

# De-escalation Mechanisms in High Technology Product Innovation

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## Abstract

Many organizations struggle to reduce commitment to failing endeavors. While such de-escalation mechanisms have been documented and tested in information technology, accounting, psychology, and organizational behavior, little work has addressed de-escalation in *innovation*. This study identifies and examines the applicability of de-escalation mechanisms specifically in new product development projects. Initially, we conducted an extensive literature review to identify de-escalation mechanisms found in research across different academic disciplines. Subsequently, we conducted a qualitative study using semi-structured interviews to gather primary data. In total, using a sample of organizations that compete in high technology industries, 31 managers and engineers in 15 new product development projects that were terminated prior to completion were interviewed regarding mechanisms used to de-escalating commitment to failing new product innovation projects. Several mechanisms reportedly used for innovation projects parallel those identified in the previous literature. More importantly, the authors uncover novel and previously undocumented ways to discontinue or redirect poorly performing projects. Specifically, internal competitions, feature-level de-escalation, continual assumption assessment, benchmarking, roadmaps, and comprehensive product testing are particularly well-suited for innovation projects. These findings extend the body of extant literature on de-escalation of commitment to include innovation, notably in high-technology settings. The study also highlights that organizations may want to accept or even encourage failure, thereby increasing the efficacy of resource use. Implications for further research and practice are offered.

# De-escalation Mechanisms in High Technology Product Innovation

## Introduction

Managers often struggle with investment in on-going projects and throw “good money after bad,” by continuing to invest in failing projects (Staw, 1976). For example, the Iridium satellite telephone system took 11 years to develop. It involved the development and launch of 66 low-orbit satellites into space, and the investment totaled \$5 billion. During its development and execution, multiple signs indicated that the system had marketing, technical, and financial problems. Finally, when Iridium managed to acquire 1/10<sup>th</sup> of the number of subscribers it forecasted, and 20 percent of the number needed to breakeven, Iridium filed for bankruptcy (Schieffer, 2005).

Escalation of commitment (hereafter ‘escalation’) occurs when managers decide to continue funding a project, “despite information that indicates the outcome is unlikely to be successful” (Schmidt and Calantone 2002, p.104-105). Escalation equates to the inability of decision-makers to end troubled projects and effectively drains resources from other more promising projects leading to large losses for organizations. Thus, escalation represents a departure from optimal decision-making (Bazerman, Guilian, and Appleman, 1984) and can be particularly disastrous for firms in today’s hypercompetitive markets that require fast reactions and adaptability for survival (Biyalogorsky, Boulding, and Staelin, 2006).

Since escalation is widely prevalent and pernicious, organizations are explicitly developing mechanisms to *de-escalate commitment* to failing endeavors. Thus far, existing research has focused on de-escalation mechanisms in information technology, management, psychology, accounting, and organizational behavior. Several de-escalation mechanisms have been identified and tested including implementing project hurdle rates (Cheng et al., 2003), post-mortem analysis (Pan et al., 2006), self-affirmation (Sivanathan et al., 2008), increased monitoring or changing decision-makers (McNamara, Moon, and Bromiley, 2002), and third-party consultation (Kadous and Sedor, 2004).

However, de-escalation in new product development (NPD) has largely been understudied (a notable exception being Boulding, Morgan, and Staelin, 1997). This opportunity is surprising considering that escalation is a common and pervasive phenomenon in NPD (Biyalogorsky et al., 2006; Boulding, et al., 1997; Schmidt and Calantone, 1998; 2002). Additionally, Cooper (1996) notes that organizations typically struggle to improve gate decisions by managers. Given the importance of NPD for an organization's success (Henard and Szymanski, 2001), a deeper, more comprehensive understanding of de-escalation mechanisms is warranted.

The article is organized as follows. First, various de-escalation mechanisms are identified across diverse academic disciplines. Second, we build on this work by using an in-depth qualitative study of 31 NPD team members from 15 different projects in 12 U.S. based high technology firms. Our interviews with these managers provided information on de-escalation mechanisms for NPD in their respective organizations. Besides finding support for de-escalation mechanisms proposed in previous work, we identify new de-escalation mechanisms for NPD that were previously undocumented in the extant literature: conducting internal competitions between projects; de-escalating at the level of product features; continual market research, re-visiting and correcting market based assumptions; continual monitoring of roadmaps followed by benchmarking against competitor roadmaps; and comprehensive product testing. Finally, the article discusses the theoretical and practical implications for researchers and managers, along with limitations and avenues for further research.

### **Literature Review**

De-escalation of commitment is the withdrawal or reversal of escalating commitment to a failing endeavor (Flynn et al., 2009). Stated differently, it is the recognition of under-performance and either the redirection (to overcome problems) or termination of the troubled project, thereby

channeling allocated resources to more productive projects (Keil and Robey 1999). De-escalation involves a lessening of the impact of forces that underlie escalation tendencies (Simonson and Staw, 1992). One line of work characterizes the process of de-escalation by the recognition of the problem, re-examination of the project, and search for alternative options (Monteleagre and Keil, 2000; Chulkov 2009). As such, de-escalation is triggered when continued investment into a project is not expected to achieve the returns necessary to merit continuation or the odds of success diminish below an acceptable level (Pan and Ling, 2011). In summary, de-escalation includes the *process* as well as the *event* of commitment withdrawal.

Based on an exhaustive review of the extant literature, we classify de-escalation mechanisms into three categories: organizational, project, and individual. Table 1 summarizes de-escalation mechanisms and provides examples of key academic articles for each. The following section describes these mechanisms in more detail.

**[Insert Table 1 about here]**

#### *Organizational De-escalation Mechanisms*

Organization level de-escalation mechanisms can be explicitly developed as part of an organization's overall strategy. Often these mechanisms are incorporated into the culture. They include finding an alternative course(s) of action, communication with stakeholders, personnel changes, and organizational culture design.

De-escalation can be achieved by identifying, considering, and pursuing an *alternative course of action* that is different from the failing project (Ross and Staw 1993). The underlying rationale is that by identifying diverse paths, the level of institutionalization, or how ingrained a project is in the corporate culture, is reduced thereby mitigating the risk of escalation. Hence, organizations should explicitly consider alternatives to projects and implement systems to facilitate tracking projects at all stages (Keil, 1995). In addition, the consideration of alternate courses leads to more objective

evaluations and better decision-making regarding the fate of troubled projects (Boulding, et al., 1997; Ross and Staw, 1993).

