

When Is a Preannounced New Product Likely to Be Delayed?

Consider that a firm announces a deadline for a new product introduction. Conditional on such a preannouncement, how must an external observer evaluate whether the product will be delayed beyond that deadline? Using data collected from managers in the computer hardware, software, and telecommunications industries, the authors present an analysis that demonstrates that delays in new product introductions beyond preannounced deadlines can be jointly explained by factors related to (1) the firm's motivations to delay the product, (2) the presence of constraints that prevent delay (or the availability of opportunities to delay the product), and (3) the firm's abilities pertaining to product development.

A new product preannouncement (NPPA) is a formal, deliberate communication that releases information about a product well in advance of the product's actual introduction (Eliashberg and Robertson 1988; Koku 1998). Preannounced products are often delayed, particularly in technology-intensive industries. For example, as many as 47% of 123 key software products that were announced before introduction during 1985–1995 were delayed by more than three months (Bayus, Jain, and Rao 2001). According to the Standish Group's 1995 survey of 8000 U.S.-based software projects, 84% did not finish on time, on budget, or with all features installed (Hoch et al. 2000). Furthermore, more than 30% of the projects were cancelled before completion.

When a product is preannounced, delays in introduction can cause a slew of problems for partner firms and customers. Delays can also hurt the announcing firm. Hendricks and Singhal (1997) study 101 firms that did not meet product introduction deadlines and find that delay announcements, on average, decreased the firms' market value by 5.25% (or, equivalently, by a substantial \$119.3 million, measured in 1991 dollars).

However, NPPAs can also be beneficial: They can advertise a firm's presence at the cutting edge of technology, enable customers and partners to prepare for the product, and provide information to the stock market. Preannouncements can also promote social welfare and increase competition (Fisher, McGowan, and Greenwood 1983; Landis and Rolfe 1985).

The phenomenon of product introduction delays beyond preannounced deadlines has attracted attention across man-

agerial, research, and policy arenas. The following question is of particular interest: From the perspective of an observer outside the preannouncing firm (e.g., a customer, a manager in a firm that is a competitor or a partner/complementor), how should a preannounced product introduction deadline be evaluated? After all, talk is cheap.

The literature lacks a systematic empirical analysis of the factors that lead to delays in the introduction of preannounced products; this article addresses the corresponding knowledge gap. Adopting the perspective of an outside observer who has the task of evaluating an NPPA, we theoretically motivate and empirically validate a framework that explains delays in NPPA fulfillment. *Ex ante*, such an accounting can help the outside observer arrive at more informed, better-reasoned conclusions about specific NPPAs. *Ex post*, such an accounting can facilitate a richer interpretation of a delay that has already occurred.

In constructing the framework, we draw from the motivation–opportunity–ability (MOA) paradigm that has been employed in other contexts (e.g., Heer and Poiesz 1998; MacInnis, Moorman, and Jaworski 1991). We demonstrate that a robust accounting for product delays beyond the preannounced introduction date must incorporate explanatory variables related to motivation (i.e., whether the managers in the firm *want* to introduce the product on time), opportunity (i.e., whether certain forces *constrain* managers from delaying the product), and ability (i.e., whether the firm and its managers are *capable* of introducing the product on time).

We do not focus here on either the motivations for preannouncements or the decisions regarding the lead time to product introduction (i.e., the length of time between the date of the preannouncement and the promised introduction date). Rather, our focus is on explaining product-launch delay beyond the preannounced deadline, conditional on the preannouncement being made. This approach is particularly appropriate from our adopted perspective of the outside observer.

We first synthesize existing perspectives about NPPAs and then present a conceptual framework and describe the survey methodology. We subsequently discuss the empirical findings and the limitations of our study.

Background

Researchers across disciplines have studied issues related to NPPAs; for example, the issue of whether a firm should pre-

Yuhong Wu is Assistant Professor of Marketing, Christos M. Cotsakos College of Business, William Paterson University (e-mail: wuy@wpunj.edu). Sridhar Balasubramanian is Assistant Professor of Marketing, Kenan-Flagler Business School, University of North Carolina, Chapel Hill (e-mail: balasubs@bschool.unc.edu). Vijay Mahajan is John P. Harbin Centennial Chair in Business, Department of Marketing, McCombs School of Business, University of Texas at Austin, and Dean, Indian School of Business, Hyderabad (e-mail: vijay.mahajan@bus.utexas.edu). Yuhong Wu and Sridhar Balasubramanian acknowledge support from the Center for Customer Insight at the McCombs School of Business. Yuhong Wu acknowledges support from the Dora Bonham Memorial Fund at the University of Texas. The authors thank Barry Bayus, Richard Briesch, Eli Cox, Robert Prentice, Phillip Zerrillo, and other faculty and doctoral students at the McCombs School of Business and at the Kenan-Flagler Business School for their useful suggestions.

announce has been considered from both analytical (Farrell and Saloner 1986) and empirical (Eliashberg and Robertson 1988) perspectives. Farrell and Saloner (1986) argue that NPPAs can halt competitive momentum in network-based markets. Eliashberg and Robertson (1988) enrich this perspective by establishing detailed conditions that guide the NPPA decision. For example, they demonstrate that large firms may hold back from NPPAs on account of antitrust concerns and potentially significant cannibalization of existing products. Strategic motivations may drive the NPPAs of yet other firms; the credibility of the preannouncements may depend on the presence or absence of a credible threat to entry (Desai and Srinivasan 1994), the existing reputation of the announcing firm (Levy 1995), and the development costs of the announcing firm (Bayus, Jain, and Rao 2001).

If a firm preannounces, when should it do so? Lilly and Walters (1997) and Kohli (1999) examine this issue of NPPA timing by providing a propositional inventory that describes how factors related to competitors, products, buyers, and the preannouncing firm can influence such timing. Kohli empirically illustrates how purchase patterns, customer learning needs, and expected competitive reactions influence such timing.

Finally, what are the effects of NPPAs and the implications of not living up to them? In this context, Robertson, Eliashberg, and Rymon (1995) examine the likelihood, aggressiveness, and path of a firm's reaction to a competitor's NPPA. In addition to demarcating a range of industry- and signal-related factors that guide such reaction (e.g., the firm's commitment to the product category, available patent protection), Robertson, Eliashberg, and Rymon find that firms may respond to NPPAs that use marketing-mix instruments other than the product itself. Koku (1998) examines stock market reactions to NPPAs and finds that the stock market reacts positively to new product announcements accompanied by detailed information releases rather than NPPAs. Hendricks and Singhal (1997) determine that not living up to NPPAs can erode market capital.¹

The existing literature provides insights into the existence, nature, and effects of NPPAs. However, from the perspective of an outside observer, a systematic examination of factors that may cause a new product to be delayed beyond the preannounced deadline is missing in the literature. Research on this issue represents a logical extension of existing work in the area.

