vince) contributing to the document, each building on the work of the last: adding new slides, combining information from multiple documents, eliminating other slides, and continuously refining the ideas. Rick focused primarily on defining the value proposition; Vijay, on outlining the features of the technology; and Vince, on establishing the economic rationale for the project. The articulation of the concept for Savior evolved from a "computing-savvy IT networking infrastructure" in document 1 to a "multi-service layer 4–7[7] computing virtualization switch" in document 2 and then to a "service hotel" in document 3, specifically for "L4–L7 services" in document 6. As Rick and Vince honed the objectives for the strategy, Vijay was able to develop further ideas for services that could be offered. Similarly, Vijay's increasing list of potential services helped define the market concept for the strategy.

Even when one person was the lead author of an evolving document, as was the case for the presentation to the review board (documents 9–12), the document changed as a result of input from all team members. The documents, therefore, did not stand alone but instead served as thought starters and as a means for documenting ideas that came up in discussion. For example, project members exchanged several documents the morning of a teleconference on August 6 (documents 3–5). They fed a discussion about what the Savior strategy would ultimately be. During the call, Rick started by reviewing his slides:

> Rick: "On page 2, I show that computing is morphing into a utility computing model. This is both an opportunity and a threat."
>
> Vijay: "OK, I put together a chart on the evolution of industry including from thick server to thin server, etc. I will send it to you."
>
> Rick: "On page 3, I lay out the value for customer and design objectives. [The chart] takes a stab at trying to classify some of the target functions. The Savior goal is to maximize the value of the computing center. What is it? A multiservice layer 4–7 computing virtualization switch."
>
> Vijay: "I am with you when you say virtualization switch, but when you add 'computing' you lose me, because it could also work with storage, CPU cycles, etc."
>
> Rick: "Well, I use computing more broadly."
>
> Vijay: "Maybe, I am being misled by using computing as a computer."
>
> Rick: "Maybe the term is misleading and overspecific."
>
> Vince: "Yeah, we talked about that a month ago."
>
> Rick: "It is data center virtualization."
>
> Vijay: "Data center virtualization is fine assuming that the data center is an aggregation of all of these functions."
>
> Vince: "But I don't want to get sucked into just building something from the data center. You will see in the document I sent out that I propose two different form factors, one for the data center and another for the branch office."
>
> Rick: [Reads over slide on "what is it?" and "so what?," "who cares?," and "why CommCorp?" sections.] "Any comments?"
>
> Vince: "Yeah . . . no. I just want to go through your next slide and then go through the two slides I sent out. They are a preface to this. I am looking at your slide 4." [After some discussion.]
>
> Vince: "Let's go to my charts to lay out the vision and then we can come back. I want to paint a more strategic picture. I only have two slides." [He takes five minutes to lay out the ideas.]
>
> Rick: "I don't understand the value proposition of the branch office model."
>
> Vince: "Go to the next page. Firms will increasingly adopt Web-based infrastructure."

After a lengthy discussion on the value proposition, Vince said, "That took a little longer than I hoped. Want to go back to your charts?" The discussion continued like this for two hours with debates about different issues interspersed with references to materials each of the team members had prepared in PowerPoint.

These exchanges also happened via e-mail. For example, to accompany the 9/16 document (document 7), Vijay wrote in an e-mail: "I made a pass on the service deck (attached). I've added a couple of new service ideas, reflecting the last two sessions. I've had further thoughts on the opportunity to link Savior with [another project]. I still have mixed feelings on it (so I did not write any details about that one just yet)." Later, he sent document 8 on 9/18, writing, "Here's the new deck including 5 new services for the Savior portfolio (it now has 15 of them altogether, ranging from table stakes to outright lunacy). See you tomorrow." Similarly, when Vince began to develop the document for presentation to the review board, he wrote on 10/21 (attaching document 9), "Hi, I started a package for discussion at next

Table 2 PowerPoint as Working Documents and Repositories (Examples from the Savior Project)

Document no.	Document title	Date/ time	Sources	Description	Latest author	No. of pages	Type of action
			Internal team working documents				
1	Savior: a back-office IT infrastructure strategy	8/1 5:53 P.M.		2×2 matrix of ways to maximize growth and profit. Value proposition for Savior: "focuses on providing Fortune 500 enterprises with computing-savvy IT networking infrastructure that maximizes their efficiency, flexibility and competitive advantage."	Rick	2	Start
2	Same as previous	8/5 12:33 P.M.	Doc 1+	Same as doc 1 plus pages on computing architecture evolution, the customer value proposition (Savior is a "multi-service L4–7 computing virtualization switch"), value proposition to CommCorp, value proposition to suppliers, design objectives, design issues, target functions.	Rick	9	Build
3	Same as previous	8/6 8:30 A.M.	Doc 1+	Uses matrix from docs 1 and 2, plus page on Savior as a "service hotel" listing eight potential services. Eight pages describing each service in detail (problem being solved, who tackles this already, how they do it, where and when to visit). List of services similar to (not identical to) doc 2 list of target functions.	Vijay	11	Combine and build
4	Same as previous	8/6 11:53 A.M.	Doc 3+	Same as doc 3 but adds two more services to the list.	Vijay	13	Build
5	Same as previous	8/6 1:10 P.M.	Doc 3+	Same as doc 3, adds two pages up front on "Savior Objectives" ("design, value, and prototype switching platform for back-office and front-office support of critical business processes and web-services") and "Savior market hypotheses."	Vince	13	Build
6	Savior: a back-office/ branch-office IT infrastructure strategy	8/21 9:41 P.M.	Doc 2+ Doc 5+	Doc 2 plus Objectives and Market Hypotheses pages from doc 5, plus pages on strawman hardware architecture, example data flow, perspectives from analysts, perspectives from startups. Design objectives: "consolidate computing resources, accelerate key functions and partition dynamically according to demand…create switching platform that is an extremely efficient channel-to-market for L4–L7 services."	Rick	17	Combine and build

Table 2 (cont'd.)

