

**Financial Projections in Innovation Selection:
The Role of Scenario Presentation, Expertise, and Risk**

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ABSTRACT

Innovation project selection is a decision of major relevance to firms. Errors in this decision may have serious consequences for firms, especially as many firms struggle with optimizing innovation project selection decisions. In their pitches to innovation decision-makers, project teams invariably present financial projections on their innovation projects, which often include best- and worst-case scenario presentation. Despite the potential influence the presentation of such financial projections has on firms' innovation project selection decisions, this topic has not received sufficient attention in the literature. This study examines the role of scenario presentation on financial projections in innovation project selection by conducting two conjoint experiments among 2,425 managers and 11 follow-up interviews with senior executives. First, the findings of this study suggest that firms should help project teams present small- rather than large-range scenarios. This is important for at least the 57% of firms surveyed in this study where project teams are reported to present 'too wide' and 'too extreme' scenarios. Second, firms seeking to promote transformational innovation in their innovation pipeline should make the presentation of small-range scenarios required for an innovation proposal to be presented to a project selection committee. This is relevant for 79% of surveyed firms that would like to select more transformational than core innovation projects and especially for the half of which that currently do not require scenario presentation. Third, project teams with less expertise should develop scenarios analytically rather than intuitively and convey the project's strategic merit to decision-makers to help increase innovation project selection likelihood.

Keywords: Innovation, Innovation Project Selection Decisions, Financial Projections, Finance, Marketing-Accounting Interface, Marketing-Finance Interface, New Product Development, Scenario Presentation.

1. Introduction

Innovation project selection is a decision of major relevance to marketers (Cooper 1979). Marketers are typically members of committees of innovation decision-makers who make project selection decisions and, thus, play a pivotal role in innovation project selection decisions (Ernst, Hoyer, and Rubsaamen 2010). While prior literature has abundantly covered innovation generation decisions, innovation selection as a decision is understudied.

Many firms struggle with innovation selection (Birkinshaw, Bouquet, and Barsoux 2011). Innovation selection decisions nevertheless are consequential. For instance, firms may err on the prudent side and select too many core innovation projects that target existing markets with products that are similar to their current offerings and too few transformational projects that target new markets with new products. Or, firms may take too much risk and neglect core innovation, giving up their leadership position in the market. Most firms, however, are heavily oriented towards core innovations and would like to select more transformational innovations in their innovation pipeline (Day 2007).

In their pitches to innovation selection committees, innovation project teams invariably include financial projections, such as expected cumulative cash flows. Practitioners suggest that the presentation of such financial projections and metrics is likely to influence firms' innovation selection decisions (Christensen, Kaufman, and Shih 2008; Nagji and Tuff 2012). However, this influence, or the channels through which it operates, has not yet been demonstrated empirically.

Interestingly, such financial projections may include best- and worst-case scenarios (Schoemaker 1993, 1995). In a survey of 1,268 executives, Bain & Company (2017) reports that the prevalence of such scenarios across various decision areas is about 19%. Focusing on

innovation project selection decisions specifically, we find, in the present study, that project teams present scenarios in about half of our surveyed firms.¹

The business press debates the usefulness of scenario presentation for project selection. On the one hand, decision-makers may feel that presentation of scenarios improves their ability to understand and manage project risk (Koller, Lovallo, and Williams 2012). On the other hand, decision-makers may perceive scenario presentation as an “abdication of leadership” that casts doubt on the project team’s capability to successfully execute the project (Roxburgh 2009). These conflicting views suggest that the effects of scenario presentation on project selection decisions are complex and require more scholarly research.

Prior literature examines how project selection is influenced by, for example, information in the innovation proposal, characteristics of decision-makers and project teams, and the design of selection processes (see Table 1). We extend this literature in two key respects. First, we contribute to prior research that examines how the presentation of information in innovation proposals influences project selection. Prior work shows that factors such as information length and tone, presentation of demos and prototypes, influence project selection (Kirsch, Goldfarb, and Gera 2009; Lu et al. 2019; Reitzig and Sorenson 2013). No study, however, examines specifically the effects of scenario presentation on project selection decisions. Our paper addresses this gap. Nor do prior studies in this area distinguish information presentation effects for different types of innovation (one exception to some extent is Lu et al. (2019) who categorize innovation based on its novelty from the customers’ perspective - see Table 1). We distinguish types of innovation from the firm’s perspective as suggested by the literature for studying

¹ We extracted this finding from the survey in Study 2, which we report in Section 5 below.

innovation development because it is the firm that must allocate resources to develop selected projects (Danneels and Kleinschmidt 2001; Sethi, Iqbal, and Sethi 2012). In so doing, we show that the effect of scenario presentation on project selection decisions is different for core vs. transformational innovation projects.

--- Insert Table 1 about here ---

Second, the literature on the innovation fuzzy front-end focuses predominantly on innovation idea generation and less on innovation project selection. The scant research on project selection (e.g., Criscuolo et al. 2017; Girotra, Terwiesch, and Ulrich 2010; Keum and See 2017) applies various theoretical lenses to explain project selection decisions but does not examine the *decision-making process* empirically. Moreover, the literature tends to disregard the importance of the *decision-making context*. Our paper addresses these gaps. Specifically, to describe the decision-making process, we adopt attribution theory and posit that scenario presentation influences the decision-makers' perceptions about project team *expertise* and project *risk* which, in turn, influence decision-makers' project selection decisions. We then examine how these influences are contingent upon two relevant decision-making contexts in which the project selection decision is taken: (1) the method of scenario development (intuitive vs. analytical) and (2) the strategic merit of the innovation (i.e., its benefits beyond the project's financial payoff).

We conduct two choice-based conjoint experiments among 745 and 1,680 managers (Study 1 and 2, respectively) and 11 complementary interviews with senior executives. We contribute to managerial practice as to when to make the presentation of scenarios required; whether to help project teams narrow down the range between scenarios; when project teams should develop scenarios intuitively or analytically; and when conveying the project's strategic merit is key.

2. Background

The literature distinguishes several stages of the innovation development process (e.g., Cooper 2006; Kornish and Ulrich 2014; Sethi and Iqbal 2008). The process starts with concept development, a stage where project teams generate ideas about solutions to customer needs or opportunities to use new technologies (Ernst, Hoyer, and Rubsaamen 2010; see Figure 1). Promising ideas are selected to receive funding and proceed to the innovation development stage, where ideas turn into tangible projects (Olson, Walker, and Ruekert 1995). The most promising projects are selected to move into the implementation stage, during which the innovation is implemented.

--- Insert Figure 1 about here ---

To obtain funding for their project, project teams pitch the results of their progress through these stages to innovation decision-makers who make “go/no-go” decisions at each stage (Cooper 2006; Sethi and Iqbal 2008; see Figure 1). Our focus is on the project selection decision after the concept development stage, which is a decision taken under high uncertainty.

In their pitches to decision-makers, project teams often include financial projections, such as expected revenues, expected Cumulative Cash Flows (CCFs), or other relevant information for a normal-case scenario of the project. Project teams may also include financial projections of best- and worst-case scenarios in addition to the normal case, which we refer to as *scenario presentation* for short (Schoemaker 1993).

To substantiate how such scenario presentation influences decision-makers’ project selection decisions, we draw on attribution theory (Kelley and Michela 1980) and interviews with senior executives that supported our theory development (see Section 7). At the most intuitive level, attribution theory explains the process someone (in our case, the innovation

decision-maker) goes through when seeking to discern the behaviors of others (the project team)—i.e., when seeking to attribute their behaviors to causes for them. For instance, decision-makers may make inferences about the project team's expertise or the project's risk based on whether the project team presents scenarios.