Other research explores the *engagement of stakeholders*, both internal and external to the organization, as a way to reduce escalation. Communication with stakeholders drives decision-makers to engage in consensus building processes (Montealegre and Keil, 2000) and negotiations among the stakeholders (Montealegre and Keil, 1998). Once engaged, de-escalation can be facilitated by appealing to internal constituencies for support (Ross and Staw, 1993) and involving internal and external constituencies in exit strategy negotiation and implementation (Montealegre and Keil, 2000). However, caution should be exercised to not completely surrender to stakeholders. Instead, a transparent organization that carefully manages the players involved in the project (Montealegre and Keil, 2000) and creates visibility to a broader set of stakeholders is well-suited to facilitate de-escalation (Keil and Mähring, 2010). Similarly, auditors and whistleblowers are effective for de-escalation (Keil and Robey, 2001).

Strategic *personnel changes* in top managers, project managers, or product champions can also result in de-escalation (Keil, 1995). Such changes increase the likelihood of more objective decision-making by newcomers who have less history with the project and a lower risk of escalation (see Staw and Ross, 1987). Personnel changes are also likely to offer new perspectives and fresh viewpoints. Similarly, such changes often yield better transparency and communication across the organization resulting in a more judicious appraisal of the troubled project.

The organizational culture can also help firms de-escalate to an underperforming project. For example, a culture that encourages problem disclosure, has a higher tolerance for failure, is receptive to bad news, or is open to taking remedial action facilitates de-escalation (Montealegre and Keil; 2000, Pan and Pan 2011). With *open sharing and information reporting*, organizations can improve the likelihood of de-escalation (Heng, Tan and Wei, 2003). Moreover, firms can choose not to

punish the reporting of negative project news (Tan, et al. 2003). These mechanisms enable the provision of safety that can lead to better and more accurate decision-making (Pan, 2009).

Finally, an *organizational reward system* that evaluates decision-makers on the decision *processes*, rather than solely on outcomes, can also encourage de-escalation. Making negative outcomes less damaging to one's career (Simonson and Staw, 1992) and reducing the severity of penalties for failure encourage de-escalation (Newman and Sabherwal, 1996). If project managers are held accountable for good decision-making rather than completed projects, then they are more comfortable de-escalating when necessary (Simonson and Staw, 1992). Managers that explicitly create and inculcate this mechanism can decrease the need for self-justification, thus re-affirming other important organizational values (Sivanathan et al., 2009; Simonson and Staw, 1992). Along these lines, McNamara, Moon, and Bromily (2002) found that increased monitoring and changing decision-makers had the desired "first-order" effects of reducing escalation of commitment in commercial lending. However, some decision-makers exhibited "intervention avoidance," wherein they resisted reclassifying clients into higher risk categories in the face of organizational intervention, thereby escalating their commitment to these clients (McNamara et al., 2002).

In summary, organizational mechanisms are not easy to implement; changing the organizational culture, engaging stakeholders, revising evaluation and reward systems, and shifting the courses of action are difficult, time-consuming, and expensive. Organizational mechanisms often increase project monitoring costs and require the support of top management. Rotating decision-makers requires human resources flexibility and can result in a loss of continuity and knowledge. Additionally, an organization risks unintended consequences of mechanisms that may prove counterproductive. In such instances, organizational execution, especially in terms of implementing these mechanisms appropriately, becomes a key success factor for de-escalation.

Specifically, continuous top management support and supervision coupled with excellent inter-functional cooperation and coordination assumes critical importance.

*Project-Based De-Escalation Mechanisms*

Project-based de-escalation mechanisms are explicitly designed into the framework of the project for the specific purpose of reducing unnecessary commitment among decision-making managers and team members. As summarized in Table 1, project-based de-escalation mechanisms include tracking, cost and risk appraisal, and empowered team members. Each is presented next.

Project tracking and appraisal tools increase the visibility of evaluations. For example, setting and publicly stating project performance standards before commencing increases the visibility of the project's goals and benchmarks (Boulding, et al. 1997; Brockner, Shaw, and Rubin, 1979; Heath, 1995; Keil and Mähring, 2010; Keil and Robey, 1999; Simonson and Staw, 1992). *Tracking* also includes regular evaluation of projects (Keil and Mähring, 2010; Keil and Robey, 1999) with clear and precise negative feedback about underperforming projects, which improves communication and reduces the potential for escalation (Garland and Sandefur, 1990; Ghosh, 1997; Keil and Robey, 1999). In the context of capital budgeting, Cheng and colleagues (2003) found that when hurdle rates are set by the project team rather than the decision-makers, escalation was reduced; mandates imposed from higher levels in the organization are not as effective. Opposite results were found by Boulding and colleagues (1997) in a study of NPD projects who surmised that "I made the rule, I can break the rule" perspective is operational (p.167).

A second stream of research on project level de-escalation techniques is primarily concerned with *cost and risk appraisal*. These techniques include making the costs of continuing a project salient to stakeholders (Ghosh, 1997; Keil and Robey, 1999; Montealegre and Keil, 1998), assessing risks early and frequently during the project to enable clear continuation decisions (Keil, 1995; Keil and Mähring 2010), and auditing the budget and risks of a project by third-parties such as outside experts

or consultants (e.g. Kirby and Davis, 1998; Kadous and Sedor, 2004; Montealegre and Keil, 1998; 2000). For example, de-escalation can be enhanced by preparing detailed expense reports or using zero based budgeting (Newman and Sabherwal, 1996), which provide unambiguous feedback on past expenditures and information about the performance requirements related to future expenses (Ghosh, 1997). Managers can also utilize the framework of post-mortem analyses of failing projects that have faced escalation to devise useful de-escalation strategies for future project development (Pan et al., 2006).

From a project team-based perspective, Keil and Mähring (2010) advocate that organizations train and support *empowered team members* who can re-assess projects, conduct intelligent project reporting, and re-plan according to the situation. Similarly, other research has demonstrated the efficacy of specific task forces that are charged with identifying short-term alternatives to failing projects (Montealegre and Keil, 1998). Mähring and colleagues (2008) argue that project teams should explicitly include the roles of exit champions and exit sponsors who address concerns regarding the termination of the failing project. They should not be the original project sponsors and should actively support de-escalation activities. Van Oorschot, Langerak and Sengupta, (2011) suggest that when projects that run behind schedule, NPD teams are better off intervening to de-escalate by combining and using a tradeoff of decision heuristics. Along these lines, Newman and Sabherwal (1996) recommend that the later-stage progress evaluation teams exclude decision-makers who initially approved the same project. This separation of responsibility for approving and re-assessing the progress of the project dilutes the influence of self-justification and thereby the potential for de-escalation.