Document no.	Document title	Date/ time	Sources	Description	Latest author	No. of pages	Type of action
7	Same as doc 5	9/16 4:51 P.M.	Doc 4+	Same as doc 4 but eliminates the matrix originally from docs 1 and 2 and adds four more services to the list. Only adds detailed slides on three of four new services.	Vijay	15	Disaggregate and build
8	Same as previous	9/18 9:03 P.M.	Doc 7+	Same as doc 7 plus one more service added and additional assessment of importance of different services.	Vijay	17	Build
			Document for presentation to Review Board				
9	Savior formulation ideas: the search for business value	10/21 5:09 P.M.		Document for presentation to the Review Board. Slides on Savior focus, technology concept, programmable services switch value items, industry discussion of computing industry cycle, drivers of business customer spending, customer cost function, explanation of how market crisis occurred, analysis of whether equipment vendors have a long-term problem, description of what business customers are doing now and how technology promotes productivity gains, and one-page work plan.	Vince	16	Start
10	Same as previous	10/24 4:10 P.M.	Doc 9+ Doc 6+ Doc 7+	Same as doc 9 plus one page listing all services in doc 7 and two-page case study of business functions to target. Adding in ideas (but no slides) from doc 6 on threat to CommCorp from startups and value proposition of Savior.	Vince	19	Combine and build
11	Same as previous	10/26 1:03 A.M.	Doc 10+	Reordering pages in doc 10, plus showing CommCorp's current businesses under pressure, mapping Savior onto existing product lines, and expanding the work plan from one to two pages.	Vince	25	Reorder and build
12	Same as previous	10/30 7:42 P.M.	Doc 11+	Doc 11 plus adding details on business customer spending on IT by geography, by sector, also adding Savior questions to answer "How do we sell more intelligent high market switches to enterprises?" and expanding the work plan from two to three pages.	Vince	32	Build

week's Review Board meeting . . . let me know if you think I am off base." Vijay replied with a detailed commentary: "Looks good. I have changed the drawing of the Savior box (slides 3 and 4). I find it more intuitive that way, do you as well?" He then added specific comments for each slide, with suggestions for additions or changes as well as questions, such as "slide (9) I wonder what are the effects of competition sharpening within a shrinking market" and "slides (8–13), do you plan to put things into specific CommCorp context?"

PowerPoint therefore enabled collaborative knowledge work within the organization. Just as engineers use drawings to solidify product design ideas and get feedback from others (Bucciarelli 1994, Carlile 2002, Vincenti 1990), CommCorp participants used PowerPoint to make strategy. This echoes descriptions of laboratory experiments functioning to create discourse in scientific practice (Knorr-Cetina 1999, pp. 173–174): At CommCorp, PowerPoint documents became spaces to express ideas about the direction and scope of a strategic choice and the constraints on it. Those who had access to these spaces could assess the ideas and shape the strategies adopted. Because strategizing was not just something done by top managers but was engaged by people throughout the organization, PowerPoint was one means through which distributed knowledge got negotiated and embodied (Tsoukas 1996).

PowerPoint's role in CommCorp strategy making enabled the assembly, interpretation, representation, and sharing of information. Because PowerPoint documents are nearly infinitely expandable (some of the PowerPoint documents at CommCorp took up 28 megabytes or more), they could serve as repositories for vast amounts of data available from a rapidly changing and uncertain market. Because the technology allowed for easy movement of slides and cut and paste of information, PowerPoint was also a useful way to organize information and structure thinking. And because the documents could be transmitted through e-mail, they were also a means of sharing information around the organization. As a result, PowerPoint was a space where collective meanings could be negotiated.

Cartography

More than providing a vehicle for information sharing and idea generation, PowerPoint was also mobilized at CommCorp in political efforts to adjudicate competing interests in which strategies the firm should pursue under the uncertain conditions it faced. Much as Latour and Woolgar (1979) describe work in the scientific laboratory as a network of texts that legitimate particular knowledge, the use of PowerPoint at CommCorp was a means to create legitimacy for one strategic vision over another. Following Gieryn (1999), I call these efforts "cartography" because they seek to draw boundaries around the scope of a strategy. PowerPoint texts could be used in boundary work to promote an individual's or group's interests in that they present selected information, set agendas, and structured discussion.

When particular claims were contested, PowerPoint documents provided a means to make compelling arguments for why one view should predominate over another. This occurred through the selective inclusion of information and actors. The embodiment of particular information in charts naturalized it such that it became established as reality. Review Board approval of a project, and therefore of the PowerPoint document representing the project, was an especially potent force for the legitimation of those data included and for the delegitimation of data that were excluded. Similarly, the owners of a PowerPoint document—those responsible for developing and presenting it—had the ability to include certain actors and exclude others simply by their choice of which slides to include and whom to consult.