Attribution theory is especially relevant for decisions under high uncertainty where it is challenging for decision-makers to be "in control" and discerning the causes of others' behaviors is especially valuable (Berscheid et al. 1976). Thus, attribution theory provides a suitable lens for our study because project selection happens under high uncertainty where innovation decision-makers, who control innovation development gates, must make inferences about project team behaviors based on limited information in the pitch (Sethi and Iqbal 2008).

More specifically, to capture the relevant aspects of the attribution process, our model incorporates (1) dimensions of attribution, (2) decision-makers' expectations, and (3) boundary conditions. We focus on two dimensions of attribution: the communicator (i.e., the project team) and the stimulus (i.e., the innovation project) (Laczniak, DeCarlo, and Ramaswami 2001). As key characteristics of the project team and the innovation project, that are pertinently linked with the controllability premise of attribution theory (Huang and Pierce 2015), we focus on project team expertise and project risk. Perceived project team expertise refers to the knowledge the project team has related to the proposed innovation as perceived by the decision-maker (Chandy et al. 2006). Perceived project risk refers to the variance in possible outcomes of the innovation project as perceived by the decision-maker (Weber and Hsee 1998). Innovation project selection requires that decision-makers "go beyond the numbers" to assess the project team's "general understanding of the project" (Jørgensen and Messner 2010); that is, an assessment of the project team's expertise is pivotal. Furthermore, because project risk is a key concern of innovation

decision-makers (March and Shapira 1987), presenting alternative outcomes of the proposed innovation as scenarios is likely to trigger decision-makers' attributions about the project's risk.

In sum, we posit that scenario presentation influences the innovation decision-makers' perceptions of the project team's *expertise* and the project's *risk* which, in turn, influence decision-makers' project selection decisions (see our conceptual framework in Figure 2).

--- Insert Figure 2 about here ---

Attribution theory holds that decision-makers' expectations influence how they generate attributions (Kelley and Michela 1980). That is, innovation decision-makers generate explanations for project team's behaviors, such as whether they present scenarios, adjusted for whether they *expect* the project team to present scenarios in a given decision-making context. One aspect of a decision-making context is the type of innovation being pitched, which we focus on in Study 1. Specifically, the *augmentation principle* implies that decision-makers generate more attributions about project team expertise and project risk when scenarios are presented but were unexpected; that is, when the decision-maker deems scenario presentation as unsuitable or "contraindicated" for the type of innovation being pitched. On the other hand, when scenario presentation is expected, the *discounting principle* implies that decision-makers lessen or discount their attributions about project team expertise or project risk because, in this case, there is another readily plausible cause for triggering scenario presentation (i.e., the type of innovation being pitched).

Thus, we suggest that the effects of scenario presentation on the perceived project team expertise and perceived project risk are contingent on the type of innovation. A commonly used framework in the innovation literature categorizes innovations by the newness of the intended market and the newness of the proposed product to the firm (Danneels and Kleinschmidt 2001;

Olson, Walker, and Ruekert 1995; Sethi, Iqbal, and Sethi 2012). The newness of the intended market is the extent to which the proposed product targets new markets and requires new sales and customer support system compared with the firm's existing products. The newness of the product is the extent to which the proposed product requires new technologies, engineering and design skills, and production processes compared with the firm's existing products. This framework is also frequently applied in practice (Day 2007; Nagji and Tuff 2012). We adopt this framework to distinguish between *core* and *transformational* innovation projects. Core innovations are incremental changes to a firm's current products to serve its existing customers. Transformational innovations are new offerings targeting new customers with new products.

Finally, attribution theory posits that boundary conditions, such as the decision-making context, makes decision-makers' attributions more or less influential in guiding their decisions (Green and Mitchell 1979). That is, the extent to which attributions about project team expertise and project risk influence project selection decisions depends on the decision-making context. In Study 2, we incorporate two relevant aspects of the decision-making context: (i) the method project teams use to develop scenarios and (ii) the innovation project's strategic merit, both of which are grounded in prior work on scenarios (Schoemaker 1992, 1993).

3. Hypotheses²

3.1. Scenario Presentation and Perceived Team Expertise

We consider how scenario presentation may affect perceived team expertise by way of positive or negative team expertise attribution, respectively.

² While H1-H3 represent expectations we had before any data gathering tool place, H4-H5 were added based on reviewer feedback after Study 1.

Presentation of scenarios may enhance perceived team expertise. We refer to this as *positive team expertise attribution*. Decision-makers attribute the voluntary presentation of a worst-case outcome, together with the best case, to the expertise of the message source (Crowley and Hoyer 1994). Presentation of scenarios indicates that the project team willingly accepts the possibility of setbacks and, thus, has adequate knowledge of customer needs and the product under various circumstances. When only the normal case is presented, decision-makers are still aware that a worst-case scenario may occur, and thus its omission from the pitch is likely to reflect negatively on the perceived expertise of the project team.

However, scenario presentation may also decrease the perceived team expertise, which we refer to as *negative team expertise attribution*. Decision-makers may attribute presentation of scenarios that depict alternative plausible futures to a lack of confidence and agreement among project team members about the project's strategies (Du et al. 2011), causing decision-makers to perceive the project team as being less expert (Slotegraaf and Atuahene-Gima 2011). In other words, unlike a single scenario (i.e., the normal case), alternative scenarios may be attributed to a lack of expertise by the project team to converge on a precise outcome of its project.

We first theorize that, *ceteris paribus*, positive team expertise attribution is stronger for transformational than for core innovations. Project teams encounter greater uncertainty and take longer when developing projects that are new to the firm (Olson, Walker, and Ruekert 1995; Sethi and Iqbal 2008). Therefore, setbacks are more likely and more consequential for transformational than for core innovations (Day 2007). That said, presenting the possibility of setbacks to decision-makers naturally runs counter to project team's interests. Consequently, presenting scenarios that do reveal a project's setbacks to decision-makers is more "contraindicated"—and, according to the augmentation principle (Kelley and Michela 1980),

more likely to trigger positive team expertise attributions—in the case of transformational than in the case of core innovations. Thus, when project teams present scenarios, decision-makers are more likely to augment positive team expertise attributions for transformational than for core innovation projects.

Second, we also theorize that negative team expertise attribution is weaker for transformational than for core innovations. There is “less relevant experience to draw on” when developing innovation projects that are new to the firm (Olson, Walker, and Ruekert 1995). Thus, innovation decision-makers know that while project teams proposing core innovations have access to sufficient information to develop their project, project teams proposing transformational innovations may need to rely on scarce information and may have more grounds for disagreements among project team members about the best strategies to develop the project. Consequently, presenting scenarios that depict alternative plausible futures is more congruent with the expectations of decision-makers—and, according to the discounting principle (Kelley and Michela 1980), less likely to trigger negative team expertise attributions—for transformational than for core innovation projects.

Hence, taken together, scenario presentation is likely to increase the perceived team expertise more, or decrease the perceived team expertise less, for transformational than for core innovations. “Increasing the perceived team expertise more” or “decreasing the perceived team expertise less” are akin to having a more positive predicted relationship between scenario presentation and perceived team expertise for transformational than for core innovations. Stated as an empirically testable hypothesis, this gives:

- H₁** There exists a more positive relationship between scenario presentation and perceived project team expertise for transformational than for core innovations.

3.2. Scenario Presentation and Perceived Risk

We again consider two sides that may underlie the effect of scenario presentation on innovation decision-makers' risk perceptions. On the one hand, scenario presentation may reduce perceived project risk, which we refer to as the *project risk-reducing attribution*. Scenario presentation places bounds on the project's expected outcomes (Goodwin and Wright 2001). An innovation proposal without scenarios may indicate to decision-makers that the project has high ambiguity and complexity that prevent the project team from conjecturing and presenting reliable scenarios (Ahmad, Mallick, and Schroeder 2013; Hogarth and Kunreuther 1995). Thus, when the project team does present scenarios, decision-makers are likely to infer that the project is less ambiguous and complex, thereby reducing its perceived risk (Cabantous et al. 2011).