Conceptual Framework

Multiple factors can cause a product to be delayed beyond a preannounced deadline. First, research on new product development has focused on how the lack of firm-level abilities can delay product introductions. These studies have highlighted the role of technical problems related to design and development, poor management of the development process, and the lack of resources and senior management support. Suggested remedial measures include the imple-

¹Heil and Walters (1993) use a signaling framework (e.g., Heil and Robertson 1991; Spence 1974) to examine incumbent reactions to new product introductions (rather than to NPPAs).

mentation of cross-functional teams and concurrent engineering and the allocation of adequate managerial resources toward development (e.g., Cooper 1995; Gupta and Wilmon 1990; Hendricks and Singhal 1997). The firm's internal capabilities play an important role in determining whether a firm conforms to a preannounced deadline; however, they provide only a partial accounting of delays, particularly when the introduction has been preannounced.

Irrespective of a firm's ability to introduce a product on time, it may be motivated to delay a preannounced product. For example, the NPPA may be designed to preempt or respond quickly to a competitor's initiative. In such cases, the NPPA may aim more to prevent customer defection in the short run by promising an upgraded product in the near future. When the threat from the competitor has been successfully eliminated, the incentive to introduce the product on time is diluted.

Finally, even when a firm is motivated to delay product introduction beyond a preannounced deadline, the firm's key customers and partners, who may be adversely affected by such delays, may constrain the firm to introduce the product on time (i.e., pressure from these entities may shrink the opportunity for delay). These entities often schedule their own activities and initiatives on the basis of the expectations set up by the preannouncement. Consequently, from their perspective, delays beyond preannounced deadlines can be inconvenient and expensive.

Taken together, these arguments suggest that any explanation of delays in the introduction of preannounced products must accommodate the announcing firm's ability to introduce the product on time, its motivations to delay the product, and the presence or absence of opportunities to delay the product. Such MOA triads have been applied in the consumer behavior literature to study how consumers process information (Andrews 1988; Batra and Ray 1986; Heer and Poiesz 1998; MacInnis and Jaworski 1989; MacInnis, Moorman, and Jaworski 1991). The motivation-ability framework has also been applied in the marketing and strategy literature to study organizational behaviors (e.g., Chen and Hambrick 1995; Grewal 2001).

We selected specific constructs related to the framework as follows: We began with a large set of variables based on the existing literature on product delays in general, and we then winnowed down the list to focus on a smaller set of salient variables. We achieved this refinement in two ways. First, we examined the literature thoroughly to identify and include constructs that were particularly salient for preannounced products. Second, we conducted in-depth, in-person interviews with eight managers from firms across the computer hardware, software, and telecommunications industries. The interviews provided a practical perspective on product delays in the context of NPPAs and helped us demarcate key constructs related to the announcing firm's motivations, opportunities, and abilities. Figure 1 describes the resulting conceptual framework.

Note that some of the antecedent variables in Figure 1 may influence (1) the time to actual launch from the date of the preannouncement (e.g., t_1) and (2) the preannouncement lead time (i.e., the gap between the date the preannouncement is made and the promised product introduction date;

e.g., t_2). The difference between the two time durations ($t_1 - t_2$) constitutes the product introduction delay, which may be negative if the product is launched before the preannounced deadline. Figure 1 thus presents what may be considered a reduced-form model that is particularly relevant from an outside observer's perspective, because such an observer can evaluate an NPPA only after the introduction deadline is announced. Stated differently, we treat the preannouncement date as exogenously determined.²

Factors Related to Motivation

Competitive objectives. Firms frequently employ NPPAs to communicate plans for a retaliatory move against a competitor and to preempt competitive entry (Rabino and Moore 1989). Kohli (1999) notes that approximately 25% of the preannouncements in his study were made in response to a competitor's announcement or product introduction. Such NPPAs can deliver significant competitive advantages (e.g., IBM's NPPA about its disk-drive system for storing data on mainframe computers flattened the sales of the industry leader EMC) (Lohr 1994).

A new product is likely to be delayed when it is preannounced with competitive objectives. For an NPPA to hinder the momentum of a competitor's product, it must be communicated shortly before or after the competitor's own announcement or introduction. In a firm's haste to act, it may communicate either a new product concept that is at an early stage of development or plans for a product that has not yet been conceived in sufficient detail.³ In each case, there is tension between high levels of uncertainty and the need to convince the market immediately that the firm will have a competitive offering available in the near future. Furthermore, announcements made in reaction to those of competitors are more likely to be "smoke," that is, designed expressly to forestall any deleterious defection of customers and partners while the firm considers a more deliberate response.

Even if a new product preannounced in a preemptive or reactive context has been under sustained development, it may need major changes to match or exceed the competitor's announced or introduced offering. Consequently, market introduction may be delayed. On the basis of these arguments, we propose the following:

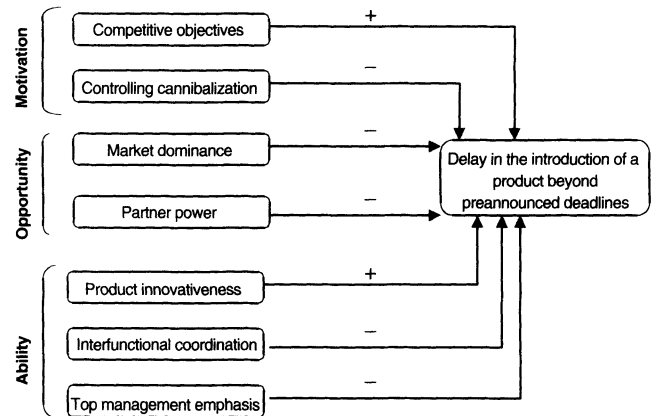
H_1 : As the degree to which a firm uses an NPPA as a competitive tool to preempt or react to a competitor's move increases, the delay in introducing the preannounced product increases.

Controlling cannibalization. New product sales can come from market expansion (i.e., demand stimulation), sales of competing products, or cannibalization of sales of

²We thank an anonymous reviewer for this interpretation.