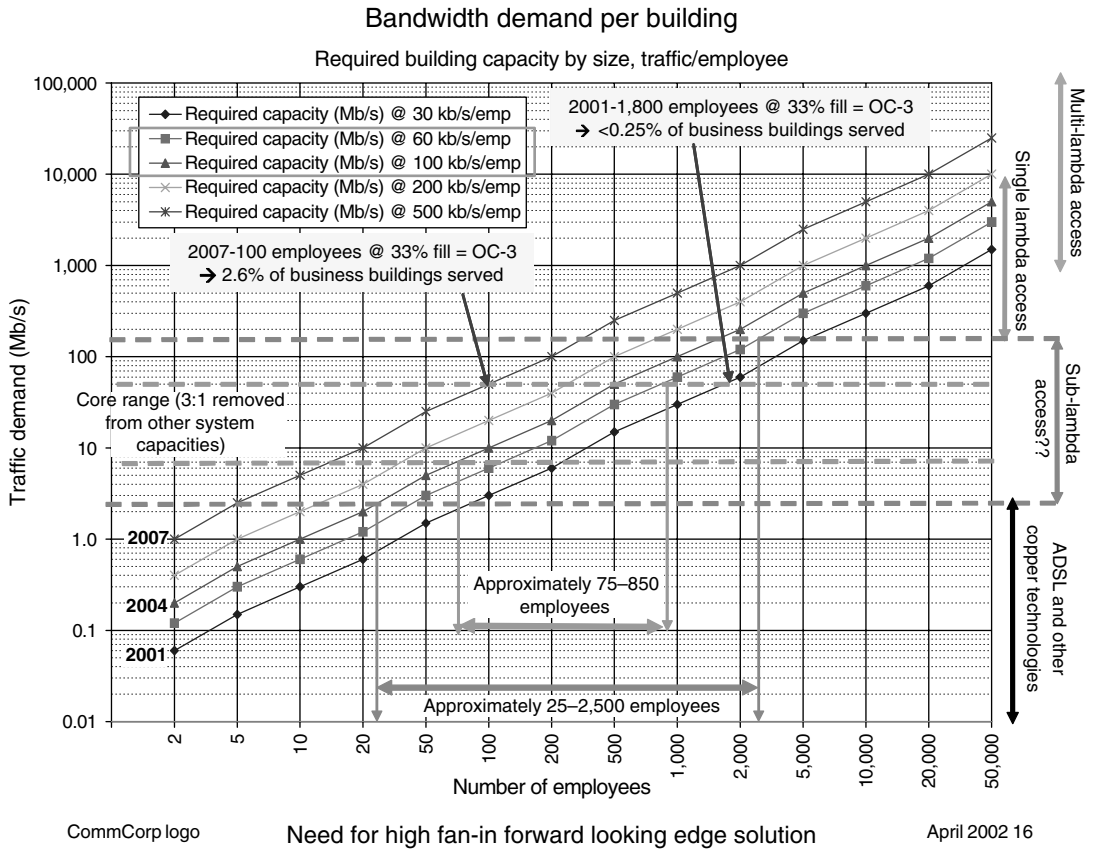
These dynamics could occur in very bald form, as in the case of the long-stymied "Multiservice" project. Here, Jack, a director in the engineering group, had proposed a new strategy to develop a bridge technology that would allow multiple forms of old customer equipment to connect into new optical networks. As the Multiservice strategy was being developed, marketing team members assigned to the project had not been able to come up with a valid business case despite careful analysis. They conjectured that the economic downturn would delay any further investment in optical technologies. After several months of frustration, Jack simply filled out the Review Board template. He included favorable estimates of the market size in the "potential market share" section required by the template, arguing that these estimates were based on conservative assumptions. With this chart in place, he was able to get the project approved, the effect of which was to certify his particular portrayal of the market and exclude the assessments of other actors in the decision-making process. Though not always so purely instrumental in appearance, the use of PowerPoint had the effect of legitimating some information and actors over others.

An extended illustration from the evolution of one project called "Last Mile" serves to illuminate the cartographic aspect of PowerPoint in use.

Selective Inclusion of Information. Hugh, a director in the engineering group, proposed a strategy to address the broadband access market. This project would represent a dramatic change in strategic direction for CommCorp because the company had exited the access market five years previously in order to focus on investments in the "backbone" of the telecommunications network. To overcome resistance to his proposed strategy, Hugh structured his PowerPoint document in such a way as to validate his interpretation of the market problems and potential solutions. The initial document was 119 pages long and filled with extremely dense charts featuring data on all aspects of the market (see Figure 2 for an example slide).

The intent, according to Hugh, was to "provide the data" to support a discussion about the strategy. The document contained many pages of analysis of the benefits of the technological solution that he preferred, "OpAccess,"[8] including an evaluation of all of the other companies pursuing OpAccess technology. Because his document was so detailed, it was difficult for anyone

Figure 2 Sample Page from Hugh's 119-Page Presentation



who might have opposed a move into broadband access technologies to counter his argument. As one observer in the organization asked ironically, "Did he tell you the secret strategy? [It] is just to wear them down with charts." The project was initially approved to move forward because all of the weight of the data was on Hugh's side. As opponents of this strategic direction began to develop their own charts showing that a reentry to the access market made little sense, Hugh continued to add to his document to "beat down the doubting Thomases. We were being driven ever deeper into detail by some of the hangers-on, who drive us to such intense frustration."

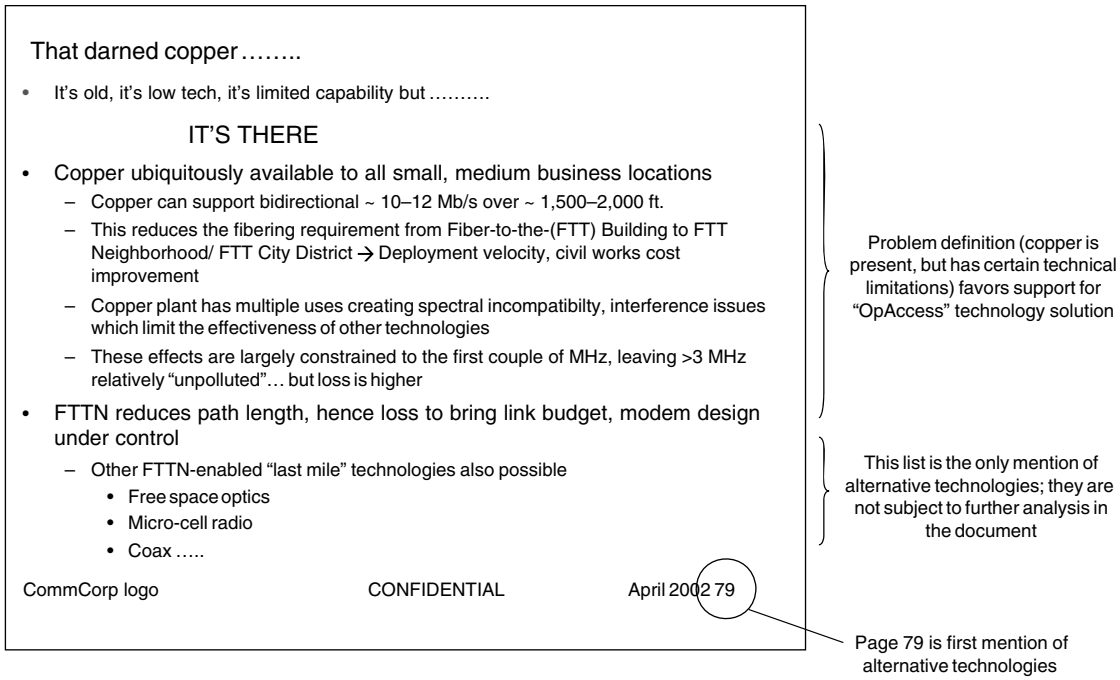
What is especially worth noting about this document is not just what Hugh included but also what he left out. As Figure 3 demonstrates, the document only mentioned alternative strategies on page 79 and only in a short list with no detail at the bottom of a page that was otherwise focused on reasons that OpAccess was a preferred solution. Because Hugh was the owner of the document, he could control what information was included or excluded and how it was positioned. In laying out the argument in this way, he hoped to get approval to invest in pursuing the access market with OpAccess technologies.