On the other hand, scenario presentation may increase perceived project risk, which we refer to as the *project risk-increasing attribution*. Just like negativity bias suggests that decision-makers may consider negative information as more consequential than positive information (Baumeister et al. 2001), attribution theory suggests that worst-case outcomes are more attributed to the project and more influential to the decision-maker than best-case outcomes of similar magnitude (Chen and Lurie 2013). Hence, scenario presentation may lead innovation decision-makers to put more weight on the worst- than on the best-case scenario, thereby increasing their perception of project risk.

We propose that, *ceteris paribus*, the project risk-reducing attribution is stronger for transformational than for core innovations. Due to the higher uncertainty involved with transformational projects, innovation decision-makers know that project teams are less able to conjecture the possible outcomes for transformational innovations (Olson, Walker, and Ruekert 1995). Therefore, when the project team does present scenarios, it is likely to indicate to

decision-makers that the project has less ambiguity and complexity which enabled the project team to conjecture scenarios. Thus, presenting scenarios has the potential to disambiguate transformational innovation projects and thereby reduce perceived project risk. In contrast, for core innovations, project teams should be more easily able to conjecture the possible outcomes of the project (Olson, Walker, and Ruekert 1995). Hence, presenting such outcomes as scenarios is more expected, and—according to the discounting principle (Kelley and Michela 1980)—less influential to reduce decision-makers’ perceptions of project risk.

We also theorize that project risk-increasing attribution is weaker for transformational than for core innovations. Transformational innovations are more likely to have negative outcomes than core innovations (Day 2007; Olson, Walker, and Ruekert 1995). Consequently, presenting scenarios that show a negative outcome of the project is more expected for innovation decision-makers—and, according to the discounting principle (Kelley and Michela 1980), less likely to draw their attention to such an outcome—in the case of transformational than in the case of core innovations. Therefore, scenario presentation is less likely to trigger a project risk-increasing attribution for transformational than for core innovation projects.

Taken together, scenario presentation is likely to decrease the perceived risk more, or increase the perceived risk less, for transformational than for core innovations. Stated formally:

H₂ There exists a more negative relationship between scenario presentation and perceived project risk for transformational than for core innovations.

3.3. Perceived Team Expertise, Perceived Risk and Project Selection

Decision-makers’ attributions guide their behavior (Kelley and Michela 1980). First, we hypothesize that perceived team expertise increases project selection likelihood. This is because decision-makers are likely to expect project teams with greater expertise to be better able to

satisfy customer needs, address implementation problems, and thus, ensure the eventual success of their innovation (Chandy et al. 2006; Slotegraaf and Atuahene-Gima 2011). Second, we hypothesize that perceived project risk decreases project selection likelihood. Indeed, there is broad support for the negative relationship between a project's risk and decision-makers' propensity to fund it based on the general premise of risk aversion (e.g., Cooper 2008; March and Shapira 1987). Specifically, decision-makers are more likely to refrain from funding a riskier project because possible large downside losses may affect the resources under their control as well as their power (Sethi, Iqbal, and Sethi 2012). Riskier projects are also less likely to be delivered, thus adversely affecting decision-makers' reputation (Criscuolo et al. 2017). Thus:

H_{3a} The greater the perceived team expertise, the higher the likelihood that a decision-maker funds the proposed innovation project.

H_{3b} The greater the perceived project risk, the lower the likelihood that a decision-maker funds the proposed innovation project.

3.4. Method of Scenario Development and Project Selection

We argue that the way in which project teams develop scenarios—i.e., analytically vs. intuitively—affects the extent to which decision-makers' attributions of project team expertise and project risk influence project selection likelihood. Decision-makers learn about the method of scenario development through their evaluations of the innovation proposals (Jørgensen and Messner 2010). Project teams that develop scenarios analytically rely on procedures, using objective data and systematic analyses, including benchmarks (Schoemaker 1995; Sloman 1996). These analyses typically use historical data on firm's prior launches of similar products and past applications of similar technologies, which project teams refer to in their proposals. Such information prompts decision-makers to use their existing knowledge of the reference products

and technologies (Bolton 2003), which causes them to less likely rely solely, and thus rely less, on attributions about project team expertise and project risk to guide project selection decisions.

In contrast, project teams that develop scenarios intuitively use affectively-charged judgments and “gut instincts” (Dane and Pratt 2007) instead of referring to firm’s prior launches of similar products and past applications of similar technologies in their proposals. As such, decision-makers have fewer, if any, explicit reference points for their project selection decisions, causing them to rely more on their attributions about project team expertise and project risk. Hence, we expect stronger effects of perceived team expertise and perceived project risk on project selection likelihood when project teams develop scenarios intuitively than when they develop scenarios analytically.

H_{4a} The effect of perceived team expertise on the likelihood that a decision-maker funds the proposed innovation project is more positive when project teams develop scenarios intuitively than when they develop scenarios analytically.

H_{4b} The effect of perceived project risk on the likelihood that a decision-maker funds the proposed innovation project is more negative when project teams develop scenarios intuitively than when they develop scenarios analytically.

3.5. Strategic Merit of the Project and Project Selection

We propose that the extent to which decision-makers’ attributions about project team expertise and project risk influence project selection likelihood depends on the project’s strategic merit. An innovation project has high strategic merit if it offers benefits beyond its direct financial merit, helping the firm compete more effectively (Ernst, Hoyer, and Rubsaamen 2010; Noordhoff et al. 2011). Such benefits include increasing the sales of other products in the firm’s assortment, improving customer relationships, and developing employee talent.

First, we argue that the effect of perceived team expertise on project selection likelihood is weaker for projects with high rather than low strategic merit. Firms concentrate their innovation development efforts and allocate more budget to innovation projects of high strategic merit (Cooper 2013). This enables firms to support project teams to gather more information about the market and the competitors that may enhance project team's knowledge in the proposed innovation after such project is selected (Calantone, Schmidt, and Song 1996). Firms may also involve external specialists with various functional skills to support the project team to develop such project that gets selected (Olson, Walker, and Ruekert 1995). Hence, decision-makers are less reliant on attributions about current project team expertise when the project has high strategic merit.

Second, we argue that the effect of perceived risk on project selection likelihood is also weaker for projects with high rather than low strategic merit. When evaluating a project in terms of its risk, decision-makers take into account the project's financial and strategic impact on the firm (Kaplan and Strömberg 2004). Decision-makers are more likely to undertake a high-risk decision if such decision promises to deliver a high financial and strategic return (March and Shapira 1987). Hence, all else equal, decision-makers are less reliant on their attributions about project risk and may accept a higher risk when a project has high strategic merit.

Taken together, we expect weaker effects of perceived team expertise and perceived project risk on project selection likelihood when decision-makers evaluate projects with high rather than low strategic merit.

H_{5a} The effect of perceived team expertise on the likelihood that a decision-maker funds the proposed innovation project is less positive for projects with high strategic merit than for projects with low strategic merit.

H_{5b} The effect of perceived project risk on the likelihood that a decision-maker funds the proposed innovation project is less negative for projects with high strategic merit than for projects with low strategic merit.

3.6. Other Variables

We control for several additional variables. First, we control for the age, gender and education of the innovation decision-maker (Chen, Yao, and Kotha 2009). Second, in line with research in marketing and finance, we control for decision-makers' (1) familiarity with financial concepts, (2) knowledge in investing, (3) quantitative background, and (4) training in metrics (Hoffmann and Broekhuizen 2010; Mintz and Currim 2013). Third, following prior research, we control for the decision-maker's risk attitude (Weber, Blais, and Betz 2002) and depth of elaboration (Nenkov et al. 2009) in our analyses. Fourth, we control for the complexity of the project evaluation task (Lee and Shavitt 2009). Finally, we control for the interaction between perceived project team expertise and perceived project risk in project selection models.