³For example, consider Airbus's NPPA about its double-decker 555-seat A3XX jetliner. The A3XX was to compete with Boeing's 747-400 Jumbo, which dominates the long-range, large-carrier market. Boeing responded by preannouncing a 747X Stretch version with a lengthened upper-deck hump, sleeping berths over coach class, and high-quality in-seat entertainment. Boeing then withdrew the plans for the 747X in favor of a smaller, near supersonic passenger aircraft: the Sonic Cruiser. Plans for this plane, too, are now on hold.

FIGURE 1
Explaining Product Introduction Delays Beyond Preannounced Deadlines: An MOA Framework



the firm's existing products (Kohli 1999). When a new product is expected to cannibalize the sales of existing products, customers may wait for the preannounced product rather than purchase existing offerings. This can reduce cash inflow, thereby placing the firm in a dire financial situation.

The willingness to cannibalize existing products or organizational routines has sometimes been viewed as a desirable trait that promotes radical product innovation and long-term corporate success (e.g., Chandy and Tellis 1998; Copulsky 1976; Kerin, Harvey, and Rothe 1978). In such cases, firms must carefully plan for cannibalization after taking multiple factors into account, including the difference in the profit margins of the old and new products.

In general, though, the fear of cannibalization can discipline firm behavior with respect to NPPAs. The fear of cannibalization can discourage a firm from even undertaking NPPAs (Eliashberg and Robertson 1988). Furthermore, in designing NPPAs, firms that fear cannibalization may ensure that the time between the NPPA and the proposed product introduction deadline is not substantial (Kohli 1999; Lilly and Walters 1997). Finally, when a firm has preannounced, it may believe that it is pressured to meet the preannounced deadline to avoid a situation in which consumers waiting for the product continue to postpone purchases, thereby constricting the firm's cash flow. For example, Osborne Computer released a premature NPPA for its next-generation computer; the NPPA dried out cash inflow from existing computer lines and led Osborne to file for bankruptcy (Casselmann 1991). On the basis of these arguments, we propose the following:

H_2 : As the potential for cannibalization of the announcing firm's existing products increases, the delay in introducing the preannounced product decreases.

Factors Related to Opportunity

Market dominance. Dominant firms are held to higher corporate standards, and they value positive public relations and their reputation as important assets. A dominant firm's delayed product introduction is likely to have strong impacts on customers and partners/complementors. The resulting criticism can damage the reputation of the dominant firm.

Dominant firms with significantly delayed products are also more likely to attract antitrust attention from the Federal Trade Commission and other regulators.⁴ For firms such as IBM and Microsoft, such legal entanglements can absorb precious resources, including managerial attention, and can adversely affect their leadership and innovativeness. Consider this description of IBM's predicament during the early 1970s, when government litigation against the firm was at its height: "At IBM, people got afraid to move. They were afraid to take risks" (BBC News 1999). Likewise, Nicholas Katzenbach, the former U.S. attorney general who led IBM's defense, noted that during the 1970s, senior executives at IBM carried two briefcases, "one for company business and one for the lawsuit" (BBC News 1999).

The immediate effects of NPPAs may well be stronger for dominant firms. A dominant firm's NPPAs can effectively evoke consumers' fears, uncertainties, and doubts and can slow the momentum of a popular rival product (Johnston 1995). However, significant delays in product introduction can hurt the dominant firm's strategic position in the long run, because the only way a firm can trick the marketplace and get away with delayed products in the short run is by cashing in on some of its existing (good) reputation (Levy 1995).

Finally, there is empirical support for the notion that dominant firms tend to be conservative and to conform to the rules in the context of product introduction. For example, large firms are less likely to broadcast NPPAs because they are sensitive to potential antitrust action on account of "market overhanging" (i.e., preannouncing a product far in advance, with the deliberate intent of injuring competitors' sales) (Eliashberg and Robertson 1988). Likewise, it has been established that significant product introduction delays (three months and more) are negatively and significantly related to firm size (Bayus, Jain, and Rao 2001). On the basis of these arguments, we propose the following:

H₃: As the market dominance of an announcing firm increases, the delay in introducing the preannounced product decreases.

Partner power. Partner power refers to the degree to which partners can penalize the offender when an NPPA deadline is not fulfilled. Such punishment can include negative word of mouth, reduced cooperation, and even termination of the relationship.

Delayed product introductions are particularly harmful for the firm's partners in high-technology industries. When changes in technology are rapid and product life cycles are short, complementary products from partners are often developed in parallel with the focal product and are based on the projected timing and features of the focal product. The NPPAs can encourage partners to undertake the risks

involved with such concurrent development. When the preannounced product is delayed, the expected cash flows of partner firms may not materialize, because their products may not have independent markets. For example, when an operating system is late, application software developers may need to stretch budgets for 6 to 18 months or even abandon projects altogether (Scannell and Johnston 1994). The systems integrator and Sun Microsystems reseller DigiNet ceased operations partly because of the inability of Sun's Java programming language to deliver on its promises in a timely manner (Gage and Foley 1998).

Complementary products' added value to the focal product can endow partners with the potential ability to punish the offending focal-product producer; however, that ability is likely to be moderated by the differential distribution of power and mutual dependence of the parties. This ability to punish is curtailed when (1) the market for complementary products is competitive, (2) the partners are relatively small, (3) there are few other ways to get to market apart from associating with the focal product, and/or (4) the partners have incurred substantial fixed costs specific to the focal-product producer. In such cases, the focal-product producers are less likely to live up to their commitments; however, in other cases, the partners may wield significant influence over the announcing firm. For example, the influence of partners may be enhanced when the relationship between the announcing firm and its partners is guided by strong relational norms that curtail opportunistic behavior (Heide and John 1992). In other cases, the announcing firm may itself be tightly linked to its partners through either idiosyncratic investments that are difficult to deploy in other relationships or contractual terms that constrain activities related to that relationship (Anderson and Weitz 1992). In these conditions, the adverse consequences of delaying the product are likely to be significant, and the announcing firm will try to meet preannounced deadlines.⁵ On the basis of these arguments, we propose the following:

H₄: As partner power increases, the delay in introducing the preannounced product decreases.

Factors Related to Ability

Product innovativeness. Product innovativeness reflects the degree to which new technology and advanced features are embedded in a product. Two innovation dimensions are relevant here: the technology dimension and the market/customer dimension (Abernathy and Clark 1985; Chandy and Tellis 1998).