As a result, in this project (as in many other projects at CommCorp), team members engaged in important debates about who "owned" a deck and how it would get produced. This question was particularly delicate within teams, such as those for the Last Mile project, that were heavily cross-functional and where viewpoints about the appropriate solutions differed dramatically. As one Economic Analysis team member reflected about the joint teamwork on the Last Mile project,

> We spent an entire meeting with me trying to get them to answer, "Who owns this pack? Who is going to produce it? What is going to be in it? What are the questions that had to be answered from the Review Board last time around? Who is taking responsibility for answering them?" And I thought that we were going to get a pack that was about addressing these questions. The pack that came back didn't address the questions and didn't really do what was needed. I sent an email to [Hugh] about this and said, "This is not my expectation on what was going to be delivered. I know you are looking for me to input into certain slides here. But this isn't actually what we were expecting as a pack."
>
> [Susannah, manager, Economic Analysis]

Ownership implied control over both the workflow and the content. Project leadership was conceived as shouldering the responsibility for producing a PowerPoint document. This meant that the leader could hand out work assignments and select what information would ultimately be included in the final document.

Figure 3 Analysis of Page 79 from Hugh's 119-Page Presentation



Selective Inclusion of Actors. Just as the owner of the document could selectively include information, the presentation of the document could either give voice to or silence various actors. Table 3 examines three critical PowerPoint documents in the evolution of the Last Mile project, demonstrating the ways that each became a site for battles about whose ideas would be included in the strategy-making process. The first document was developed by the Marketing team (with Susannah and Albert in the lead) and presented in early July to the project leaders (Hugh and later Hermann), who were also the technical team leaders. This document summarized their findings about the market for "last mile" technologies. It concluded that opportunities were few because most service providers would make do with existing systems, given the industry crisis (slide 17). In addition, the marketers stated that they could not identify any "killer app[lication]" that would drive increased demand for high-speed services (slide 28) and suggested that CommCorp should focus on high-speed copper rather than optical solutions (slide 33).

The remaining two documents represent different decks prepared by Hermann, who assumed project leadership from Hugh—the first on September 11 and then a revised version on September 16—for a decision meeting with the Review Board on whether a strategy for the Last Mile would be pursued. The shading and the information in the "source" column indicate that only one of the slides (slide 3) from the marketing team's document was included in the September 11 version of the draft Review Board presentation. Because the data from Susannah, Albert, and others from marketing did not support the project, Hermann stopped seeking that team's input for the document he was preparing. The marketers complained vociferously to Theresa, Steering Committee leader, who then postponed the review meeting to force the technical team to include information and insights from the Marketing team. According to Susannah,

> They were supposed to deliver a package to us . . . . By Friday, nobody had talked to us for two weeks. We had left multiple voice mails and emails. No response in any direction whatsoever. So it was clear that they were off doing something. What it was, we had no idea . . . . So I said to Theresa, "Look, we were supposed to have this packet on Friday. We have had no input to it. So there should be no expectation that we will support or champion anything within this pack, because there has been no communication. We do not even know what will be presented next week . . . ." So the material came out the next day [September 11] anyway. It was basically the stuff [on OpAccess technologies] with no context around why you would do it, or where it would fit into the market. So Albert [in Marketing] . . . went back with a response that this pack is not fit to go anywhere. It does not have the marketing input in it. It does not have the sort of agreement about where we are and what we want to do. So basically we got Theresa to cancel the meeting and reschedule it for the following week. At that stage, it became evident to [Hugh and Hermann] that they were not going ramrod it through the Review Board without us on board. [Susannah, manager, Economic Analysis]

As a result of these pressures, Hermann was forced to include more of the marketers' perspectives in the document prepared for a rescheduled Review Board

Table 3 Comparison of Marketing and Technical Team Documents for Last Mile Project

"Last Mile" marketing report, July 9, 2002			"Last Mile" Review Board proposal, September 11, 2002			"Last Mile" Review Board proposal, September 16, 2002			
#	Source	Title	Content description	#	Source	Title	Content description	#	Source	Title	Content description
1		(Cover): "Last Mile" Review—Marketing Document	Cover page with logo. Date: July 9, 2002.	1		(Cover) "Last Mile" and Product X Next Gen Proposal	Cover page with logo, date September 11, 2002	1		(Cover): Last Mile Results to Date + Product X Next Gen proposal	Lists "prime" (Hermann), core team, extended team and customer (2 BU executives). Date: September 16, 2002
2		Sections	Table of contents (TOC) (market view, qualitative and primary research, internal view, recommendations, white space)	2		Portfolio gaps for BB business services	Table listing portfolio segment (within CommCorp), portfolio gap, required technologies (with potential technologies and names assigned)	2		"Last Mile" White Space—Media	Reasons why "using existing copper is not a panacea." Summary: "white space exists in media technology:
3		Global Market Size Data (Equipment)	Data from corporate Marketing dept. on size and growth of various types of modems, also fiber to the home, Ethernet, "OpAccess"	3		Potential programs—"Last Mile" evolution	Table listing projects, customer (within CommCorp BU), readiness and resource estimates. Highlighting the "Product X" portion as "focus of today's presentation"	3	Using some info. from pp. 14–17 of mkt doc.	"Last Mile" white space—carriers	Loosely derived from mkt. doc. pages. Assessment of major telco and cable operator deployment of BB. Summary: "white space exists in carrier's BB offering"
4		Proposed Bandwidth Requirements	Peak bandwidth requirements over time, "100 Kb/s/employee appears to be a safe maximum value to use"	4		Decision statement—Product X extension	Value, cost statement—phase 1: study and report (headcount 3 FTE, duration to Dec 15, total cost $127k), phase 2: product group support	4		The Fiber Divide (Access)	Decision tree showing logic for fiber adoption. The "Fiber Divide" is everyone else without high bandwidth demand and positive ROI. Key question: "what is the likely fiber access adoption rate?"
5		Always On vs. Not Always On Access	Trend towards "always on" broadband access but does not mean "always full"…questions about whether applications will emerge to drive higher short-term peak bandwidth requirements	5		Strategic/business value	Diagram of Product X system, plus list of "business value to CommCorp" and "relational value to ATG"	5		What could change this?	Reasons for adoption: higher value for higher speed, lower installation costs, return of the "build it and they will come and pay" model, discontinuity, government reg., company with deep pockets

Table 3 (cont'd.)