4. Study 1

4.1. Field Interviews with Multinational Companies and Pretest

In this study, we test our hypotheses H₁-H₃ using an online choice-based conjoint experiment with experienced managers as subjects. We went through several steps to ensure the practical relevance and realism of our experiment. Specifically, we conducted several interviews at four multinational companies to validate the importance of scenario presentation on innovation project selection decisions (Web Appendix A). We pretested our measures and experimental stimuli on a sample of 251 undergraduate students attending degree programs at one of our universities to verify the clarity of our experimental task. To further ensure the realism of the operationalization of our factors, we calibrated our stimuli based on 31 actual innovation proposals and on the advice from two senior innovation executives from Alcatel-Lucent Bell

Labs. These innovation proposals cover a wide array of applications, ranging from new hardware components, new software and mobile/IOT applications, to entirely new business models.

4.2. Subjects

We contracted Instantly to recruit and incentivize participants to our conjoint experiment from its online executive panel in the US. Subjects were considered eligible for our study if they (1) were sufficiently knowledgeable about innovation within their firm (at least 6 on a 10-point scale), (2) worked for a firm with 500 employees or more, and (3) did not work in financial institutions, insurance or consulting. Out of 1,215 potential respondents who clicked on the link of our study, 373 (30.7%) were ineligible and 69 (5.7%) exited the study early, resulting in 773 participants. We then conducted additional checks and removed 28 multivariate outliers from our data³ (see Web Appendix B).

Our final sample consists of 745 managers with an average age of 39.7 years, 40.5% female, 91.5% holding a bachelor's degree or higher, and an average tenure at their firm of 11.5 years. The sample participants were highly knowledgeable about innovation within their firm (an average of 8.7 on a 10-point scale) and reported high knowledge and experience of investing in general (5.3 and 5.2, respectively, on a 7-point scale).

4.3. Experimental Procedures

At the start of our experiment, subjects read a vignette depicting a hypothetical situation in which they worked for a leading global telecommunications equipment supplier Telforce and had to select which innovation projects to fund (see Web Appendix B). To ensure the truthfulness of

³ We examined the fit of our models with and without these outliers based on Schwarz's Bayesian Information Criterion (BIC). Excluding outliers increased model fit in all models in both of our studies. If we do not remove these outliers, our significant results still hold (although sometimes at different levels of significance).

participants' project selection decisions, we informed participants that the best performing participant would earn a reward of \$250 (see Web Appendix B for our reward mechanism).

Next, we administered our choice-based conjoint task. We created six unique innovation projects (or profiles, in conjoint terminology) based on our experimental manipulation of two factors: *type of innovation* (core v. transformational) and *scenario presentation* (no scenarios, small-range, and large-range scenarios). We distinguished small-range and large-range scenario presentation because prior studies suggest that decision-makers' attributions may vary depending on the range between scenarios (Du et al. 2011; Schoemaker 1993). Our experimental design thus enables us to test empirically whether our theoretical arguments regarding the moderating effect of type of innovation in H₁ and H₂ hold for different ranges between scenarios.

We constructed all possible pairs of these six projects (Louviere and Woodworth 1983), resulting in 15 choice tasks. In each choice task, the participant had to evaluate two innovation projects described by their financial projections and by a description of the type of project. Next, she had to select which of the two projects she would fund. Our pretests revealed that 15 choice tasks did not constitute an inordinate cognitive burden on participants. We randomized the order of pairs and the order of profiles within each pair to rule out order effects (Criscuolo et al. 2021).

We manipulated *type of innovation* by varying the extent to which the proposed innovation targets new markets with a new product. We ensured that transformational innovations, as compared to core innovations, had (1) a higher CCF in the normal-case scenario and (2) a lower probability of occurrence of the normal-case scenario.⁴ Specifically, following Day (2007), we

⁴ Note that our operationalization of the type of innovation factor encompasses (i) the extent to which the proposed innovation targets new markets with a new product, (ii) the CCF in the normal-case scenario, and (iii) the probability of the normal-case scenario. This operationalization follows prior literature (e.g., Day 2007; Rosenkopf and McGrath 2011). Thus, manipulating type of innovation orthogonally to the probability of normal-case scenario is infeasible. As such, our intent is not to test separate effects of each of these components of type of innovation.

designed the CCF in the normal-case scenario for transformational innovations to be \$30M after five years with a low probability of occurrence (20%), whereas for core innovations, we designed the CCF in the normal-case scenario to be \$7.5M after five years with a high probability of occurrence (80%). We based this value on the CCFs of the transformational projects among the Alcatel-Lucent Bell Labs' projects we examined. Finally, we also based the required investment and target return of each project on the projects from Alcatel-Lucent Bell Labs (see all conjoint profiles in Web Appendix B).

To manipulate *scenario presentation*, we again used Alcatel-Lucent Bell Labs' innovation projects. About 40% of the projects we examined contained scenarios. In the "no scenarios" level, we presented CCFs only in the normal-case scenario without any mention of best- or worst-case scenarios. To determine the "small-range" and "large-range" scenario levels, we proceeded as follows. We consider the size of the scenario range as the difference between the CCFs in the best- and worst-case scenarios relative to the CCFs in the normal-case scenario. We used the Alcatel-Lucent Bell Labs' projects with below-median scenario range to construct the small-range scenario level, which is equal to $\frac{4}{3}$ of the CCFs in the normal-case scenario. For the large-range scenario level, a similar procedure resulted in a range that is four times larger than the range in the small-range scenario level (i.e., $\frac{16}{3}$ of the CCFs in the normal-scenario case).

4.4. Measures

After the 15 pairwise project selection decisions, we presented again the six unique projects, one at a time and in a random order, and measured the perceived team expertise and the perceived risk of each project (see Web Appendix B). We used three items (i.e., expert, experienced, and knowledgeable) to measure the perceived team expertise on seven-point scales

(adapted from Ohanian 1990), and a numerical rating scale ranging from 0 (“not at all risky”) to 100 (“extremely risky”) to measure perceived project risk (Weber and Hsee 1998).

After conducting our experimental task and measuring expertise and risk perceptions, we administered the rest of our measures (we provide all measures, their respective sources, and their reliabilities in Web Appendix E). We adopted scales widely used in prior research for all our constructs. To ensure truthfulness and reduce inattentive or careless responses, we used different scale formats and guaranteed respondents full anonymity (Podsakoff et al. 2003).

4.5. Model Specification and Estimation

Let us denote each project by $j = 1, \dots, 6$ and each choice set by $k = 1, \dots, 15$. We denote project j appearing in choice set k by $j(k)$. We estimate two hierarchical linear models to test hypotheses H_1 and H_2 , which pertain to the effects of scenario presentation (SCENARIOS_j), innovation type (INNOV_TYPE_j) and their interaction on perceived expertise (Equation 1) and on perceived risk (Equation 2). We control for several subject-specific control variables (**Controls** _{i}). We include subject- and project-specific error terms in the model ($\varepsilon_{ij,E}$ and $\varepsilon_{ij,R}$, for the expertise and risk equations, respectively), which we assume to be independently normally distributed with mean zero. To capture unobserved heterogeneity among subjects, we model the parameters capturing the effects of our conjoint factors as random coefficients with their own error terms ($v_{i,E}$ for expertise and $v_{i,R}$ for risk). We assume that these error terms are independently and normally distributed with mean zero and are independent of the residuals ($\varepsilon_{ij,E}$ and $\varepsilon_{ij,R}$). We estimate these models using restricted maximum likelihood.

$$(1) \quad \text{EXPERTISE}_{ij} = (\beta_{0,E} + v_{0i,E}) + (\beta_{1,E} + \beta_{2,E} \times \text{INNOV_TYPE}_j + v_{1i,E}) \\ \times \text{SCENARIOS}_j + (\beta_{3,E} + v_{2i,E}) \times \text{INNOV_TYPE}_j + \beta_{4,E} \times \text{Controls}_i + \varepsilon_{ij,E},$$

$$(2) \quad \text{RISK}_{ij} = (\beta_{0,R} + v_{0i,R}) + (\beta_{1,R} + \beta_{2,R} \times \text{INNOV_TYPE}_j + v_{1i,R}) \times \text{SCENARIOS}_j$$

$$+ (\beta_{3,R} + v_{2i,R}) \times \text{INNOV_TYPE}_j + \beta_{4,R} \times \text{Controls}_i + \varepsilon_{ij,R}.$$

To model managers' project selection decisions, we use a mixed logit specification with repeated choices (Revelt and Train 1998). The mixed logit model circumvents several limitations of the standard logit model by allowing for random taste variation, unrestricted substitution patterns, and correlation in unobserved factors over choice sets and does not impose the independence from irrelevant alternatives assumption (Train 2009).