Product innovativeness increases uncertainty in the product development and marketing contexts and can delay product introduction. First, in the development context, innovative products are associated with increased technological risk (i.e., the firm may not be able to effectively design and efficiently manufacture the product). To control technological risk, firms need to sequence and carefully manage complex development processes, but this can be a challenging task (Krishnan, Eppinger, and Whitney 1997).

⁵Although we initially included customer power as an explanatory variable in the model, we dropped it on account of measurement problems.

⁴The ruling of Judge Stanley Sporkin in Civil Action No. 94-1564 (*United States of America v. Microsoft Corporation* 1995, § V.B.3) offers evidence of a dominant firm being scrutinized for the practice of aggressive preannouncement: "Microsoft has a dominant position in the operating systems market, from which the [g]overnment's expert concedes it would be very hard to dislodge it. Given this fact, Microsoft could unfairly hold onto this position with aggressive preannouncements of new products in the face of the introduction of possibly superior competitive products."

In addition, firms may reduce technological risk by designing and rigorously testing new product platforms, seeking new technology partners, and building new knowledge related to the product. These initiatives can take considerable and unpredictable amounts of time. Therefore, increased technology uncertainty can prolong development and delay the product beyond the promised deadline.

Second, innovative products are associated with increased market risk (the risk that the product may not find market acceptance even after successful design and manufacture). Firms typically preannounce innovative products early to advance consumer learning (Eliashberg and Robertson 1988) and to build a sense of familiarity that diminishes resistance to the unknown and unfamiliar (Lilly and Walters 1997). Although preannouncement of an innovative product may help prepare the marketplace for change, it is frequently difficult to control the pace of the development process and, accordingly, to predict the product's introduction date with confidence. Given that uncertainty is gradually clarified as the firm progresses through the development process, deadlines promised in NPPAs for innovative products are more likely not to be fulfilled. On the basis of these arguments, we propose the following:

H₅: As the innovativeness of the preannounced product increases, the delay in introducing the preannounced product increases.

Interfunctional coordination. Interfunctional coordination refers to the extent to which the work activities of different functions are logically consistent, coherent, and mutually coordinated with respect to preestablished performance objectives (Cheng 1983; Wood and Tandon 1994). Interfunctional coordination has been associated with greater new product success and a stronger market orientation (Cooper 1984; Kohli and Jaworski 1990).

New products are frequently delayed by a lack of coordination both among members of the core product development team and between the product team and functional areas such as marketing and manufacturing (Jenkins 1988). Product teams often accuse functional areas of being overoptimistic about development outcomes and timelines and of disseminating news without careful consultation with developers (Kay 1992). Kay (1992) cites the example of Monarch Computer, which promised its textile industry customers a six-month delivery time frame for a new knitting machine. The director of software development noted, "they were only concerned with selling the machine itself, and it didn't even occur to them that it may be difficult to write the (software) system that drives the machine within the six months" (Kay 1992, p. 81). However, management and marketing had their sides of the story as well. They complained that developers kept working on the product until they were completely satisfied, without realizing the urgency of introducing a product on time to beat competition.

Cross-functional teams are increasingly used in new product development. The members of such teams have collective knowledge that cannot be effectively held by individual members; therefore, coordination is crucial if the embedded knowledge possessed by team members is to be translated into *embodied* knowledge that is resident in the

product (Madhavan and Grover 1998). Cross-functional product development teams can support timely product introductions (Cooper 1995); however, for such teams to work well, effective interfunctional coordination is required. On the basis of these arguments, we propose the following:

H₆: As the interfunctional coordination in the firm increases, the delay in introducing the preannounced product decreases.

Top management emphasis. Top management shapes an organization's values (Kohli and Jaworski 1990), and its emphasis on timely product introduction can influence the attitudes of lower-level managers toward delay in product launch. If top management believes that a delay in introducing a preannounced product is a mistake that the firm does not want and cannot afford to make, that message would influence the entire product development process, including decisions related to NPPAs. Living up to public commitments would then be a priority for the firm.

Senior managers at many firms work to define and improve the product development process. At EDS, Dick Brown, the chief executive officer, who inculcated a culture of living up to internal and external commitments, noted: "It's easier to miss a budget than a commitment, because a budget is just an accumulation of numbers. A commitment is your personal pledge to get the job done. And that's how we strive to behave as a team" (*Fast Company* 2001, p. 106). At EDS, the company's leaders know exactly when a client's expectations are not being met. At another consumer product firm, top management established an informal but widely known two-year deadline for bringing new products to market. Managers who consistently met these deadlines were promoted.⁶

When top management sets an appropriate tone, lower-level managers strive to introduce the preannounced product in a timely manner. On the basis of these arguments, we propose the following:

H₇: As top management's emphasis on delivering a preannounced product on time increases, the delay in introducing the preannounced product decreases.

Methodology

Data Collection

The unit of analysis is an NPPA in the computer hardware, software, and telecommunications industries. These industries preannounce new products more often than other industries. Furthermore, the focus on a limited set of industries ensures sufficient within-sample consistency. Product development processes and environmental factors vary widely across industries; thus, if we studied disparate industries, we would need to control for the substantial variances. Our focus on a set of allied industries reduces the generality of the results to an extent; however, we are reasonably assured that the broad parameters related to development processes and the competitive environment are consistent across the studied firms. This enhances our confidence in the results.

⁶We thank Abbie Griffin for suggesting this example.

As a first step, we conducted in-depth, in-person interviews with eight managers from firms across the chosen industries. The interviews provided a practical perspective on NPPAs and product delays and helped segregate the antecedents of greatest importance. We acquired a list of potential respondents, including senior marketing executives in the industries, from CorpTech. We restricted participants to strategic business units (SBUs) with 250 or more employees. This ensured, by design, that we did not include small divisions in the surveys, which further enhances the comparability of results. The sampling frame covered 1252 potential respondents.

Following previous work in the area (e.g., Eliashberg and Robertson 1988; Kohli 1999; Robertson, Eliashberg, and Rymon 1995), we used key informant reports as the source for data. Typically, the head of marketing was the key informant. Most potential respondents (more than 80%) were at the level of director or higher. The questionnaire also requested a self-report of the respondent's level of knowledge about the NPPA activities of their SBU. The sample reported a high average score of 6.4 on a seven-point scale. Thus, we are reasonably confident that the respondents were able to comment authoritatively on the issues of interest.