"Last Mile" marketing report, July 9, 2002			"Last Mile" Review Board proposal, September 11, 2002			"Last Mile" Review Board proposal, September 16, 2002			
#	Source	Title	Content description	#	Source	Title	Content description	#	Source	Title	Content description
6		NA Business Site Broadband Demand Scores	Bandwidth demand by size of business. Assessment of how many sites "moving into fiber range" of demand. 1.8% of all North American sites require fiber.	6		CommCorp/Carrier interaction	Diagram of project phases showing responsibilities at each phase and decision point after phase 1. Identifies BU collaborators and potential carriers to work with.	6	Summary of pp. 6–7 of mkt doc.	Broadband demand summary	Summary of market team input: notes that 1.7% of business sites have >45 Mb/s demand. Summary: "high percentage of the total bandwidth and revenue is in the top 5% of business sites"
7		Broadband Demand Scores	Example from Manhattan ("upper bound" of demand). Breakdown of demand by type of business. 13% of sites require fiber.	7		Project description/ deliverables	Diagram of deliverables for Phase 1 project: carrier business case, ATG product readiness, CommCorp business case, Deliverable 1: analysis of Product X reqs, Deliverable 2: report to BU on technology evaluation, Deliverable 3: technical support to business.	7	From p. 18 of mkt doc.	Key market take aways	Revised from mkt. doc. page to 7 (from 8) bullets: "still don't see a killer app, 100 Kb/s/employee appears safe," "it's a copper based world for now, no backhoes"…"do not cannibalize existing revenues [of carriers]." Summary: "'build it and they will come and pay' has completely failed as a bus. case"
8		Industry View	Spending by different size businesses on telecoms. Access connections growth in the U.S.	8		Project description	Description of project according to ATG phases of "explore," "validate" and "transition" to BU.	8		Access topology options	Map of Product X and extensions and how they would match different bandwidth demand levels
9		Outside Plant Access Infrastructure	Industry downturn means tight budgets for service providers. "All near-term access solutions must be 'backhoe free'"	9		Why in ATG?	List of reasons: deep expertise in broadband, cross-BU support of a common view, fits ATG mandate to provide forward-looking support to BU, support for LT ATG activities	9		"City X" case study	Map of City X, highlighting a specific business district (XXX Street)
10		Access Physical Layer Scenarios	Matrix of different wireline vs. wireless, light based vs. non light based technologies with challenges for each quadrant.	10		Deliverables	3 deliverables, showing timeline. List of team "prime" (Hermann) and members.	10		Revenue potential ($/month) on XXX Street.	Analysis of potential distribution of demand on XXX Street with scenarios for bandwidth growth. Summary: Product X not on this street because sites are <250 employees"

Table 3 (cont'd.)

"Last Mile" marketing report, July 9, 2002				"Last Mile" Review Board proposal, September 11, 2002				"Last Mile" Review Board proposal, September 16, 2002			
#	Source	Title	Content description	#	Source	Title	Content description	#	Source	Title	Content description
11		T1 Access: New Market Dynamics	Declining price of T1 lines to customers means less cash for service providers to invest in fiber and also raises entry barrier for replacement technologies.	11		Deliverables—agreed with "BU executive"	Breakdown of deliverables with end dates, owner and resources (people)	11		ILEC service decision tree	Decision tree for telcos to provide high speed access to customers. Shows opportunity for Product X if carriers want to deploy Fiber to the Business Curb.
12		Standards	Many standards. ST technologies already in standards. LT technologies will require CommCorp effort to influence standards.	12		Risks and mitigation strategy	Table with risk description (project planning, carriers business case support, CommCorp business case support), risk level, mitigation	12		"Last Mile" Follow-on decision statement	Target #1: Product line X evolution. Collaboration with BU architecture team. Target #2: focus on cable providers. Consider for next proposal.
13		Sections	TOC: "qualitative and primary research" highlighted	13		Transition	List of activities for transitioning the technology into a product in the BU.	13		Decision: Product X extension	Cost statement—phase 1: study and report (total 3 full time, Duration to Dec. 17, $127k.) Phase 2: product group support
14		SupperComm Comments	Comments from customers during the SuperComm conference. Main themes: don't cannibalize existing businesses, voice services are "cash cow," "copper is golden, will last a long time"	14		Decision statement	Repeat of p. 4.	14	From p. 6 of Sept. 11 doc.	CommCorp/Carrier interaction	Identical to Sept. 11 page. Diagram of project phases showing responsibilities at each phase and decision point after phase 1. Identifies BU collaborators and potential carriers to work with.
15		"Customer X" Customer Input	Has already reached 83% of high value customers with DSL; build out will now slow down.	15		Back-up	[place holder page]	15	From p. 5 of Sept. 11 doc.	Strategic/business value	Identical to Sept. 11 page. Diagram of Product X system, plus list of "business value to CommCorp" and "relational value to ATG"

Table 3 (cont'd.)