Let us denote the utility that manager i obtains from selecting project j appearing in choice set k by $U_{ij(k)}$. To test H_{3a} and H_{3b} , we express $U_{ij(k)}$ as a function of manager i 's perceptions regarding project j 's team expertise ($\text{EXPERTISE}_{ij(k)}$) and risk ($\text{RISK}_{ij(k)}$), the interaction between expertise and risk and an unobserved individual, project and choice set specific error term ($\varepsilon_{ij(k)}$) that captures unexplained variance in managers' preferences for different innovation projects (Equation 3). To allow for heterogeneity in managers' preferences for observable project characteristics, we model the parameters (β) in our model as random coefficients with their own error terms (v_i). We allow for different variances for these error terms and assume that they are independently and normally distributed. We assume that the error terms ($\varepsilon_{ij(k)}$) are iid extreme value, independent of observed variables and coefficients.

$$(3) \quad U_{ij(k)} = \beta_0 + (\beta_1 + v_{1i}) \times \text{EXPERTISE}_{ij(k)} + (\beta_2 + \beta_3 \times \text{EXPERTISE}_{ij(k)} + v_{2i}) \times \text{RISK}_{ij(k)} + \varepsilon_{ij(k)}.$$

Equation 4, in turn, tests the same relationship while including scenario presentation, type of innovation and their interaction in the model, allowing us to account for the influence of scenario presentation on innovation project selection decisions beyond its influence through project team expertise and perceived risk of the project:

$$(4) \quad U_{ij(k)} = \beta_0 + (\beta_1 + v_{1i}) \times \text{EXPERTISE}_{ij(k)} + (\beta_2 + \beta_3 \times \text{EXPERTISE}_{ij(k)} + v_{2i}) \times \text{RISK}_{ij(k)} \\ + (\beta_4 + v_{3i}) \times \text{INNOV_TYPE}_{j(k)} + (\beta_5 + \beta_6 \times \text{INNOV_TYPE}_{j(k)} + v_{4i}) \times \text{SCENARIOS}_{j(k)} + \varepsilon_{ij(k)}.$$

To estimate the model parameters in Equations 3 and 4, we assume that decision-makers make utility-maximizing project selection decisions. We use the utility functions specified in Equations 3 and 4 to derive, using the conditional logit formula, the probability that manager i chooses to fund project j in choice set k . We estimate our models using simulated maximum likelihood. The resulting log likelihood does not have a closed form solution. Hence, we implement the procedure proposed by Revelt and Train (1998) to simulate the likelihood function value. We use 50 Halton draws in our simulations.

4.6. Results and Discussion

Table 2 presents the estimation results for Study 1. Unless otherwise mentioned, we use effects coding for the *type of innovation* factor (where core is coded as -1 and transformational as 1) and dummy coding for the *scenario presentation* factor (where small-range scenario is coded as 1 if small-range scenarios are presented, 0 otherwise; and large-range scenario is coded 1 if large-range scenarios are presented, 0 otherwise). For this and subsequent analyses, we compute variance inflation factors (VIFs) for all independent variables. The maximum VIF is 3.2, indicating that multicollinearity is not a threat.

Scenario Presentation and Perceived Expertise. Columns 2 and 3 of Table 2 present the results of our perceived expertise model (Equation 1). We find that the model has a better fit (see Table 2; AIC = 12,795; BIC = 12,833) compared to a model without random coefficients. In line with H_1 , we find that the effect of scenario presentation on perceived team expertise is more positive for transformational than for core innovation projects both for small-range scenario presentation ($\beta = .07, p < .05$) and large-range scenario presentation ($\beta = .06, p < .05$).

--- Insert Table 2 about here ---

Additional findings deserve mention. First, although we made no formal prediction, we examine the effects of scenario presentation on the perceived expertise for small and large ranges. We find that small-range scenarios increase the perceived expertise ($\beta = .16, p < .01$) but large-range scenarios decrease the perceived expertise ($\beta = -.11, p < .01$).

Second, to identify the marginal effects of small- and large-range scenarios on perceived expertise for core and transformational innovations, we dummy code the type of innovation (i.e., the focal level of type of innovation is coded as 0 and the other level as 1) and then re-estimate Equation 1. We find that, for core innovations, small-range scenarios increase ($\beta = .09, p < .05$), whereas large-range scenarios decrease, perceived team expertise ($\beta = -.17, p < .01$). For transformational innovations, while small-range scenarios increase the perceived expertise ($\beta = .23, p < .01$), the effect of large-range scenarios is not significant ($\beta = -.05, p > .10$).

Third, when no scenarios are presented, decision-makers perceive the project teams of transformational innovations as less expert than those of core innovations ($\beta = -.22, p < .01$).

Fourth, for the control variables, we find that decision-makers' depth of elaboration on potential outcomes ($\beta = .14, p < .01$) and risk-seeking attitude ($\beta = .38, p < .01$) have a positive influence, whereas decision-makers' age has a negative influence ($\beta = -.01, p < .01$) on the perceived team expertise. Finally, decision-makers' general knowledge in investing ($\beta = .10, p < .05$), quantitative background ($\beta = .05, p < .05$) and level of training in metrics ($\beta = .11, p < .01$) all have a positive influence on perceptions of expertise.

Scenario Presentation and Perceived Risk. Columns 5 and 6 of Table 2 present the results of our perceived risk model (Equation 2). We find that the model has a better fit (see Table 2; AIC = 40,378; BIC = 40,416) compared to a model without random coefficients. Supporting H₂, we find that the effect of scenario presentation on perceived project risk is more

negative (for small-range scenarios; $\beta = -2.53, p < .01$) and less positive (for large-range scenarios; $\beta = -1.27, p < .05$) for transformational than for core innovations.

Additional findings deserve mention. First, we find that small-range scenarios decrease ($\beta = -1.55, p < .05$), while large-range scenarios increase the perceived project risk ($\beta = 14.39, p < .01$). Second, through marginal effect analysis, we find that, for core innovations, the effect of small-range scenario presentation on perceived project risk is not significant ($\beta = .97, p > .10$) and only large-range scenario presentation increases the perceived risk ($\beta = 15.65, p < .01$). For transformational innovations, we find that small-range scenarios decrease ($\beta = -4.08, p < .01$), whereas large-range scenarios increase the perceived risk ($\beta = 13.10, p < .01$). Third, we find that transformational innovations are perceived as riskier than core innovations ($\beta = 9.30, p < .01$). Fourth, in terms of the control variables, we find that decision-makers with higher (vs. lower) depth of elaboration on potential future outcomes ($\beta = -1.89, p < .05$), older (vs. younger) decision-makers ($\beta = -.16, p < .05$) and male (vs. female) decision-makers ($\beta = -2.00, p < .10$) tend to perceive innovation projects as less risky. In contrast, risk attitude ($\beta = 2.80, p < .01$), innovation decision-makers' education ($\beta = .74, p < .05$), general knowledge in investing ($\beta = 1.86, p < .05$), quantitative background ($\beta = 1.26, p < .05$), and level of training in metrics ($\beta = 2.00, p < .05$) all tend to increase decision-makers' risk perceptions. Perceived task complexity ($\beta = 1.61, p < .01$) also has a positive effect on decision-makers' project risk perceptions.