The survey and a personalized cover letter were mailed to potential respondents. We assured potential respondents that their identities would remain anonymous and that we would only report aggregated results. Approximately ten days later, the first reminder letter was mailed. Approximately five weeks after the first copy of the survey was mailed, the second reminder letter and a new copy of the survey were mailed to nonrespondents. The projected incentive for completing the survey was that the research project would help advance managerial knowledge and guide managerial initiatives related to NPPAs; we also promised respondents a copy of the tabulated results, aggregated to ensure that respondents could not be identified. From 1252 mailings, 26 were returned because of inaccurate addresses or absence of the addressees, which reduced the frame to 1226. A total of 201 surveys were returned, for an overall response rate of 16.4%. Among the 201 returned surveys, 82 had no NPPAs in the past two years, and 6 were unusable because of missing input. Thus, we used data from 113 respondents for the final analysis.

This response rate is reasonable, and even encouraging, for the following reasons: First, the survey covered questions about the SBUs' NPPAs and product-delay times. In general, answers to these questions are confidential and/or sensitive. Second, the targeted respondents were typically heads of the marketing function (marketing vice presidents or marketing directors), who usually operate under significant time constraints (Calantone and Schatzel 2000).

To check for response bias, we classified the data into two groups on the basis of survey-return dates. We classified responses received before six weeks from the first mailing date as early responses ($n = 80$) and those we received later as late responses ($n = 33$). We compared response means for the dependent and the explanatory variables across early and late respondents; with the exception of the partner-power construct, the means were statistically indistinguishable ($p <$

.1), suggesting the absence of any significant response bias. Consequently, we pooled the data for further analysis.

Measurement

We asked respondents to provide extensive data for the most recent NPPA in the previous two years. The dependent variable measures the length of delay in the introduction of a preannounced product, which is the difference between the product introduction date specified in the preannouncement and the actual introduction date. To measure the dependent variable, we asked respondents to provide information about whether the product was delayed beyond the preannounced introduction date. If a delay did occur, we asked respondents to report the length of delay beyond the preannounced deadline (in weeks).

We generated items for measuring the independent variables on the basis of the existing literature, field interviews with eight managers, and the theoretical antecedents to the proposed hypotheses. Whenever possible, we used scales from the existing literature; however, we specifically constructed some scales for this study. We pretested the items in several steps. First, several doctoral students reviewed the items for content and readability. Second, six academic experts critically evaluated the items. Finally, eight managers who were knowledgeable in NPPA activities provided feedback. We modified items on the basis of feedback from the different sources.

We established the reliability and validity of the measures using the standard procedure that Gerbing and Anderson (1988) recommend. We performed a Varimax-rotated principle component analysis to investigate the unidimensionality of each construct. We deleted items with significant cross-loadings. The results are displayed in Table 1: Note that despite the relatively large number of constructs, there is a clean separation between the resulting seven factors (we did not prespecify the number of factors). Because of the size of the sample ($n = 113$), we did not conduct confirmatory factor analysis. Nonconvergence and improper solutions are likely to occur when sample sizes are smaller than 150 (Gerbing and Anderson 1988).

The specific items used, their sources, and the Cronbach alphas associated with their respective scales are detailed in Appendix A. All the included items demonstrated acceptable item-to-total correlations. The alphas for all scales compare favorably with the .7-and-greater criterion that Nunnally (1978) suggests, except for the scale that measures partner power. At .67, Cronbach's alpha for this scale is close to Nunnally's criterion. There are some limitations to our scales, particularly the new ones we developed for this study: We expect that they will be expanded and refined in further research.

Analysis and Results

Approximately 70% of respondents encountered some delay in introducing preannounced products. For delayed products, the average delay was 9.3 weeks (minimum 1 week and maximum 52 weeks). These findings are broadly consistent with those of Kohli (1999).

For a firm that introduces the product on time, the dependent variable (i.e., number of weeks the product is

TABLE 1
Rotated Component Matrix of Item Loadings for Independent Variables

Construct	Items	Components						
		1	2	3	4	5	6	7
Competitive objectives	OBJ1	.813	-.052	-.017	-.072	.061	.090	.000
	OBJ2	.764	.204	.152	.002	-.084	.043	-.025
	OBJ3	.900	.050	-.050	-.015	-.041	-.044	.070
Controlling cannibalization	CANN1	.039	.766	.124	-.066	-.122	-.098	.097
	CANN2	.034	.778	.067	.104	.023	-.091	.060
	CANN3	.122	.751	-.227	-.008	.042	.050	-.131
Market dominance	DOMIN1	.050	.002	.732	.085	.311	.281	.025
	DOMIN2	.149	.037	.834	-.094	.126	.051	.192
	DOMIN3	-.101	-.030	.822	-.214	.131	-.038	-.099
Partner power	POWER1	.053	.022	-.075	.874	.071	-.124	-.043
	POWER2	-.154	.017	-.134	.788	-.149	-.124	-.095
Product innovativeness	INNOV1	.080	-.329	.035	-.076	.593	.191	.123
	INNOV2	.075	.244	.192	.057	.694	.189	.190
	INNOV3	-.124	-.048	.180	-.033	.665	.137	.225
	INNOV4	-.042	.016	-.009	-.019	.783	.019	.008
	INNOV5	-.016	-.057	.272	-.015	.713	.011	.138
Interfunctional coordination	COORD1	.220	-.060	-.032	-.219	.214	.674	.294
	COORD2	.041	.107	.048	-.057	.178	.655	.443
	COORD3	.012	-.096	.093	-.040	-.010	.688	.240
	COORD4	-.057	-.098	.093	-.076	.157	.733	-.073
Top management emphasis	EMPH1	.001	-.038	.004	-.137	.071	.110	.866
	EMPH2	.047	.186	.117	.193	.099	.238	.777
	EMPH3	-.086	.137	.040	-.101	.283	.041	.709
	EMPH4	.083	-.227	.023	-.010	.057	.117	.827
	EMPH5	.035	.026	-.044	-.202	.448	.262	.585

Notes: Extraction method is principal component analysis. Rotation method is Varimax with Kaiser normalization. We did not prespecify the number of factors. For items, see Appendix A.

delayed beyond the preannounced deadline) is zero. Therefore, the dependent variable is left-censored (i.e., there is a mass point at zero representing firms that introduced the product on or before the preannounced deadline). In such cases, ordinary least squares regression yields estimates that are inconsistent and biased toward zero (Judge et al. 1985); instead, a Tobit model provides the appropriate estimation approach (Tobin 1958). We represented independent variables with their average item score.