#### *Individual De-Escalation Mechanisms*

The third category, de-escalation mechanisms for individuals, is designed to tap into the mental framework of decision-makers involved in evaluating projects. The bottom section of Table

1 identifies individual level de-escalation mechanisms found in previous work. Individual de-escalation mechanisms include four types: bias prevention (Montealegre and Keil, 2000), monitoring (Kirby and Davis, 1998), commitment transformation (Pan et al., 2006) and self-affirmation (Sivanathan et al., 2008).

First, biases distort information and hinder effective decision-making. For example, Snow, Keil, and Wallace (2007) find the impact of bias in 60% of status reports during the development of software programs, with twice as many positively biased than negatively biased. The *reduction of biases* leads to better project continuation decisions (Montealegre and Keil, 2000).

*Monitoring* of decision-makers can be used as a de-escalation mechanism as well. Kirby and Davis (1998, p.213) find that “decision-makers whose decisions strategies are monitored are less prone to escalate commitment to a failing strategy than those who are not monitored.” Pan and colleagues (2006) find de-escalation in the form of commitment transformation during an e-government project in the United Kingdom. *Commitment transformation* comprises of three steps: the first stage involves unfreezing commitment to the previous failing course of action, followed by a stage of changing beliefs and attitudes, and concludes with the refreezing of new attitudes and behaviors (Pan et al., 2006). Hence, de-escalation acts here as a process where various psychological elements are invoked and interlaced.

Researchers have drawn from the motivated cognition literature to examine how self-*affirmation processes* influence self-justification needs and escalation decisions. Sivanathan and colleagues (2008) found that individuals with a larger pool of affirmational resources (high self-esteem) reduced their escalation compared to those with fewer affirmational resources (low self-esteem). Individuals also de-escalated their commitment when they were provided an opportunity to affirm an important value or a trait that was of little relevance (e.g., creativity) to an initial decision (Sivanathan et al., 2008). This implies that firms should explicitly consider the psyche and cognitive

abilities of decision-making managers when attempting to de-escalate failing projects since managers simultaneously experience myriads of emotions, often of a conflicting nature, while making risky project review decisions.

### **Conclusions from the Literature**

Managers use three different categories of mechanisms to reduce commitment to underperforming projects. However, little work has examined de-escalation in NPD. This is notable and surprising since NPD has been found to be especially conducive for escalation (Biyalogorsky, Boulding, and Staelin, 2006; Schmidt and Calantone, 1998; 2002). For example, the Stage-Gate®<sup>1</sup> process, which typically involves a series of stages with evaluative checkpoints or gates interspersed where project investment decisions are normally made, can be considered “a series of increasing bets” (Cooper, 2008). Additionally, NPD involves competition, risk, and time pressures that arouse conflicting emotions and impair the decision-making abilities of managers. Thus, NPD merits a more thorough investigation of de-escalation mechanisms conducive for firms that are especially engaged in risky innovation projects.

### **Research Design**

The study of de-escalation mechanisms for innovation requires exploration and theory building. Thus, a qualitative, exploratory approach was used for its flexibility and inductive data analysis. Additionally, the efficacy of qualitative studies has been shown to generate important and useful insights on innovation (e.g., Bourgeois and Eisenhardt, 1988; Koners and Goffin, 2007; Workman, 1993). The research question also required a method that would facilitate a deep investigation to uncover mechanisms not known *a priori* (Singleton and Straits, 2005). Thus, we chose to interview people who had experienced de-escalation situations in NPD projects and who

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<sup>1</sup> State-Gate® is a registered trademark of the Product Development Institute Inc.

were thus qualified to provide reliable and valid responses. Semi-structured interviews aid building rapport with interviewees, which facilitates more complete data collection (Singleton and Straits, 2005). The semi-structured interview technique also allows the researchers to build and refine theory with clarifying questions as the data is being collected (Berg and Lune, 2011). Thus, communication problems, such as the misunderstanding of idiosyncratic acronyms that are prevalent in innovation projects, are minimized. Using these methods also remedies a common and valid criticism of both escalation and de-escalation research regarding the preponderance of laboratory-based experiments (Keil and Robey, 1999; Newman and Sabherwal, 1996; Staw, 1997). For these reasons, we selected individual semi-structured interviews as the primary source of data collection.<sup>2</sup>

To gather relevant data addressing the research question, we interviewed employees of high technology firms regarding de-escalation in NPD projects. The research method used needed to be sensitive to the fact that people are usually reluctant to disclose details of failures in which they participated. Additionally, these projects involved valuable company intellectual property that is rarely discussed outside the organization. We contacted project managers at leading high technology firms in Silicon Valley and asked for their introduction to current or former managers who had taken part in failing or failed projects. We also used snowball sampling by contacting and interviewing subjects introduced to us by the first round of participants. To simultaneously ensure quality and a variety of insights, we interviewed a sample of 31 mid-level managers engaged in NPD projects. Since NPD mostly involves cross-disciplinary teams, we deliberately included a diverse set of respondents that typically engage in NPD review decision-making including four Product Managers, two Project Managers, two Program Managers, fourteen Engineers, seven Marketing

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<sup>2</sup> Although ideally we would have liked to gather triangulated data by examining relevant company documents and by observing important NPD project review meetings, companies were extremely reluctant to grant us access given the competitive nature of NPD especially in dynamic high technology markets.

Managers and two Finance Managers. At the time of the interviews, these individuals were employed in twelve leading companies in high technology markets. Nine of the companies operated in the business-to-consumer (B2C) domains (such as game studio, PC peripheral manufacturer, internet, software, and hardware products) and three of these companies operated in the business-to-business (B2B) domains (such as client virtualization products or selling design IP). The interviewees also drew their insights from companies in which they were employed prior to their current jobs.

The average years of work experience for the sample was twelve years, out of which they averaged eight years of work experience in NPD. Hence, the sample of managers had sufficient work experience, especially in NPD and could thus lend reliable and valid insights into de-escalation mechanisms. To remain flexible and make adjustments in the interview protocol as insights arose, we overlapped data collection and analysis (Eisenhardt, 1989; Glaser and Strauss, 1967), which also supported theory reflection over time (Yin, 2008). During these semi-structured interviews, the subjects were asked open-ended questions regarding their experiences with project termination where the new product project was deemed as failing and was intentionally discontinued. Questions included topics such as project details, factors that led to the discontinuation of a project, reasons why such measures were employed by the project team and mechanisms to reduce commitment to a losing course of action. The interview protocol is contained in the Appendix.