Project Selection Decisions. Columns 2 and 3 of Table 3 present the parameter estimates of the model described in Equation 3. Supporting H_{3a} and H_{3b}, we find that perceived expertise increases ($\beta = .18, p < .01$), while perceived risk decreases ($\beta = -.02, p < .01$), the likelihood of innovation project selection. The coefficient for the interaction between the perceived expertise and the perceived risk is positive and significant ($\beta = .002, p < .05$). However, due to the

nonlinearity in logit specifications, the sign and significance of the interaction coefficient may not indicate the true direction and true statistical significance of the interaction effect (Hoetker 2007). Hence, we examine the interaction effects in Table 3 using the simulation-based approach suggested by Zelner (2009).⁵ We confirm that the perceived expertise has a positive and significant moderating effect on the effect of perceived risk on project selection likelihood.

--- Insert Table 3 about here ---

Columns 5 and 6 of Table 3 present the results of the model described in Equation 4. We find that the full model, which includes the effects of scenario presentation, type of innovation and an interaction term between these variables, has the best fit (see Table 3; $AIC_{FULL} = 12,558$ vs. $AIC_{BASELINE} = 14,299$; $BIC_{FULL} = 12,663$ vs. $BIC_{BASELINE} = 14,339$). The full model also has the best predictive validity using a hold-out sample (hit rate of 67.2% for the full model and 61.2% for the baseline model, both of which compare favorably to chance, which is 50%).⁶

In line with H_{3a} and H_{3b} , the effect of perceived expertise on project selection likelihood remains positive and significant ($\beta = .10, p < .01$) and the effect of perceived risk on project selection likelihood remains negative and significant ($\beta = -.01, p < .01$). The moderating effect of perceived expertise on the effect of perceived risk on project selection likelihood remains positive and significant ($\beta = .001, p < .10$).

Discussion. In summary, in Study 1, we find that the effect of scenario presentation on perceived team expertise is more positive for transformational than for core innovations (H_1). The effect of scenario presentation on perceived project risk is more negative for

⁵ We explain in detail this approach in Web Appendix D. We check the interpretation of interaction effects using this approach for all logit specifications reported in this paper. All focal results pertaining to the interaction effects hold.

⁶ To compute these hit rates, we re-estimate our baseline and full models on a calibration sample of respondents' first thirteen choice decisions and predict their remaining two choice decisions.

transformational than for core innovations (H_2). Moreover, we find that perceived team expertise positively affects, and perceived project risk negatively affects, the likelihood of project selection (H_3). In addition, small-range scenarios increase perceived expertise and reduce perceived risk, whereas large-range scenarios decrease perceived expertise and increase perceived risk.

Study 1, however, accounts for the type of innovation as one aspect of the context in which project selection decisions are taken. This raises the question whether our findings from Study 1 generalize to different decision-making contexts. In addition, in Study 1, we make some assumptions in our experimental procedures to enhance its internal validity. These assumptions, however, might somewhat restrict our findings' weight. Thus, we design a second study to address these issues and further strengthen both the robustness and relevance of our findings.

5. Study 2

Study 2 aims to replicate the findings of Study 1 with different experimental procedures. Study 2 also extends Study 1 by accounting for two additional aspects of the project selection decision-making context: (i) the method that project teams use to develop scenarios and (ii) the strategic merit of innovation projects as hypothesized in H_4 and H_5 .

5.1. Subjects and Experimental Procedures

Similar to Study 1, we used a large-scale online conjoint experiment with experienced innovation decision-makers to test our hypotheses. We pretested our measures and experimental stimuli on a sample of 192 managers. We contracted ResearchNow to run the fieldwork of the pretest and the full experiment among innovation managers from its online executive panel in the US. We used the same sampling, screening and data cleaning criteria as in Study 1. This resulted in a final sample of 1,680 managers who were 42.1 years of age on average, 31% female, 92.7% holding a bachelor's degree or higher, and an average tenure at their firm of 12.9 years.

Participants were highly knowledgeable about innovation in their firm (8.4 on a 10-point scale). They also reported high knowledge and experience of investing in general, 5.3 and 5.2, respectively, and high knowledge of investing in innovation projects, 5.0, on a seven-point scale.

In Study 2, we employed the same experimental procedures as in Study 1 with the following exceptions. First, in Study 1, we deliberately manipulated the type of innovation in a way that core and transformational innovations had the same expected return after five years in the normal-case scenario. In Study 2, we relaxed this assumption as follows. The normal-case scenario of a transformational innovation project had a 25% (rather than 20%) probability of occurring. Consequently, in this study, the expected return of transformational innovations ($25\% \times \$30\text{M}$) was higher than that of core innovations ($80\% \times \$7.5\text{M}$). Our scenario presentation factor followed the same manipulation as in Study 1 with the exception that we explicitly stated that the worst- and best-case scenarios were equally likely to occur.

Second, we modified our instruction vignette to inform subjects that Telforce would accept that its entire innovation budget might be lost because of investments in projects that were not successful (Web Appendix C). To ensure truthful responses, we informed subjects that the experimental projects were disguised real projects and that we would compare their project selection decisions with the ranking of projects by Telforce's CTO and a senior innovation manager. The best performing subject would be the one whose project selection decisions were closest to this ranking, and we would reward her or him with a \$250 Amazon gift card.

Third, besides manipulating *scenario presentation* (no scenarios, small-range, and large-range scenarios) and *type of innovation* (core vs. transformational) to replicate our tests for hypotheses H₁ to H₃, we manipulated two additional factors to test hypotheses H₄ and H₅: *the method of scenario development* and *strategic merit*. We manipulated scenario presentation and

type of innovation within subjects, as in Study 1. We manipulated the method of scenario development and the strategic merit between subjects. In other words, each participant was randomly assigned to one of the four conditions based on our 2×2 manipulation of the scenario development method (intuitive vs. analytical) and strategic merit (high vs. low), and had to make project selection decisions among combinations of the six innovation project profiles.

To manipulate the method of scenario development, we provided information whether project teams used their intuition (“intuitive”) or conducted a thorough analysis of the different scenarios they presented (“analytical” - Dane and Pratt 2007; Schoemaker 1995). To manipulate strategic merit, we varied the extent to which the proposed innovations generated benefits for the firm beyond their financial merit (Ernst, Hoyer, and Rubsaamen 2010; Noordhoff et al. 2011). Specifically, in a “high” (“low”) strategic merit level, all projects generated a high (low) increase in the sales of other products in the firm’s assortment, improvement of current customer relationships, and development of employee talent (see Web Appendix C).

Fourth, in the choice tasks of Study 1, we did not allow a no-choice option. One may argue, however, that in practice decision-makers may sometimes not be willing to fund any project during project selection decisions. To account for this, we allowed a no-choice option in our second study. To ensure design efficiency, we generated Bayesian D-optimal choice design (Sandor and Wedel 2001). This resulted in 11 choice tasks consisting of three possible choice options in each set: two innovation projects and a no-choice option (see Web Appendix C). We randomized the order of choice sets for each participant.

5.2. Measures

We used the same measurement approach as in Study 1 with two exceptions. First, we measured perceived team expertise and project risk *before* project selection decisions. For each

of the 11 choice tasks, we measured participants' perceptions regarding the team expertise and the risk of the two innovation projects in a choice task. Hence, for each participant, we obtained 22 evaluations of perceived expertise and risk. Second, we measured these two variables using a 10-point scale with the same scale type and response format to facilitate participants' task (Web Appendix C). After measuring perceived expertise and risk and obtaining participants' project selection decisions, we inventoried the same control variables as those obtained in Study 1.