"Last Mile" marketing report, July 9, 2002			"Last Mile" Review Board proposal, September 11, 2002				"Last Mile" Review Board proposal, September 16, 2002			
#	Source	Title	Content description	#	Source	Title	Content description	#	Source	Title	Content description
16		"Customer Y" Customer Input	Fiberizing private line customers would cost ~$1 billion for $100–1,000/month revenue. Would need to reduce cost 100X to meet cost/revenue ratio demanded by the financial markets.	16	From p. 3 of mkt doc	Global market size data (equipment)	Chart from p. 3 of marketing team document. Additions: highlighting DSK access concentrator, Ethernet and FTTB; summary text on size of market for DSL, "OpAccess" and Ethernet Access.	16	From p. 7 of Sept. 11 doc.	Project description—Phase 1 deliverables	Nearly identical to Sept. 11 page. Diagram of deliverables for Phase 1 project: carrier business case, ATG product readiness contributing to CommCorp business case, Deliverable 1: analysis of Product X requirements, Deliverable 2: report to BU on technology evaluation, Deliverable 3: technical support to business case.
17		Business (not Technology) Alternatives to High Speed Access	Make do with existing network and services, alter business practices, niche solutions	17		Project scope	Evolution strategy for Product X, establish application configurations support business case decision, evaluate technical solutions	17	From p. 8 of Sept. 11 doc.	Project description: phases and IPR	Derived from Sept. 11 page. Description of project according to ATG phases of "explore," "validate" and "transition" to BU. More detail on the patent possibilities.
18		Key Market Takeaways	8 bullets: "still don't see a killer app, 100 Kb/s/employee appears safe," "it's a copper based world for now, no backhoes"…"do not cannibalize existing revenues [of carriers]." Summary: "'build it and they will come and pay' has completely failed as a business case"					18	From p. 9 of Sept. 11 doc.	Why in ATG?	Identical to Sept. 11 page. List of reasons: deep expertise in broadband, cross-BU support of a common view, fits ATG mandate to provide forward-looking support to BU, support for longer term ATG activities
19		Sections	TOC: "Internal view" highlighted					19	From p. 10 of Sept. 11 doc.	Deliverables	Identical to Sept. 11 page. 3 deliverables, showing timeline. List of team "prime" (Hermann) and members.
20		Wide Range of Access Related Products	Circle with "CommCorp" products around the edge. Blind men and elephant in the center. "Access has different meanings for different product groups."					20	From p. 12 of Sept. 11 doc.	Risks and mitigation strategy	Identical to Sept. 11 page. Table with risk description (project planning, carriers business case support, CommCorp business case support), risk level, mitigation approach

Table 3 (cont'd.)

"Last Mile" marketing report, July 9, 2002			"Last Mile" Review Board proposal, September 11, 2002				"Last Mile" Review Board proposal, September 16, 2002			
#	Source	Title	Content description	#	Source	Title	Content description	#	Source	Title	Content description
21		Glue Factor vs. Business Size	Diagram of different CommCorp product groups for large, medium, small enterprise customers. "Access 'glue' is strongest and direct for our largest customers."					21	From p. 13 of Sept. 11 doc.	Transition	Identical to Sept. 11 page. List of activities for transitioning the technology into a product in the BU.
22		Recent Activities	List of product development and launch activities for various CommCorp businesses					22		Back-up	[place holder page]
23		"Product X" Near Term "Tactical" Focus	Description of "Product X"…using 3rd parties for future functionality, but ST focus on meeting immediate needs of 6 leading customers					23	From p. 2 of Sept.11 doc.	Portfolio for BB business access	Identical to Sept. 11 page. Table listing portfolio segment (within CommCorp), portfolio gap, required technologies (with potential technologies and names assigned)
24		"Product Y" Summary	3G cellular networks will increase demand. Falling T1 prices will impact demand.					24	From p. 16 from Sept. 11 doc. (p. 3 of mkt doc)	Global market size data (equipment)	Identical to mkt. doc. page in Sept. 11 doc. Highlighting DSL access concentrator, Ethernet and FTTB; summary text on size of market for DSL, "OpAccess" and Ethernet Access.
25		CommCorp Sales Strategy for Access	Comparison of requirements for Access distribution and current CommCorp capabilities. Conclude that CommCorp does not address access sales to small and medium businesses.					25		Services vs. copper delivery technologies	Table with services (analog voice, digital voice, VoIP, high speed internet access, VPN, broadcast video, HDTV) and which technologies can deliver each. Summary: "not all services run on all technologies"

Table 3 (cont'd.)

"Last Mile" marketing report, July 9, 2002			"Last Mile" Review Board proposal, September 11, 2002				"Last Mile" Review Board proposal, September 16, 2002			
#	Source	Title	Content description	#	Source	Title	Content description	#	Source	Title	Content description
26		Key Internal Takeaways	CommCorp previously exited Access. Several product teams actively investigating solutions. Need a "broadband access story" for requests for proposals and for customer interaction. Need to develop distribution channels.					26	From p. 11 of Sept. 11 doc.	Deliverables—agreed with "BU executive" Sep 10, 2002	Identical to Sept. 11 page. Breakdown of deliverables with end dates, owner and resources (people)
27		Sections	TOC: "recommendations" highlighted					27		"Last Mile" reports	List of 22 analyses and reports completed by the "Last Mile" team
28		Broadband Access Summary	9 bullets: "copper will dominate for awhile," "no identified 'killer app'," "product teams investigating solutions," "ATG should focus on longer term broadband technologies"								
29		Broadband Access Summary	Table with market dynamics, BB deployment and recommended actions for today, 18 months and 3+ years.								
30		Sections	TOC: "white space" highlighted								
31		Potential Development Areas	Table of 10 major product groups at CommCorp. Indicates "white space" in places where businesses are not active. Conclusion: help product groups in ST, "explore" activities for LT.								

Table 3 (cont'd.)

"Last Mile" marketing report, July 9, 2002				"Last Mile" Review Board proposal, September 11, 2002				"Last Mile" Review Board proposal, September 16, 2002			
#	Source	Title	Content description	#	Source	Title	Content description	#	Source	Title	Content description
32		[No title]	Slide 31 plus comments for the 10 products								
33		Recommendations	Split up ATG activities into two areas: 1 person looking at LT "disruptive" space; a few people working with the BUs. Highest opportunity in high-speed copper, IP services.								
34		One Interesting Example	Example of technology to support digital rights management based on an existing product and video on demand.								