The data were collected either by meeting with the subjects one-on-one at a mutually agreeable time and place or through a one-on-one telephone conversation as per their convenience. The interviews were approximately an hour long and were audio recorded and transcribed by multiple people to ensure accuracy, reliability and validity. In total, interviewees discussed 15 failed projects that were discontinued prior to commercialization. We followed the qualitative data analysis techniques explicated by Miles and Huberman (1984). Specifically, we performed a detailed

content analysis of all the collated data to identify, extract and explicate common themes related to de-escalation mechanisms. In addition, we theoretically analyzed and rationalized why such mechanisms were utilized under such circumstances and how they succeeded in mitigating escalation in the context of NPD. In the process, we identified several mechanisms that had been discussed in previous research. More importantly, we uncovered new mechanisms previously undocumented in the literature. Next, the findings and results of the research are discussed.

### **Findings**

Table 2 summarizes the de-escalation mechanisms found in this study. Those identified previously in the literature and found in our NPD sample are indicated. The italicized mechanisms are those identified through the analysis of the interview data that are new to the de-escalation literature and are used particularly for NPD. In the following we discuss and explain each mechanism and provide examples from the NPD projects in our sample.

**[Insert Table 2 about here]**

#### *Organizational Mechanisms*

Along the lines of the existing literature, a popular mechanism used to de-escalate commitment to failing NPD projects was explicitly using an *alternative course of action* (Montealegre and Keil, 1998). In one instance, the project members working on an online PC game were concurrently working on anywhere between three to seven other projects. Though the focal project created quite a bit of internal excitement, it was showing diminishing rates of progress after 14 months in development. Because of these signals of impending failure, the project lead was assigned to a committee that weighed the struggling project against other projects in development. Consensus determined that the company would be better suited to reallocate personnel and resources to other projects that were closer to commercialization and had superior performance prospects. According to one team member, “Since our bandwidth on the project was being mis-

utilized and there was a lot of work but not a lot of progress, it wasn't a hard decision to turn around and say, 'I've got better things to be spending resources on.'" The project was stopped, and all team members were assigned to alternative projects.

A *cultural tolerance for failure* within a firm was also found to reduce escalation. In one company, NPD project team members were frequently reminded by their supervisors that individual performance evaluations and compensation were not tied to the successful launch of the new product, but were instead tied to continued process and knowledge improvements contributed by the project team. As one of our interviewees said, "It's nice not feeling the pressure to get every single idea out the door and into a market. It makes it easier to stop, take a step back, and say 'OK, I gave this a shot. It's not going to work out, and at least the next guy will know that as well.'" This enabled them to discontinue the project without negative career repercussions when it started underperforming on various pre-determined performance-based parameters.

Firms that inculcated a culture of *regular evaluation and monitoring* for troubled projects (Keil and Robey, 1999) were able to de-escalate – redirect or cancel – dubious projects. For example, in one particular project, an engineer reported that the company had increased the frequency of reviews that were conducted locally with leads from marketing and R&D. The reviews evaluated projects on clear criteria that needed to be met (Cooper, 1990). Additionally, the evaluation process included dedicating time at the end of assessment meetings to discuss the next set of criteria for the subsequent reviews. As one programmer said, "The procedure was to make sure we had accomplished more than we had left on the table. If it started to look like there was more and more that needed to be completed than we had capacity to complete – that's when projects got cancelled." Another team member elaborated, "One day, I looked at the progress reports and noticed that we had more team members working longer hours but less was being done." These frequent

checkpoints implemented by the company revealed a consistent and unacceptable lack of progress, which led to the cancellation of the project.

From a broader perspective, having alternative courses of action, inculcating a culture of tolerance for failure and regular monitoring can create and foster a pragmatic environment within a firm where NPD decision-makers can make a more judicious termination choice rather than letting a failing project continue indefinitely. These techniques can counteract typical escalation drivers such as self-justification, groupthink, and sunk costs leading to a more objective and rational evaluation of the options.

We also found that organizations that pursue a policy of *continual market research and assumption correction* can facilitate de-escalation to failing NPD projects. This mechanism was idiosyncratic to product innovation projects only and necessitated conducting market research on a continual basis throughout the course of the project. After collecting data, market-based assumptions are revisited and re-assessed periodically so that project performance can be reliably and frequently compared to predetermined hurdle rates. In one instance in our interviews, product development was hastily set into motion because a new innovative product had galvanized the market which influenced one of our sample companies to manufacture a peripheral product. The company hired a research firm to estimate the market for the new technology, quantify the market size for its peripheral, and conduct focus groups regarding what their product should offer for maximum performance and adoption. Early market research was extremely bullish on the new technology, and it encouraged the company to develop its peripheral product faster. However, subsequent market research became increasingly bearish. While performance of adjacent technologies was an external factor, assumptions about the markets for these technologies were made internally. This company conducted frequent market research and revisited their market assumptions. After continually revising their assumptions, their

financial models became increasingly less attractive, and the project was ultimately terminated in the face of the new negative knowledge.

The importance of continual market research and assumption correction is further highlighted by one of the decision-making managers involved in this project:

I was part of the committee that ultimately decided to can the project because we were receiving new forecasts every month, and every month the forecasts were less kind... It's funny but, I moved on to a competitor about a year later and my first task was to exit that very same market. Why? Because the guy before saw some forecasts that he liked and couldn't be convinced otherwise and couldn't be convinced to go back and check his numbers.

These findings imply that fine-tuning market knowledge and underlying assumptions by continual research enables de-escalation by highlighting and contradicting fuzzy and dubious long-term views and focusing more on the contemporary situation. This insight can thus facilitate a more accurate appraisal of the project's prospects.

Another key de-escalation mechanism especially pertinent to product innovation projects was *consistent roadmap monitoring coupled with competitive benchmarking*. The importance of road mapping has been well documented in the extant literature and involves technology forecasting, strategic and product line planning (Kappel, 2001; Wheelwright and Sasser, 1989). Product-technology roadmaps have been used to define the plan for product evolution, linking business strategy and market drivers to the evolution of the product features and the technologies needed to achieve the strategic objectives. (For a detailed discussion of the benefits of road mapping see Albright and Kappel, 2003). Our research revealed an interesting and important de-escalation mechanism – the need to conduct market intelligence and benchmark company roadmaps with the rest of the industry that leads to continual big-picture, technical comparisons. NPD decision-makers can undertake periodic monitoring of the technology roadmap for the product (and product family) against other available solutions in the industry.