5.3. Model Specification and Estimation

We follow the same general model specification and estimation procedures as in Study 1 with the exceptions that we account (i) for the method of scenario development and strategic merit manipulations in all our models and (ii) for the presence of a no-choice alternative in our project selection models (see Web Appendix C for details).

5.4. Results and Discussion

Replication Tests of H_1 and H_2 . Columns 2 and 3 and columns 5 and 6 of Table 4 present the results of our perceived expertise and risk models. We again find that our perceived expertise and risk models fit the data well (see Table 4; $AIC_E = 142,040$ and $BIC_E = 142,091$; $AIC_R = 152,060$ and $BIC_R = 152,111$) compared to models without random coefficients. The results in Table 4 replicate Study 1 and are consistent with our hypotheses H_1 and H_2 both for small- and large-range scenario presentation. One difference, as compared with Study 1: the effect of large-range scenarios on perceived team expertise is positive ($\beta = .65, p < .01$).

--- Insert Table 4 about here ---

Replication Tests of H_3 . Columns 2 and 3 and columns 5 and 6 of Table 5 present the parameter estimates of the baseline and full project selection models. We again find that the full model has the best fit (see Table 5; $AIC_{FULL} = 29,318$ vs. $AIC_{BASELINE} = 29,769$; $BIC_{FULL} =$

29,443 vs. $BIC_{BASELINE} = 29,814$) and the best predictive validity, again using the last two choices as a holdout sample (hit rate of 68.4% for the full and 67.1% for the baseline models, both of which compare favorably to chance, which is 33.33%).

The results in Table 5 replicate H_{3a} and H_{3b} . One difference, as compared to Study 1, is that the coefficient for the interaction between perceived team expertise and perceived project risk is positive but not significant in both the baseline and full project selection models.

--- Insert Table 5 about here ---

Method of Scenario Development and Project Selection. In support of H_{4a} , we find that the effect of perceived expertise on project selection likelihood is more positive when project teams develop scenarios intuitively than when they develop scenarios analytically ($\beta = .04, p < .05$; see columns 5 and 6 in Table 5). We do not find a significant moderating effect of the method of scenario development on the effect of perceived project risk on project selection likelihood ($\beta = -.02, p > .10$). Hence, we do not find support for H_{4b} .

Strategic Merit and Project Selection. Supporting H_{5a} , we find that the effect of perceived expertise on project selection likelihood is less positive for projects that have a high rather than low strategic merit ($\beta = -.06, p < .01$). However, strategic merit does not significantly moderate the effect of perceived risk on project selection likelihood ($\beta = -.02, p > .10$). Hence, we do not find support for H_{5b} .

Discussion. In summary, Study 2 replicates our tests for hypotheses H_1 to H_3 with different experimental procedures and accounting for two additional project selection decision-making contexts. Study 2 also enriches our insights by showing that the effect of perceived expertise on project selection likelihood is more positive when project teams develop scenarios intuitively rather than analytically (H_{4a}), and when projects have low rather than high strategic merit (H_{5a}).

6. Robustness Checks and Further Analyses

One may conceive that the perceived expertise of a project team influences decision-makers' project risk perceptions. To account for this possibility, we re-estimate our perceived risk models controlling for the perceived team expertise (Web Appendix F; AIC = 40,314 and BIC = 40,353 in Study 1; AIC = 152,037 and BIC = 152,089 in Study 2). Our focal results remain robust with one borderline exception. In Study 1, the effect of small-range scenarios on perceived risk (which was significant at the 5% level) becomes insignificant ($p = .11$).

Similarly, in Study 2, we conduct further analyses to study whether (1) the method of scenario development and (2) the strategic merit of the innovation project moderate the effects of scenario presentation on perceived expertise and perceived risk. We do not find these factors to have an influence on the effects of scenario presentation on perceived expertise and risk (AIC_E = 142,050 and BIC_E = 142,101; AIC_R = 152,073 and BIC_R = 152,124).

Finally, we compare the proposed models with different model specifications. First, we run our project selection models without controlling for the interaction term between perceived expertise and risk in project selection models (AIC_{FULL} = 12,560 and BIC_{FULL} = 12,656 in Study 1; AIC_{FULL} = 29,318 and BIC_{FULL} = 29,434 in Study 2). Second, we re-estimate our perceived expertise and risk models including an additional variable that indicates the respondents' progress through the experiment and controls for learning or fatigue effects (AIC_E = 12,803 and BIC_E = 12,841, AIC_R = 40,367 and BIC_R = 40,405 in Study 1; AIC_E = 142,050 and BIC_E = 142,101, AIC_R = 152,041 and BIC_R = 152,092 in Study 2). All our hypothesized results hold.

7. Follow-up Interviews: Complementary Evidence

To provide direct process-related evidence for our theoretical arguments, we conducted follow-up interviews with senior executives at 11 multinational companies from several

industries, all of whom had extensive experience in project selection decisions (Web Appendix A). First, our interviewees suggested that scenario presentation influences project selection through processes that are consistent with, respectively, the positive and negative team expertise attributions and the project risk-reducing and risk-increasing attributions:

“It [scenario presentation] shows, it is not a proof but it shows, that at least the team has done quite a bit of work to get to know what the market is, how the product would behave in the market, and so on...” (A global head of innovation at a multinational energy company) [Positive team expertise attribution]

“Sometimes, scenarios might mean that the team is not realistic. ... It might lead to a perception of the team not having made selections whether they want to start with the project.” (A global talent acquisition manager and a former head of the innovation incubator office of a global tire manufacturer) [Negative team expertise attribution]

“The advantage of scenarios is that it ... makes the project less uncertain... When I think of scenarios in a practical sense, it allows you [the decision-maker] to think how to overcome them [the problems].” (An innovation manager at a European food and beverages producer) [Project risk-reducing attribution]

“If you put in front of people a positive and negative case, they will only see the negative. They will not see the positive.” (A senior research scientist in an R&D department of an American multinational healthcare company) [Project risk-increasing attribution]

Second, consistent with our theoretical accounts, many interviewees believed that scenario presentation is more beneficial for transformational than for core projects. As an interviewee indicated, presenting scenarios in transformational projects is more challenging and, thus, project teams get more credit when they do so:

“If it is an incremental innovation, the level of uncertainty is lower, and the [project] teams are obviously more capable of doing scenarios easily. If you are working in areas of high uncertainty, so more transformational innovations, what we see is that the teams even do not know where to start from, and scenarios require a high level of abstraction.” (An innovation manager at a European food and beverages producer)

Third, many of our interviewees found project team’s expertise to be more important when the project team develops scenarios intuitively than when they develop scenarios analytically:

“If you move to the analytical way, you kind of neutralize the [role of] expertise of the team because you say I am using analytics and more efficient tools.” (A global head of innovation at a multinational energy company)

Fourth, virtually all interviewees suggested that project team expertise is less influential for projects with high strategic merit. Consistent with our theoretical argument, an innovation manager at a European food and beverages producer explained that the firm buys “expensive historical data” and supports project teams to survey potential customers for projects with high strategic merit, thus decreasing the importance of project team expertise to decision-makers. The following quote illustrates this insight further:

“For projects in our ... [strategic areas], I worry less about the expertise of the people of the project because I know I would be more on top of things afterwards.” (A chief technology officer at a European online retailer)

In sum, our interviews not only buttress our theoretical arguments underpinning our hypotheses, they also enrich our insights. In addition, in our interviews, we extract pertinent managerial implications, which we discuss next.