Marketing document slide later used in "Last Mile" Review Board proposals, both September 11 and September 16

Marketing document slide later used in "Last Mile" Review Board proposal, September 16 only

September 11 document slide, later used in "Last Mile" Review Board proposal, September 16

From Marketing document, used in September 11 and September 16 documents

From Marketing document, used in September 16 document but not used in September 11 document

From September 11 document, used in September 16 document

Key to terms:
BB = broadband
BU = business unit
FTE = full time employee
LT = long term
ROI = return on investment
ST = short term

meeting. In this document (dated September 16), four pages (pages 3, 6, 7, and 24) representing information from seven pages of the marketing document appear. However, he positioned the marketing information in a way that was more favorable to an investment in OpAccess technologies by developing several new pages of countervailing information. For example, although he did use information on market "white spaces" (page 3 of the September 16 document), he preceded it with a page on why "using existing copper is not a panacea" (page 2) and followed it with a decision tree showing the logic for optical fiber adoption (page 4). Meanwhile, the project description, deliverables, and strategic business value slides (pages 14–23 and 26) remained nearly the same as the ones in the September 11 version. Thus he remained effective in shutting out marketers from the decision. According to Susannah,

> He included some of our charts in the pack, but not the ones that didn't prove the scenario correctly. He put in the global one but didn't put in the ones where we had gone through and identified the sweet spots. He then talked to it in terms of "Well, you know the available market is 48%" and we're saying "No, no, no, the available market is something like 4%."
>
> [Susannah, manager, Economic Analysis]

This cartographic work to draw boundaries around the scope of a strategy was enabled by the digital nature of PowerPoint, which allows documents to be combined selectively, either by choosing individual slides or by picking out parts of slides. The owner of a document, Hugh and later Hermann in this example, could therefore control what information would be included or omitted. Other participants had to fight to have their charts inserted into a presentation document once they had been excluded. Thus, the ownership of a document and the ability to get one's charts incorporated into a document shaped the process for making strategic choices. As a result, the use of PowerPoint was a source of legitimation and control in the strategy making practices at CommCorp. The PowerPoint document was the terrain upon which battles of different interpretations and interests played out in the organization.

Collaboration and Cartography as Two Sides of the Same Knowledge Production Coin

The cartographic practice of drawing boundaries occurred simultaneously with the collaborative practice of exchanging ideas. This genre analysis of PowerPoint-in-use illuminates these two sometimes conflicting practices in action. For example, in the case of the Savior project, the team (Vince, Vijay, and Rick) used PowerPoint in collaboratively building their ideas about what a transformational technology to bring together computing and communications could look like. At the same time, we see Vince thinking about the public face of the document and how he would use it to marshal evidence to persuade others. As the team's ideas became more fully formed and as the date neared when they would have to present their proposal to the Review Board, Vince wrote to the team about the composition of the document. He recognized that the order of the slides would structure the Review Board discussion: "I set up the flow of charts so that we could develop a concept of Savior first, then we can layer in how it is applicable to customers, the industry, and CommCorp. I fear that if we start with the industry we will get into a low-yield debate with the audience as to the history and the future." He was worried that such a debate would derail the project and as a result CommCorp would not take up the opportunity to be a leader in what he imagined would be the future direction of the industry. Similarly, even though Hugh and Hermann used their September 11 and 16 documents for the Last Mile project to exclude the views and participation of the Marketing team members, the fact that they had to respond to the marketers' claims pushed them to develop their thinking about the actual business opportunity.

In these cases, the materiality, mutability, modularity, and digital nature of PowerPoint meant that its use enabled the simultaneous negotiation of meanings and adjudication of interests in the process of making strategy in an uncertain context. Many have suggested that such artifacts function as boundary objects (Bechky 2003, Carlile 2002, Star and Griesemer 1989), enabling the communication and transformation of knowledge across boundaries. However, the results from this study suggest that the use of PowerPoint in the discursive practices of strategy making was as much about constructing boundaries as it was about working across them. Putting together a PowerPoint document was not just a communications task but a knowledge production process that involved both collaboration and cartography.

Discussion and Conclusion

The genre analysis reported in this paper looks at how the use of PowerPoint mediates the discursive practices of strategy making in CommCorp. Doing so sheds light on the epistemic culture of strategy, describing how the culture operates and not just what the culture is. Rather than treat PowerPoint as a pervasive cultural artifact to be investigated as a representation of this culture, this study analyzes PowerPoint as part of the epistemic machinery that undergirds the knowledge production culture in one organization. Here, we can see how knowledge is produced and validated. Using such a lens allows us to move beyond the debate between the promoters of PowerPoint's features and the critics of its pathologies. The findings in this paper show that PowerPoint is not just a static piece of technology but rather that it exists as enacted in the organization. Analogously, strategy culture is not static either but

exists through discursive practices that are mediated by PowerPoint-in-use.

I find that the epistemic culture of strategy making is composed of two interrelated discursive practices: collaboration to negotiate meaning and cartography to adjudicate interests. Strategy making is ultimately about actors attempting to make choices under uncertainty. The practices that produce these outcomes are both about finding one's way through the uncertainties posed by the market as well as about appropriating the rewards of the deliberations over which claims are included. Although limited in scope—the study examines PowerPoint use in only one organization in a particularly intense period of uncertainty—the analysis presented here provides insights into both the discursive practices that undergird epistemic cultures and the microdynamics of strategy making. It also clears the way for a revised appraisal of PowerPoint.

Extending the analysis of epistemic cultures from its origins in science studies of laboratories (Gieryn 1999, Knorr-Cetina 1999, Latour and Woolgar 1979) to the context of strategy making in organizations offers a fresh empirical setting in which to examine the culture and machineries of knowledge production. It demonstrates that science is not the only, nor even the premier, site of knowledge generation in our society. The world of business is both a consequential and revealing site for the study of knowledge cultures (as Knorr-Cetina herself has noted in more recent work on the functioning of financial markets; Knorr-Cetina and Preda 2005): consequential because economic growth and jobs are at stake, and revealing because knowledge production feeds strategic choice and action.

Research on the sociology of knowledge has focused on how texts, as they circulate in networks of relations, serve to stabilize and naturalize facts and define acceptable courses of action (Gieryn 1999, Latour and Woolgar 1979). Such texts have been described in this literature as "immutable mobiles" (Latour 1987): they are only mobile to the extent that they are immutable (retaining their essential form as they travel). Introducing genre analysis of the use of PowerPoint as it functioned in strategic knowledge production offers a specific methodology for investigating the circulation of such texts. This analytical approach revealed a pair of discursive practices that explains not just how texts circulate but also what happens to the texts as they circulate. Because PowerPoint mediates both collaboration and cartography, the texts themselves change as they travel. Rather than being seen as fixed road maps for action, they might be thought of as what Law and coauthors have more recently called "mutable mobiles" (Law and Mol 2001, Law and Singleton 2005). By examining this genre-in-use, we see that PowerPoint texts are transformed as they are engaged in discursive practices that must both make meaning and carve up territories. This dynamic perspective on the epistemic machineries of strategic knowledge production shows that strategies are defined as these texts change.