Before estimation, we tested the data for multicollinearity. Diagnostics indicated that the variance inflation factors associated with each variable were much less than 2. Furthermore, none of the condition indexes associated with the eigenvalues of the variable matrix was greater than 20. In conjunction with the separation of constructs demonstrated in Table 1, these tests imply the absence of significant multicollinearity problems (Johnston 1991, p. 250).

An initial estimation that included dummy variables to capture potential industry-specific effects revealed no significant variation by industry; thus, we pooled the data for the final estimation. For firms with positive delay in product introduction, both a visual inspection of the residuals and a formal Glesjer test did not signal the presence of significant heteroskedasticity (Johnston 1991). We then obtained maximum-likelihood estimates using TSP 4.5. We initially included two variables (technology uncertainty and market uncertainty) to control for the possible influence of the dynamic nature of the technological environment and of rapid changes in product requirements and/or definition on

product introduction times. Neither of the variables was significant; thus, we dropped them during the final estimation.

Results

Table 2 presents the results for the Tobit estimation. In the context of motivation, as we hypothesized, objectives related to competitive reaction or preemption are positively related to delays in product introduction ($p = .016$). Contrary to the proposed hypothesis, motivations related to the control of cannibalization are also positively related to delay ($p = .035$). We advance explanations for this unexpected finding in the "Discussion" section. In the context of opportunity, we find that delays are reduced when the firm is dominant in its market ($p = .084$) and when partner power is high ($p = .083$). Finally, in the context of ability, as we hypothesized, greater product innovativeness is positively associated with delay ($p = .04$), whereas greater interfunctional coordination and a higher level of top management emphasis on timely introduction are negatively associated with delay ($p = .000$ and $p = .016$, respectively).

Discussion and Implications

This article addresses the question, Conditional on a preannouncement being made, how must an outside observer evaluate a firm's preannounced product introduction deadline? We demonstrate that to answer this question, factors related to (1) the firm's motivations to delay the product, (2) the presence or absence of opportunities to delay the product, and (3)

TABLE 2
Factors Contributing to Product Introduction Delay: Tobit Results

Predictors	Estimate	Standard Error	p-Value	Support for Hypothesis
(Constant)	21.102	7.849	.007	—
Competitive objectives (H ₁)	.455	.189	.016	Yes
Controlling cannibalization (H ₂)	.468	.223	.035	Significant, but in opposite direction
Market dominance (H ₃)	-.442	.256	.084	Yes
Partner power (H ₄)	-.615	.355	.083	Yes
Product innovativeness (H ₅)	.618	.212	.040	Yes
Interfunctional coordination (H ₆)	-1.116	.247	.000	Yes
Top management emphasis (H ₇)	-.413	.172	.016	Yes

Notes: N = 113. Positive delay: N = 80 (70.8%), Schwarz Bayesian information criterion = 334.96, and log-likelihood = -316.05.

the firm's ability to deliver the product on time must be considered. We discuss our findings next, beginning with the unexpected finding that increased cannibalization potential is associated with increased delay in product introduction.

Findings

The positive link between cannibalization potential and increased delay. When a new product that is expected to replace an existing product is preannounced, customers anticipating the former will postpone purchases of the latter. Ostensibly, managers who seek to avoid such delayed sales will strive to introduce the new product on time. Contrary to our hypothesis, though, we find that increased potential for cannibalization is associated with *increased* delay in product introduction beyond preannounced deadlines.

The following explanations are consistent with our finding. First, when existing products are performing well, managers may seek to postpone the uncertainty caused by their replacement with new, relatively untested products. Such an aversion to the potential downsides of replacement may be more pronounced as the product introduction deadline approaches. Increased aversion of this kind to potential losses in the short run is consistent with the behavioral phenomenon of myopic loss aversion (Benartzi and Thaler 1999).

Second, the new product may present a less attractive profit proposition because it may (1) involve higher variable costs than anticipated and thus cannot quickly reap economies of scale in production; (2) involve substantial unforeseen expenditures related to advertising, consumer education, and other aspects of information dissemination; and (3) need to be priced lower than expected to penetrate the market sufficiently even while embedding more sophisticated and expensive materials and technologies. Managers and design engineers who supervise early stages of product development often focus more on issues related to innovation and technology and do not pay adequate attention to the overall economic case for product development. Furthermore, while focusing on the product under development, managers may tend to

ignore firm-level costs and implications related to the product line and customer mix (Kaplan 1990).

The economic disadvantages, both perceived and real, associated with switching to the new product are clarified and magnified as the product introduction deadline approaches. Under these conditions, the existing product increasingly takes on the characteristics of a relatively safe bet. In response, managers tend to delay the new product and treat it as an option, to be exercised at an appropriate time in the future. On the basis of these arguments, and consistent with the argument of Christensen (1997), established firms might fear cannibalization and thus delay the introduction of new technologies.

These arguments are supported by firms' real-world experiences. For example, fearing cannibalization, IBM often delayed or otherwise stymied innovative technologies and products that were ready for market entry (McGrath 2001). Although IBM developed reduced instruction set computing technology, it delayed implementing it and lost ground to competing computer makers. Likewise, IBM intentionally reduced the capabilities of PCjr to avoid cannibalizing the personal computer market. Similarly, in the early 1980s, IBM hesitated to push into desktop computers and workstations because it feared losing business on its high-margin mainframe computers. This was a lapse of great consequence that opened up the markets to new and aggressive competitors, a lapse that hurts IBM to this day.

Among the considered antecedents to product delay, note that such aversion to risk associated with the replacement of the tested and familiar with the new and unfamiliar is in a direction opposite to the stated hypothesis and works in favor of increased delay in the case of fear of cannibalization. Among other antecedents, consistent with the corresponding hypotheses, such aversion to risk, in general, works in favor of a timely introduction of the preannounced product. For example, managers who are averse to risk would work toward a timely introduction when they fear scrutiny on account of

market dominance, are apprehensive of backlash from partner firms, or seek to keep top management satisfied.⁷

Findings related to the MOA framework. The results suggest that to obtain a relatively complete accounting of factors that delay preannounced products, factors related to each element of the MOA framework must be considered. First, in the context of motivation, not every preannouncement is backed up with honest intentions. For example, firms may not intend to fulfill NPPAs when they seek to protect the substantial cash inflow from existing products or when they announce a new product to react to or preempt a competitor. Second, constraints from the strategic partners and the environment can discipline the announcing firm's product introduction plans and increase the likelihood of timely introduction. Third, some delays in product introduction may derive from the true inability of the announcing firm to uphold its promises made in good faith. For example, the challenges encountered in the development of innovative products are difficult to anticipate *ex ante* and can be underestimated in the excitement and can-do spirit associated with new product and NPPA activity.