In one NPD project designed to enhance bandwidth efficiency, part of the team, including the architectural or senior technical members, engaged in continually evaluating the technology of the current project with other competitive technology-based options available on the market. Armed with this information, they revisited and benchmarked their roadmaps against those of their competitors. These roadmap assessments enabled them to monitor the project's key benefit for the customer and its performance for cost. In the words of the project manager, "there was better performance...and better ease of implementation in the field" available. Furthermore, he stated that, "it was sort of evolutionary. We always look at alternate technologies, alternate ways of doing things... [asking] should we be focusing on this?" Continual industry and technology monitors led to reliable information about better technology available elsewhere in the industry. Thus, the team cancelled the project to pursue the next generation product in their revised roadmap. Constantly monitoring the technology roadmap and benchmarking against the competitive landscape enables de-escalation by providing an objective yardstick by which to measure the NPD project. This external perspective can reduce the effect of well-known escalation drivers such as self-justification, framing effects and sunk costs (Staw and Ross, 1987) and create better market foresight in the firm.

Firms that conduct *inter-project competition* can also facilitate de-escalation in innovation projects. This strategy necessitates organizing a deliberate competition between multiple projects, with the better and more promising projects ultimately pursued until completion. Multiple interviewees identified the pursuance of this course of action in product innovation projects. In one company, the project was related to the development of a new data center technology where two parallel projects were pursued. One of the projects was developed internally by a project team within the firm whereas the other project was developed by an external third-party as a contingency plan. This enabled de-escalation because it was explicitly predetermined that only one of the two projects would be taken to production. Ultimately a systematic and objective evaluation of both

projects led to the legitimization of the project by the independent third-party. A second example took place while building a new automated hardware testing framework where the company staged a “bake-off” competition between two internal projects. In this case, a new internal NPD project was set up as a competition against another existing, on-going internal project, with a set timeframe and specific criteria for comparison and final judgment. Since the explicit understanding was that only one project would be chosen, de-escalation was achieved with the lower performing project being ultimately cancelled.

These examples illustrate that firms that explicitly authorize and legitimize the competition between two projects to avoid intertwining the fate of only one dubious project with the organization’s future profitability can achieve de-escalation. This process facilitates a more careful, comprehensive and detailed appraisal of the decision situation thereby counteracting managerial biases. In situations where two projects are distinct and resource constraints preclude the continuing development of both projects, the more promising one is carried forward thereby mandating de-escalation.

#### *Project Mechanisms*

Another key de-escalation mechanism that was frequently mentioned across five NPD projects was having *clearly defined success criteria* (Keil and Robey, 1999). These diverse projects included developing features for an online service, a mobile product, automated hardware testing framework, echo cancellation, and an email alert system. All of these efforts were ultimately cancelled with the exception of the mobile product where the personalization feature was removed from the product before release. In all these cases, the managers concluded that the clarity of criteria for success and failure ultimately led to de-escalation since it enabled them to objectively gauge the progress of the project. Moreover, *clearly defined and agreed upon project requirements* (or the parameters and boundaries of the project) acted as an important de-escalation mechanism. When

adding personalization to a mobile product, the product manager confirmed that having clearly defined project specifications and requirements that were explicitly agreed-upon by the project team members led to removing a particular problematic product feature. This prevented a typical problem in NPD projects where the project drifts because of a lack of consensus and clear goals (Keil and Mähring, 2010).

In light of this finding, organizations would be well-served to develop lucid and universally agreed upon project requirements at the onset, continually review these goals using clearly defined success criteria, and re-affirm goal consensus throughout project implementation and deployment. Setting clearly defined success and failure criteria by management enable more objective reviews of innovation projects, or at least make it more difficult to ignore the criteria, and thereby enable de-escalation. Similarly, clear project requirements that have team-wide consensus enable gate keepers to better understand the progress of the project and to successfully enforce review based milestones.

Another novel de-escalation mechanism that this study uncovered is *comprehensive product testing* during the NPD process. Product testing is defined as evaluating the usage of the product under normal operating circumstances by involving either internal managers (alpha testing) or external customers or end users of the product (beta testing) (Crawford and di Benedetto, 2010). Although product testing is widely embraced by managers in many types of organizations, its role in the de-escalation process has not been adequately investigated and established. Our study identified the role of product testing as a de-escalation tool, used by multiple firms in our sample. In fact, various types of testing tools such as user interface evaluation, quality assurance, customer beta testing, and internal alpha testing were used in different NPD projects to enable de-escalation. For example, in the case of a project in which a new button was developed on a remote control, both the User Interface (UI) and Quality Assurance (QA) teams were responsible for the technical evaluation of the product that preceded the de-escalation. The software engineer described some pressing

technical (both hardware as well as software) issues with the product. Engineers and user-interface teams found that the product did not function well enough and was not usable by a customer. The project was cancelled within a week of its deadline for completion.

Another NPD project involved the testing of an underperforming product by external, third-party consultants. NPD teams who were not involved in the development process also reviewed the project. Both sets of evaluations found flaws with the product's design. The evaluations by these two groups ultimately led to the project cancellation. In cases where a team different from the development team is reviewing or analyzing a project from a technical viewpoint, two factors counteract escalation. First, the reviewers are a different group than those involved in development, so the negative effects of self-justification are neutralized. Second, the reviewing teams (not directly involved with the project) are more likely to perceive a negative analysis and judgment of the project as less of a loss and more of a gain, thereby neutralizing the framing effects.

*Feature-level de-escalation* consists of removing individual features of a product that are especially troublesome, even major ones, and thereby not cancelling the entire project. The personalization feature in the mobile product mentioned earlier is an example. Feature-level de-escalation provides development flexibility and allows product developers to modify their product as new and evolving information from customers and technical possibilities are better understood – essential in highly competitive and dynamic environments (Thomke and Reinertsen, 1998). This finding supports agile product development, which is an iterative process that incorporates frequent and rigorous testing by customers and end users throughout the developmental process. Such an approach also lowers development costs and time. In turn, team members are less likely to react negatively to de-escalation or participate in groupthink. This reduces potential regrets over sunk costs for a group as well.

The mechanisms by which feature-level de-escalation is achieved is supported by the basic tenets of prospect theory (Kahneman and Tversky, 1979; Whyte, 1986), which posits that losses are perceived to be larger than gains of equal size. Hence, the magnitude of the reaction by decision-makers is significantly higher in terms of losses. When a troubled project is terminated, the loss is deemed to be substantially larger by the project team than when a faulty feature is deleted from a project due to customer feedback. This is because project decision-makers may feel that it is a collective gain to remove an unwanted feature instead of cancelling the whole project. They can thereby provide a better product that fits well with their customers' needs and enhance its likelihood of adoption. This also reduces the potential for over-commitment due to sunk costs or self-justification (since any negative information about the feature comes directly from the customer), thereby facilitating de-escalation.

Feature-level de-escalation emerged as an important technique in a new mobile product.

One product manager stated:

I think it probably came down to ...a couple of major categories ... of feature updates we were looking to include in the next major version of the product, and I think it became clear that one of those categories was proving more challenging... We didn't want to delay the next major release of the product. And so we just re-defined the next major release of the product to remove that one category.