This view of PowerPoint also fills an important gap in the strategy-as-practice research agenda. Research on the practice of strategy making has made important strides in moving our attention from strategies to the daily doings of strategy makers (as described in Jarzabkowski et al. 2007, Whittington 2006). Critics of such practice-based research worry that these studies risk privileging actions over artifacts and have the potential to sideline the cultural settings associated with such practices (Rasche and Chia 2009, Yanow 2000). The genre analysis reported in this paper offers an approach to addressing these challenges by seeing strategy making as an activity of expert culture and by using an examination of PowerPoint-in-use to understand the epistemic machinery that makes up that culture.

Although the participants at CommCorp found themselves in a particularly turbulent environment, strategy making in any organization takes place under conditions of uncertainty. The future is unknown and unknowable. Information arrives from myriad sources. Different actors come from different backgrounds and thus will likely have different interpretations of both the environment and of the potential strategic solutions to the challenges facing the organization (Kaplan and Orlikowski 2009). Yet it is incumbent upon managers to make strategic choices and take action. As they do this, they produce knowledge that will inform their decisions. At CommCorp, and in most organizations today, this process is enabled and constrained by the use of PowerPoint. An analysis of this communication genre-in-use reveals its role in mediating two practices that address the problem of dealing with uncertainty, those of collaboration to negotiate differences in interpretation and cartography to adjudicate differences in interests.

The strategy field has long considered the impact of each of these dynamics separately. Research on the role of managerial cognition has examined the impact of interpretations on strategic outcomes (see Huff 1990, Walsh 1995). Research on the political pursuit of interests has highlighted the influence of agenda setting, impression management, and power plays on strategic choice (cf. Dutton and Ashford 1993, Eisenhardt and Bourgeois 1988, Pettigrew 1973). Yet rarely does research in these two areas intersect (but see Kaplan 2008). However, when starting from the ground up in an analysis of how PowerPoint is used in daily strategy-making practice, the connections between cognition and politics are unavoidable. Collaboration and cartography are two sides of the same coin: these dual practices are the means by which organizational participants collectively sort through uncertainties and make strategy.

Just as Latour and Woolgar's "Laboratory Life" (1979) showed how writing scientific articles was a means of establishing what was "true" or not (see also Knorr-Cetina 1981), this paper proposes that there is a parallel "strategy life" at CommCorp (and by inference in other organizations) in which the production of PowerPoint documents was a means to generate and legitimize knowledge. These activities shaped the information presented to decision makers and therefore the decisions that they made. Thus, strategy was not only about analyzing industry structure, competitive positioning, or resources and capabilities to identify new strategic directions, as suggested by mainstream strategy research, but also about making and presenting PowerPoint documents.

Treating PowerPoint as part of the epistemic machinery of strategy expands our view of PowerPoint from the static reports of the kind critiqued by Tufte (2003). Such an approach shows that it is not even enough to analyze PowerPoint as implicated in dynamic performances (as articulated by Stark and Paravel 2008). Rather, we must think more broadly about the use of PowerPoint in social interaction. Facts do not travel directly into strategic choices and action. Instead, they are represented through PowerPoint documents, which are embedded in a set of practices for constructing and presenting those documents. Genre analysis offers the means to map the complex of arrangements associated with PowerPoint-in-use in the discursive practices of strategy making. What emerges is a multifaceted view of PowerPoint. Its use enables actors to sort through and decipher complex and conflicting information, but in doing so, these actors might simplify the data beyond usefulness or shape the information to suit a personal agenda. Some individuals' voices might be excluded, whereas others' might be amplified.

In some ways, this picture of PowerPoint lives up to the criticisms levied against it—the technology clearly enabled simplification, objectification, and politicization. This may not be the whole picture, however. Those features are not necessarily "bad" in the sense that they were part of what made knowledge production possible in a highly uncertain context. PowerPoint documents became a space for the collective negotiation of meaning and the adjudication of interests as CommCorp managers attempted to respond to market uncertainties. Research has suggested that change can only occur when the required spaces exist in which such changes can be envisioned and enacted (Kellogg 2009). The analysis of PowerPoint presented here demonstrates that the affordances of this technology create a space where new strategies and organizational changes can be negotiated. These affordances also have the effect of democratizing strategy making by facilitating the inclusion of ideas from disparate sources and giving voice to people up and down the hierarchy of the organization through their production of PowerPoint documents. However, these opportunities are most open to those with political skills (Kellogg 2011) for managing strategic knowledge production. Through these processes, organizational participants were able to reach decisions about investments in technologies that would affect the strategic direction of the firm. PowerPoint use was an essential part of the culture within which these strategies were constructed.

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Endnotes

[1]PowerPoint is a registered trademark of the Microsoft Corporation.

[2]A search on Amazon.com™ turns up thousands of how-to manuals, with titles such as *PowerPoint 2007 for Dummies, PowerPoint 2007 Bible,* and *Beyond Bullet Points: Using Microsoft Office PowerPoint 2007 to Create Presentations That Inform, Motivate, and Inspire*. Even a book titled *Why Most PowerPoint Presentations Suck* is aimed at helping people use PowerPoint more effectively.

[3]WebEx is a product of Cisco, and NetMeeting (more recently replaced with Windows Meeting Space) is a product of Microsoft. These and similar products allow geographically dispersed meeting participants to log into a website, see a presentation as it is being projected, and participate in the discussion (a multimedia conference call).

[4]The company name, the identities of projects and technologies, and the names of individual actors are disguised.

[5]Although the structure of the template shifted over time and not everyone in the organization was clear on what it contained, the basic components were the following: a decision statement, resource requirements, a description of the technology, an analysis of CommCorp's potential market share, a summary of letters of support from internal and end customers, a risk assessment, program milestones, and a project plan (including budget).

[6]He is referring to the notes section available in PowerPoint that allows for annotating slides.

[7]The communications infrastructure backbone is described according to the International Standards Organization OSI (open systems interconnection) model for "layers" within it. In brief, layers 0–1 are the basic physical hardware of the system (and the traditional focus for CommCorp). Layers 2–3 focus on data and networking. Layers 4–7 add on transport, protocols, and applications (such as TCP, SSL, or HTTP).

[8]The nature of the technology is disguised.

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