Managerial and Policy Implications

The findings offer guidelines for outside observers who seek to evaluate NPPAs, for managers who design NPPAs, and for policy planners who seek to reduce the anticompetitive effects of product-introduction delays beyond preannounced deadlines.

NPPA evaluation. From the perspective of an outside observer, a blind acceptance of product introduction deadlines in an NPPA can prove a costly mistake; many companies have suffered substantial financial losses while waiting for preannounced products, and some have gone out of business while doing so. In response, though, observers of NPPAs in the field have tended to smother all NPPAs in a blanket of suspicion and to develop rather rough heuristics to deal with the problem. For example, consider the reaction of a senior information technology manager (Brandel 1994, p. 14): "Always wait until Version 1.1 or 1.2[;]... the software version that ends with .0 is always deadly."

When outside observers integrate information about the factors related to all components of the MOA triad as demarcated in this study, they are in a better position to interpret and evaluate NPPAs and to arrive at more informed conclusions about how they should react.

However, before evaluating the NPPA, outside observers must develop a keen understanding of the conditions that lead to the predictors themselves. For example, consider the ability of partners to punish the announcing firm. This ability might depend on the level of mutually embedded assets that the firm and the partners possess (the greater such embeddedness, the lesser is the ability of a partner to walk

⁷Dominant firms may be less willing to delay preannounced products to avoid cannibalizing existing offerings; that is, the degree of dominance may moderate the estimated positive relationship between fear of cannibalization and introduction delay. *Ex post*, we estimated a Tobit model with an interaction term to explore for such a moderating effect. Although the interaction term was not significant, this moderating effect deserves closer attention in further research.

away and thus the lower is its ability to punish), the availability of other partners to switch to, and the degree to which product standards compel the partners to stick with the announcing firm. After considering such conditions that relate to the predictors, observers can meaningfully judge the salience of each predictor in a specific context.

When a high probability of delay is associated with an NPPA, observers can take steps in response. As we subsequently describe, these steps vary according to whether the observers are managers in partner or complementor firms, managers in competing firms, or customers.

Managers in partner or complementor firms are primarily concerned with reducing their exposure to delay. First, these managers can avoid overcommitment by defensively scheduling projects that embed the preannounced product. Second, they can seek more credible commitments for skeletal versions of the product from the announcing firm: These versions may deliver lower functionality but can be introduced in a shorter time frame. Third, they can coordinate with other partner firms to emphasize collectively the importance of meeting promised deadlines to the announcing firm. Finally, in the absence of other recourse, they can plan around the preannounced product or switch to competing products.

Managers in competing firms are primarily concerned with designing their business strategies to accommodate the moves of the announcing firm. When these managers estimate that the focal firm is not likely to adhere to a promised product introduction deadline, they must avoid the tendency to overreact. This does not imply that they must take no actions in response to the NPPA; rather, the nature and degree of their response must be carefully calibrated to accommodate the likelihood that the preannounced product either may be significantly delayed or may not even materialize. For example, these managers may proceed with plans for developing a competing product to an extent, thus leaving further development and launch as options to be potentially invoked as the announcing firm clarifies its plans and intentions.

A customer evaluating an NPPA can choose between adopting an existing product of the announcing firm (or of a competitor) and postponing the adoption decision (in which case either the preannounced product or any other product can be adopted at some future point). Much as complementor and partner firms do, customers must develop contingency plans in case the preannounced product is delayed and/or an appropriate substitute is unavailable. Furthermore, customers must be particularly careful to avoid the sunk-cost fallacy (i.e., a long wait for a preannounced product must not be used to justify a decision to wait even longer). Instead, customers must dispassionately evaluate the costs and benefits of waiting longer at periodic intervals.

Designing an NPPA. From the perspective of managers in the announcing firm, the results draw attention to conditions that can hinder the implementation of NPPAs according to preannounced deadlines. For example, managers must think twice before instinctively reacting to competitors' NPPAs or aggressively preempting their forthcoming initiatives. It may be tempting to forestall customer migration to the competitor in the short run, but such a move may have significant negative consequences in the long run, including dilution of the firm's marketplace credibility. Likewise, even at an early

stage of product development, managers must carefully evaluate whether they are ready to cannibalize a profitable, well-established product with a new product that may be technologically advanced but offers risky market prospects and is less profitable on a per-unit basis. In addition, management should act more conservatively when deciding on introduction times for highly innovative products.

Policy implications. Although there may exist some policy benefits of ensuring that all new products are introduced according to preannounced deadlines, the delays that raise the greatest antitrust and anticompetitive concerns are those that are intentional or strategic (these broadly correspond to the motivation aspect of our analysis). However, as is shown in Appendix B, it is exceedingly difficult to distinguish between strategic and innocent delays. There is an intense debate in the policy arena about whether all substantial delays in preannounced products should be treated equally under antitrust law, regardless of the announcer's intent (much like deceptive advertising under the Lanham Act). Our findings serve as a reminder that to arrive at a fair and balanced evaluation of delays in preannounced products, factors related to opportunity and ability must be considered in parallel with those related to motivation.

Limitations and Further Research

First, although we believe that we targeted the correct key informants and that the informants provided relatively candid responses, extension of the analysis with independently collected information might lead to even greater confidence in the results. Second, our set of key explanatory variables is not exhaustive. For example, researchers might consider variables that represent customer power, development team motivation, and team leadership quality. Whereas problems with measurement inhibited the consideration of customer power in the current analysis, this variable must figure in further research. Third, the scales used must be refined and expanded in further research. This is particularly true for the scale that measures partner power, which currently comprises only two items. Fourth, we focused on a subset of

high-technology industries to reduce interindustry confounds. The study can be replicated in other settings.

The following three themes present particularly worthwhile research opportunities in the area: First is an explanation of the entire timeline of NPPA-related activities. In communicating with the marketplace in the context of new product development, managers must decide (1) when the NPPA should be made (i.e., the preannouncement date), (2) the gap between the preannouncement date and the promised product introduction date (i.e., the preannounced lead time), and (3) the actual time of product introduction (this may partly be driven by factors outside of the managers' control). A single model that considers the drivers of each of these decisions and the relationships between these decisions appears to be an appropriate next step.