Here, the team would have been hard-pressed to quit since they were near the end of the project and had invested considerable time, money and resources. Feature-level de-escalation enabled re-assessing a part rather than the entire project and was perceived as a smaller, more tolerable step that reduced escalation of commitment to a failing feature that was endangering the entire project.

### **Discussion and Conclusion**

Since new products are not only vital to an organization's long-term survival and health, but also suffer from a high rate of failure (Cooper 2001; Crawford and di Benedetto, 2011), in part due to escalation of commitment to a failing course of action (Boulding, et al. 1997). Continuing to

invest in poorly performing projects uses resources inefficiently, lowers profits, and damages employee morale (Schmidt, 2004). These sub-optimal decisions also can harm brands and erode the credibility of an organization in the eyes of its stakeholders (Schmidt, 2004). Consequently, de-escalation techniques, tools, and preventive procedures, which in this article are grouped under the rubric of “mechanisms”, can lessen the occurrence of these expensive mistakes. Despite the obvious importance of de-escalation mechanisms, little research exists to “help people avoid the escalation trap” (Simonson and Staw, 1992, p.419). What can be done to encourage de-escalation in failing NPD projects? By its nature, NPD is a setting that fosters escalation, but with the exception of Boulding et al. (1997) little research that focuses on de-escalation mechanisms exists.

This article aims to address this gap by investigating the de-escalation mechanisms used in high-tech organizations during innovation. This was achieved by conducting a two-part qualitative study – first a content review and analysis of the existing literature, and second by interviewing managers in organizations operating in high technology environments. The results reveal interesting insights regarding de-escalation that not only have theoretical significance and practical implications, but also expose important avenues for future research. We discuss these next.

First, after reviewing existing research, we organized de-escalation mechanisms into three levels: organization, project, and individual. In the absence of a suitable theoretical framework of de-escalation, this multi-layered conceptual approach provides a finer grained, more nuanced picture of de-escalation mechanisms. It also helps identify the mechanisms that are effective for de-escalation in innovation.

Interestingly, the present research shows that during NPD, organization- and project-level mechanisms are more commonly used to de-escalate commitment to failing projects compared to individual-level mechanisms. While the first category requires top management support and the appropriate strategic initiatives to implement effectively, individuals and project team leaders can use

the other two types of mechanisms to mitigate risk during innovation projects, even in the absence of top management support. We believe this is an opportunity for practitioners.

In their important de-escalation study, Simonson and Staw (1992) concluded that there are two ways to reduce escalation of commitment: (1) reduce self-justification tendencies, and (2) increase decision-making accuracy. Their results showed that the former is far more effective to decrease escalation. Yet, when Table 2 is examined, the preponderance of de-escalation mechanisms used by organizations in our sample are aimed at increasing decision-making accuracy. A culture that supports failure is the only mechanism reported by the respondents in the present study that reduces self-justification. There seems to be an opportunity for future research to develop and test mechanisms that lower the need to self-justify continuation decisions. Furthermore, there is a disconnect between past research and practice; it was surprising that more techniques that lower the effect of self-justification are not used by decision makers in NPD situations. One especially promising avenue seems to be the separation of decision makers over repeated continuation decisions. Boulding et al. (1997) found that using a new decision maker(s) at subsequent decisions reduces commitment to a losing course of action. Recognizing that this has practical limitations, future research might look at how group dynamics and decision outcomes change as the percentage of turnover in the decision making team varies.

A second promising path is evaluating decision makers on the process rather than on the outcome of the project. Simonson and Staw (1992) found this to be an effective means to reduce escalation. However, the difficulties in implementing such an evaluation system have been noted (Boulding et al. 1997).

Lastly, both Boulding et al. (1997) and Simonson and Staw (1992) showed that having decision makers agree to a pre-specified stopping rule (or hurdle rates) lowered escalation tendencies. None of the teams studied in the present research reported using such techniques.

Some significant best practices emerge from this study, which are particularly relevant for managers operating in high technology markets who evaluate a wide gamut of strategic alternatives to lower the odds of “throwing good money after bad.” From a broader organizational perspective, having alternative courses of action, engaging stakeholders, effecting relevant personnel changes, creating a culture of tolerance for failure, and regular monitoring can facilitate de-escalation. From a project level perspective, decision-makers can de-escalate commitment from troubled product innovation projects by: (a) defining clearly measurable success and failure criteria at the beginning of the project, (b) defining the requirements of the project very clearly, (c) ensuring general firm wide agreement upon these criteria and project requirements, (d) evaluating, reviewing and tracking their NPD projects on a regular basis, and canceling the projects that do not meet the previously agreed upon requirements. These mechanisms can counteract typical escalation drivers that unnecessarily create biases in the minds of decision-makers leading to sub-optimal decision-making (Staw and Ross, 1987; Brockner, 1992). Consequently, NPD project team members can make a judicious evaluation of the options and make a more rational termination choice rather than letting a failing project continue.

In addition to the above mechanisms that were already being used in different contexts, our study highlights some newly uncovered mechanisms used specifically for NPD projects. These include:

- *Market Research and Assumption Correction:* continual evaluation of the market and competition, which results in revising and adjusting market based assumptions.
- *Roadmaps and Benchmarking:* Continual monitoring of progress on pre-determined roadmap and continual big-picture, technical comparison to the industry and competitive capability.

- *Inter-project Competition:* Competition between two (or more) teams engaged in developing similar new products concurrently, with only a single project ultimately reaching advanced stages of development.
- *Product Testing:* Product testing during NPD process by outside team members.
- *Feature-level De-escalation:* Eliminate problematic features instead of terminating the entire new product, thereby supporting useful features and work so that the remainder of the project can move forward.

These mechanisms provide boundary conditions for action particularly relevant to NPD. For example, market research, assumption correction, roadmaps, and benchmarking establish boundaries using contemporaneous market knowledge. In doing so, these actions enable the determination of alternative courses of action and the termination of projects. Similarly, the project level mechanisms of testing and feature level de-escalation require the previously identified tracking mechanisms that are used for de-escalation in multiple settings. These findings provide nuanced insight into how de-escalation mechanisms must respond to contextual variants.

Another important issue relates to the accuracy of these perceptions regarding the relative effectiveness of these newly uncovered de-escalation mechanisms. Future research should focus on testing and ordering the usefulness of de-escalation mechanisms. Perhaps the most effective manner in which to conduct such tests is through the use of laboratory and/or field experiments. While in the present study, we used managerial perceptions to inform the research, future studies can further analyze these perceptions to provide empirical validation.