Second is management of the release of information related to new product development. Little is known about how a firm should manage the entire process of information exchange with the marketplace during the product development process. For example, when and how must management inform the marketplace about delays on an ongoing basis? Such an incremental approach might help the firm better manage the expectations of various constituencies and, in turn, help it manage its own plans to accommodate such delays. Furthermore, the design of innovative NPPAs deserves attention. For example, NPPAs could provide a distribution of probabilities over a range of potential introduction times, as opposed to a single deadline.

Third is the establishment of the timeliness-quality trade-off. Because product introductions tend to be well-defined public acts, research has focused on issues related to the timing of new product initiatives. However, firms can often trade off timeliness against quality (e.g., it may be possible to introduce a product of marginal quality on time). When the focus is solely on introduction timing, the issue of *what* is being introduced into the marketplace is overlooked. The relationships among NPPA deadlines, product introduction timing, and product quality require closer examination; a focus on timing alone tells but part of the story.

APPENDIX A Construct Items and Reliability

Construct	Scale Items	Source
Competitive objectives $\alpha = .79$	<ol style="list-style-type: none"> 1. One objective of our last new product preannouncement was to respond to or to preempt a competitor's announcement/introduction of a new product. 2. One objective of our last new product preannouncement was to discourage customers from switching to a competitor's product. 3. Our last new product preannouncement was not related to competitors' new product introduction activity or plans. (reverse coded) 	New scale.
Controlling cannibalization $\alpha = .70$	<ol style="list-style-type: none"> 1. The sale of the preannounced new product may come from three sources: (1) sales replacing our existing products, (2) sales displacing our competitors' products, and (3) sales from new customers. Please estimate the percentage of the new product sales that was expected to come from a replacement of the existing product sales. 2. The preannounced product was expected to greatly reduce the cash inflow from our existing products. 	Item 1 is adopted from Kohli (1999).

APPENDIX A
Continued

Construct	Scale Items	Source
	3. For the preannounced product, the possibility that customers might delay purchases of existing products was a serious concern.	
Market dominance $\alpha = .78$	<ol style="list-style-type: none"> 1. Perceived dominance within the product category. 2. Perceived leadership within the product category. 3. Product category market share relative to that of the top four players. 	Items 1 and 2 are adopted and Item 3 is adapted from Eliashberg and Robertson (1988).
Partner power $\alpha = .67$	<ol style="list-style-type: none"> 1. Our complementors will need to rely on us in the future even if our relationship is not on the best terms. (reverse coded) 2. Our complementors are very dependent on our product to serve their customers. (reverse coded) 	New scale.
Product innovativeness $\alpha = .78$	<ol style="list-style-type: none"> 1. The preannounced product included innovative product features. 2. High-quality technological innovations were embedded in the preannounced product. 3. Compared to similar products developed by our competitors, the preannounced product offered unique features/attributes/benefits to customers. 4. In terms of the embedded technology, the preannounced product was substantially more innovative compared to existing products available in the market. 5. The preannounced product was only a minor product improvement/modification over existing products available in the market. (reverse coded) 	Items 1, 2, 3, and 5 are adapted from Sarin and Mahajan (2001).
Interfunctional coordination $\alpha = .75$	<ol style="list-style-type: none"> 1. The activities of the different functions are well coordinated. 2. Management teams from different functions feel that the goals of their respective functional groups are in harmony with one another. 3. We share resources with other functional units within the organization. 4. Functional units in our organization often blame each other when products fail. (reverse coded) 	Item 2 is adopted from Jaworski and Kohli (1993). Item 3 is adopted from Narver and Slater (1990).
Top management emphasis $\alpha = .86$	<ol style="list-style-type: none"> 1. Top managers emphasize that delivering a new product on time is key to product success. 2. Top managers clearly communicate the message that failure to deliver preannounced product on time causes great harm to the company's reputation and image. 3. Top managers emphasize that we will not announce a product unless we are confident that it will be launched on time. 4. Top managers here generally tolerate product delays well. (reverse coded) 5. Delivering a product within the preannounced time frame is a top priority for our senior managers. 	New scale.
Technology uncertainty (control) $\alpha = .75$	<ol style="list-style-type: none"> 1. In this product category, technology is changing rapidly. 2. In this product category, technological changes provide big opportunities. 3. In this product category, a large number of product ideas have been made possible through technological breakthroughs. 4. In this product category, technological developments are rather minor. (reverse coded) 	Adopted from Jaworski and Kohli (1993)
Market uncertainty (control) $\alpha = .73$	<p>Indicate how quickly the following factors change:</p> <ol style="list-style-type: none"> 1. Customers' preferences for product features 2. Competitors' selling strategies 3. Competitors' products and models 4. Competitors' product pricing 5. Competitors' promotion/advertising strategies 	Items 1, 2, 3, and 5 are adopted from Maltz and Kohli (1996).

Notes: Except for Item 1 in the product cannibalization scale, we measured all items on a seven-point Likert-type scale (1 = "strongly disagree" and 7 = "strongly agree").

Appendix B

When Is a Delayed Product Vaporware?

Vaporware has been variously defined as the occurrence of substantial product introduction delays, the absence of promised features, or even the belief that a preannounced product will never ship. However, the most common interpretation of vaporware pertains to the intent to deceive on the part of the announcing firm. Vaporware is controversial precisely because of this; in the absence of a smoking gun (e.g., a transcript of internal meetings or an exchange of e-mail) that captures such intent, the occurrence of vaporware is difficult to prove. As Prentice (1996, p. 1175) argues, delays in NPPA fulfillment may be perfectly innocent and are to be expected:

Of course, not all of the products will meet projected introduction dates. Others may not carry all the promised fea-

tures. Others may not see the light of day. After all, the design, testing, and manufacturing of high-tech products is a very complicated business. Many projects are so very complex that it is nearly impossible to know when all the glitches will be worked out. Not all delays are foreseeable. Not all broken promises are broken intentionally.

In the proposed MOA framework, the variables related to motivation are the ones that are most likely to be associated with vaporware. However, even when variables related to motivation are relevant and must be accommodated by an outside manager in evaluating an NPPA, it is difficult to prove intent to mislead in a court of law. To prove such intent, it is not sufficient to demonstrate, for example, that the NPPA was made in reaction to an announcement from a competitor. Instead, it must be demonstrated that the information in the NPPA was not merely a reflection of the honest, if overambitious, intentions of the announcing firm but that the NPPA was explicitly designed for anticompetitive purposes.

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