From a research design perspective, the present study departs from much of the body of NPD research. In total, 15 projects terminated prior to completion were studied. In contrast, most NPD research focuses solely on completed projects. Consequently, there is a dearth of information and knowledge about projects that were terminated prior to launch (Cooper and Kleinschmidt,

1990). This study attempts to address this gap. Here, we find that the termination of poorly performing projects has some positive outcome for organizations. In contrast with most literature, this study shows that organizations may want to accept or even encourage failure, thereby increasing the efficacy of resource use.

The qualitative approach adopted in our study was instrumental in the identification of these mechanisms as it revealed invaluable insights pertinent to the creation of new theory in the NPD and escalation literature. We believe that this article makes a theoretical contribution since some of these techniques are unknown, and also the usefulness of some of these techniques for de-escalation had not yet been established or theoretically explained by extant academic work. Furthermore, the findings of our study were validated by the wealth of relevant information provided by the diverse sample of managers who participated in failing projects that were intentionally discontinued through the use of these techniques. In addition to the theoretical significance, these results provide prescriptive guidance and a broad set of tools and techniques to product managers regarding how to better manage failing projects.

Finally, this study utilizes a cross disciplinary approach and synthesizes and categorizes de-escalation mechanisms used across various contexts such as information technology, management, psychology, accounting and organizational behavior. In the process, this study critically reviews and provides some structure to the growing literature on de-escalation with the primary aim of enhancing the comprehension of scholars and managers of this important phenomenon. By building on work in multiple disciplines, we extend theory regarding de-escalation to include innovation and new product development.

There are some limitations to this study that offer avenues for future research. First, there is the possibility of the existence of other de-escalation mechanisms that were not uncovered by the present study. Additional research in more organizations, and especially in different types of

organizations with respect to industry, organization size, type and age, could reveal de-escalation mechanisms hitherto unknown yet substantially important. Similarly, future research is needed to build theory regarding de-escalation in diverse contexts such as low technology markets, services etc. Additionally, the theory building process can be further strengthened by utilizing theoretical frameworks from varied disciplines to explain how various mechanisms alleviate escalation.

Moreover, future research can look at individual-level determinants of de-escalation in troubled NPD projects. The managers that were interviewed here did not report using individual-level mechanisms to de-escalate commitment. This is indeed surprising since this level of mechanisms is under the control of the decision-maker whereas project- and organizational-level factors are considerably more difficult to implement. Individual level de-escalation mechanisms provide an interesting arena for further exploration.

Finally, academicians would be well served to investigate whether the efficacy of de-escalation mechanisms varies according to the type of new products being developed. Specifically, should managers use the same or different mechanisms to gauge incremental or innovative products and reduce escalation tendencies? The study of de-escalation mechanism efficacy would be a provocative addition to the de-escalation work across disciplines.

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**Table 1. Identified De-Escalation Mechanisms.**

<b>Level</b>	<b>Mechanism Type</b>	<b>Description</b>	<b>Relevant work</b>
Organizational	▪ Alternative Courses	Determine courses of action besides current project.	Boulding et al. (1997); Keil (1995); Ross & Staw (1993).
	▪ Stakeholder Engagement	Communicate with stakeholders.	Keil & Mähring (2010); Montealegre & Keil (1998, 2000); Ross & Staw (1993).
	▪ Personnel Change	Change in key project owners such as product champion.	Boulding, Morgan, & Staelin (1997); Keil (1995).
	▪ Culture – Open Info. Sharing	Manage project decision-makers, enable negative news reporting.	Heng et al. (2003); Montealegre & Keil (2000); Keil & Robey, 2001; Newman & Sabherwal (1996); Pan (2009); Pan & Pan (2011); Simonson & Staw (1992); Tan (2003).
	▪ Culture – Reward Systems	Process based evaluation and increased monitoring.	McNamara et al. (2002); Sivanathan et al. (2008).
Project	▪ Tracking	Progress evaluation, standards setting, using pre-defined hurdle rates.	Bouding, et al. 1997; Brockner, Shaw, & Rubin (1979); Cheng et al. (2003); Garland & Sandefur (1990); Ghosh (1997); Heath (1995); Keil & Mähring (2010); Keil & Robey (1999); Newman & Sabherwal (1996); Simonson & Staw (1992).
	▪ Appraisal	Costs and risk assessment, post mortem analysis, third-party assessment.	Ghosh (1997); Kadous & Sedor (2004); Keil (1995); Keil & Mähring (2010); Keil & Robey (2001); Kirby & Davis (1998); Montealegre & Keil (1998; 2000); Pan et al. (2006).
	▪ Empowered Management Teams	Task force and exit champions Team Composition and Intervention.	Keil & Mähring (2010); Langerak and Sengupta, (2011); Mähring (2008); Montealegre & Keil (1998); Newman & Sabherwal (1996); Van Oorschot.
Individual	▪ Bias Prevention	Reduce fact distortion.	Boulding, Morgan, & Staelin (1997); Montealegre & Keil (2000); Snow, Keil, & Wallace (2007).
	▪ Decision Monitoring	Monitor decision strategies.	Kirby & Davis (1998).
	▪ Commitment Transformation	Unfreezing, changing beliefs and attitudes, refreezing.	Pan et al. (2006).
	▪ Self-Affirmation	Self-justification, esteem, value affirmation, creativity.	Sivanathan et al. (2008).

**Table 2. De-Escalation Mechanisms for New Product Development.**

<b>Level</b>	<b>Mechanism Type</b>	<b>Description</b>	<b>Example</b>
Organizational	▪ Alternative Course	Determine courses of action besides current NDP project	Online game product development personnel reallocated to other projects closer to commercialization
	▪ Culture - Failure Tolerance	Manage project decision-makers, enable negative news reporting	Project manager tied incentives to NPD process and knowledge improvements
	▪ Culture - Monitoring	Process based evaluation of NPD and increased monitoring	Increased frequency of project evaluation by other functional areas
	▪ <i>Market Research and Assumption Correction</i>	<i>Continual evaluation of market and competition, revising and adjusting market based assumptions</i>	<i>Although initial evaluation was positive, continued research showed diminishing market potential</i>
	▪ <i>Roadmaps and Benchmarking</i>	<i>Continual monitoring of progress on pre-determined roadmap and continual big-picture, technical comparison to the industry capability</i>	<i>Bandwidth enhancement project comparative metric of performance for cost continually evaluated and continual monitoring of competitors' technology</i>
Project	▪ <i>Inter-project Competition</i>	<i>Competition between two teams engaged in the NPD, simultaneously</i>	<i>New automated hardware testing projects 'bake-off'</i>
	▪ Tracking	Clearly defined success criteria and agreed upon project requirements for NPD project	Cancellation of online service, automated hardware testing, echo-cancellation, and e-mail alert projects.
	▪ Testing	<i>Product testing during NPD process</i>	<i>Product testing of remote control button by employees external to the team resulted in the project's cancellation</i>
	▪ <i>Feature-level De-escalation</i>	<i>Enable de-escalation to occur for individual features</i>	<i>Mobile product re-definition after feature proved unviable</i>

Regular font: Existing de-escalation mechanism.  
*Italics:* Previously undocumented de-escalation mechanism.

## Appendix

### Sample of Exploratory Interview Questions– De-Escalation Practices

Person Interviewed:
Title of Person Interviewed:
Company Name, Division, Unit :
Company Address:
Telephone numbers:
Email Address:

Date \_\_\_\_\_/ \_\_\_\_\_/ \_\_\_\_\_

#### Interviewee Details

1. What is your job title?
2. How would you describe your role, or what you do in that job?
3. How long have you been working full-time? \_\_\_\_\_ **Years**
4. How long have you been working in your current company? \_\_\_\_\_ **Years**
5. In which area have you spent the majority of your career? (Check  $\surd$  one box).

<b>Engineering/ Technical</b>	<b>Finance / Accounting</b>	<b>Marketing</b>	<b>Other (Write In)</b>
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6. What is the name of the group or department in which you work?
7. Do you work on projects at your firm?
  - a. <If No, continue with question 7b, c, d.  
If Yes, go to Question 8>
  - b. What constitute a project at your firm?
  - c. How would you describe what you work on?
  - d. <attempt to figure out the unit of work and then continue interview if possible with the right level of abstraction, perhaps they work in products or websites or widgets or anything else besides projects>
8. Are the projects with which you are familiar at your firm composed of phases?
  - a. <If Yes, continue with question 8b, etc  
If No, go to Question 9>
  - b. Are these phases formal?
  - c. What are they like?
9. Thinking about your overall career.....
  - a. How many projects total have you been involved with?
  - b. Of those involved with, how many projects were new product development?
  - c. Of those ones that were new product, How many were modified/course-corrected for any reason? How many were cancelled/stopped for any reason?
  - d. Repeat a-c for current company

Projects	Throughout Career	Current Company
<b>Total</b>		
<b>New Product</b>		
<b>Modified</b>		
<b>Cancelled</b>		

10. Are you currently working on a project? Tell me about this project. If not, tell me about your most recent project...

(If needed) :

- a. What is your role?...
  - b. how many people work on the project?
  - c. When was it started?
  - d. What was the purpose?
  - e. Who are the customers?
11. How are projects evaluated /how is project success measured in your organization?
12. Are all the projects evaluated on common criteria or does each project have its own set of criteria?

### **De-Escalation of Project Details**

Have any of the projects on which you have worked been stopped before completion?

Have any of the projects on which you have worked been abandoned before completion?

Have any of the projects on which you have worked been restructured before completion?

Of these, which is the most recent?

For the following set of questions, let's focus on this (the most recent) project.

1. While a project is underway, how do you measure if it is meeting expectations?
2. Have any projects you worked on not been able to meet expectations?
3. Tell me about the most recent one *that was not meeting (or did not meet) expectations...*  
<If this project is the same as the most recent one discussed earlier as the subject's most recent project, Go to Question 3i.

If not, continue with 3a>

- a. What was your role?
- b. How many people work(ed) on the project?
- c. When was it started?
- d. What is/was the purpose?
- e. Who are the customers?
- f. Was the project within one department or across departments?
- g. How was it structured?
- h. How were participants/team members chosen?

<digging deeper>

- i. If innovative is defined as a wholly new idea or concept or at least a significant feature set, and incremental is defined as a follow-on to something that exists already.... Was the product innovative or incremental? \_\_\_\_\_
- j. When did you become involved with the project?
- k. What was the nature of your involvement?
- l. When was the project stopped, abandoned, or restructured?
- m. Why was it stopped, abandoned, or restructured?
- n. Who made this decision?
- o. How was the decision communicated?
- p. Tell me about any (other) issues with the project?
- q. Was the project meeting expectations?
  - i. <if Yes, continue with 3p, If No, continue with 3oii>:
  - ii. Talk a little bit about how was the project not living up to the expectations?
  - iii. When In the project lifecycle was this discovered? (is there a point at which the project was no longer meeting its objectives)
  - iv. How was this discovered?
  - v. Who discovered it?
  - vi. What action (if any) was taken?
- r. Was it discontinued, restructured, or allowed to continue course unchanged?

<The following questions are for if the project in Question 3 *was* discontinued, abandoned or restructured>

4. What happened? / Describe how the project was re-directed or brought to a stop.
5. Who was involved in determining this project direction be altered or stopped?
6. Were there one or two people in particular leading to the restructuring or halting?
7. Was everyone in agreement?
8. Who wanted to continue unchanged? How long had they been involved in the project and what was/were their role(s)?
9. Who wanted to make course corrections to alter the project?
10. Who wanted to discontinue the project? How long had they been involved in the project and what was/were their role(s)?

<if needed/if time, continue below>

11. On your own measures, what do you think should have been done with the project?
12. Generally, why are projects redirected or stopped in your organization?
13. Where (in what setting, formal or informal, meeting or private, etc) was the final decision made to modify or discontinue this project?
14. Why was this decision made?
15. What were the stated reasons? The unstated / implicit ones?
16. What persons or things were responsible for redirecting or stopping the project, specifically :
  - a. What psychological factors were involved?
  - b. What project level factors were involved?
  - c. What social factors were involved?
  - d. What organizational level factors were involved?
  - e. What environmental level factors were involved?

<Note: The following are specific questions from thinking about specific mechanisms>

17. Did you feel any need to justify your past decisions?
  - a. Did anyone?
18. Did anyone outside of the project influence the decisions inside the team?
  - a. If Yes, then ask : Did you notice anyone else pressured by the need to justify past decisions, either team or individual ones?
19. Were there budgetary or time limits set on the project?
20. How ingrained in the organizational culture was the project?
21. Were other alternatives to the project in progress or available to start?
22. Were regular progress reports prepared by the project manager or another manager?
23. Were gate meetings held to pass from each project stage to the next?
24. How strong were the negative signals the project was giving before canceled? How were these measured or understood?
25. Was the person(s) involved in modifying or halting the project the same or different than the person(s) responsible for starting the project originally?
26. Is there a stigma or a perceived stigma to canceling projects in your company for those whose names were associated with the project?
27. How was the team treated after modifying or canceling the project?
  - a. What was the reaction from peers?
  - b. From upper management?
28. Who was perceived as the exit champion? Exit sponsor?