8. Implications

8.1. Theoretical Contributions and Implications

Our research contributes to the literature on the innovation fuzzy front-end. In this space, we first contribute to the nascent but still scant literature on innovation project selection (e.g., Criscuolo et al. 2017; Girotra, Terwiesch, and Ulrich 2010). Most studies that focus on the innovation front-end investigate factors that facilitate idea generation, not project selection. We show that presenting financial projections using scenarios influences project selection decisions. In doing so, we highlight the importance of scenario presentation as an important antecedent for project selection and cast new light on growing evidence that characteristics of an innovation proposal (e.g., length and tone, inclusion of demos and prototypes) influence project selection

(Lu et al. 2019; Reitzig and Sorenson 2013). Future research could extend our study by examining how other relevant information presentation choices influence project selection decisions (e.g., disaggregation of revenues and costs, presentation of customer survey results, use of new technologies such as Augmented Reality for pitching, etc.).

Second, by drawing on attribution theory we add a pertinent lens to the literature to examine project selection decisions. We demonstrate that attribution theory can be consistently applied to predict how the presentation of financial projections triggers decision-makers' attributions of project team expertise and project risk which, in turn, influence their project selection decisions. We therefore believe that future research could fruitfully extend attribution theory into other aspects of the "black box" behind the project selection decision process.

Third, we examine how our theorized relationships between scenario presentation and project selection decisions vary depending on the decision-making context, such as the type of innovation being pitched (Rosenkopf and McGrath 2011). Prior literature examines the effects of innovation proposal characteristics on project selection but tends to disregard how such effects vary for different types of innovation (e.g., DeRosia and Elder 2019; Kirsch, Goldfarb, and Gera 2009). Our results suggest that scenario presentation is more advantageous for transformational than for core innovation projects. This adds to the literature by showing that innovation proposal characteristics do not influence the selection of all projects in the same way. This is important for scholars who might examine how other aspects of innovation proposals also differentially affect (core vs. transformational) project selection.

Fourth, our results suggest that the effects of decision-makers' perceptions on project selection are also contingent on the decision-making context. We found support for the effects of two additional contextual factors: the method of scenario development and the project's strategic

merit. Most studies on project selection do not explicitly incorporate the influence of decision-making context. Accounting for the decision-making context thus extends prior work and enriches our understanding of project selection decisions. Specifically, our results suggest that the same project may have systematically different chances of being selected depending on how the context interplays with decision-makers' perceptions. This is pertinent to scholars who might examine other contextual factors that play a role in project selection decisions to enhance the relevance of our scholarly research with respect to inevitably complex settings.

8.2. Managerial Implications

Our findings offer four substantive implications to managers. First, our findings suggest that firms should help project teams present small rather than large-range scenarios. Small-range scenario presentation increases perceived team expertise and reduces perceived project risk, whereas large-range scenario presentation increases perceived project risk (both studies), though its effect on perceived team expertise is inconclusive. Large-range scenarios may thus lead decision-makers to avoid selecting an innovation project and, instead, default to a “do nothing” position, which is hardly desirable (Christensen, Kaufman, and Shih 2008).

Although the implication to present small-range scenarios may seem apparent, it is not evident in a sizable number of firms where we observe that project teams present ‘too wide’ and ‘too extreme’ scenarios (57%; Study 2). Our interviewees highlighted several reasons why project teams present large-range scenarios. For instance, some project teams may not be “focused enough” or may not do “strong pre-work to validate the assumptions of their project”. Project teams may also fail to collect sufficient information on potential customers, possible competitive actions, and major costs of maturing their project which are especially uncertain for

transformational innovations, and thus, pose quite a challenge. What then can firms do to make their likely practice come closer to the best practice?

Practically, firms can take specific actions to encourage small-range scenario presentation, often by way of setting expectations and/or providing resources and training. For instance, regarding expectations, we learned from the follow-up interviews that firms can inculcate in their project teams a mindset and/or issue guidance that it pays to “do their homework” and narrow down the range of expected outcomes. Moreover, firms can offer resources to help project teams collect and analyze the competitive and market data they need to develop small-range scenarios. Firms may also coach project teams on various techniques, such as performing a project pre-mortem, to validate the assumptions driving scenarios and, thus, narrow down the range.

Second, our study suggests that firms seeking to promote transformational innovation should make the presentation of small-range scenarios required for an innovation proposal to be presented to a project selection committee. Indeed, based on our attribution theory predictions, we find that the effect of scenario presentation on perceived team expertise is more positive, and its effect on perceived project risk more negative, for transformational than for core innovations (both studies). Thus, presentation of (particularly small-range) scenarios increases the probability that decision-makers select transformational projects both when decision-makers face a forced choice among projects (Study 1) and when they do not (Study 2). Thus, our attribution-based model informs managers that project teams’ behaviors differentially influence decision-makers’ attributions and, in turn, their project selection decisions for different types of innovations, which may have systematic consequences on the composition of a firm’s innovation pipeline.

Our recommendation is relevant for a sizable number of firms. In practice, decision-makers cannot fund all projects they evaluate due to budget constraints and often need to choose

between alternative projects. Moreover, most of our respondents (79%; Study 2) indicate that senior management at their firms would like to select more transformational than core projects to strengthen their innovation pipeline. Yet, at present, only about half of the project teams at their firms always or almost always present scenarios.

Third, we find that projects with an expert team have a higher likelihood to be selected than projects with a less expert team (both studies). One of our interviewees corroborated this assertion. He mentioned that a project team with high expertise “knows what it is doing” as “they have expertise and experience under their belt” which leads decision-makers to “trust their projects.” As project teams have less expertise, however, we find that they should especially use analytical scenario development to help increase project selection likelihood (Study 2). Based on our attribution theory account, this happens because the context of analytical scenario development makes decision-makers’ attributions of project team’s lower expertise less influential in guiding project selection decisions. This is pertinent because novice project teams “tend to fall in love with their own ideas” and thus experience high levels of positive affect that reduces their ability to engage in analytical thinking (Baron and Ensley 2006). Thus, project teams with less expertise are especially prone to developing scenarios intuitively. Yet, our results indicate that this is bound to damage the likelihood of their project selection.

Fourth, lack of expertise may prevent project teams from discovering and articulating their project’s strategic merit. However, as project teams have less expertise, we find that it is especially important to convey the project’s strategic merit to decision-makers in the innovation proposal to help increase project selection likelihood (Study 2).

The latter two points are consequential for both project teams and firms because teams with the least propensity to develop scenarios analytically and ascertain a project’s strategic merit

depend on these two features for their projects to be selected. For project teams this implies that they should be aware of their “blind spots” and to try and remedy them. For firms this implies that they should “level the playing field” for their project teams, as one of our interviewees put it.

9. Limitations and Further Research

Our study has limitations, some of which offer pertinent opportunities for future research. First, in our experimental manipulations, we assumed that the CCFs in the normal-case scenario are at the midpoint of the CCFs in the best- and worst-case scenarios. Even though this is a standard practice in decision-making studies (e.g., Ho, Keller, and Keltyka 2002), it would be worthwhile to focus on the role of skewed scenarios in innovation project selection decisions.

Second, one may ask whether some project teams may interpret the guidance of presenting small- vs. large-range scenarios as an excuse to withhold information about their project’s true uncertainty. However, managers we interviewed suggested that such practice would be frowned upon and detrimental for project team reputation, making the practice unsustainable over time. In addition, it is not the purpose of our research to delve into the moral or ethical implications of such practices; we merely discuss the implications of presenting small- or large-range scenarios. Further research and scholarly discourse, however, could fruitfully address this question.

Finally, although we deemed an experiment to be the best possible method given the objectives of our study, it would be interesting to test if the effects of scenario presentation on project selection decisions hold in a retrospective study. However, it is difficult to conceive of a method to make this feasible at sufficient levels of reliability and validity.

Overall, we offer this study as a new look into the rather understudied innovation project selection process. By studying the effect of scenario presentation on innovation project selection decisions, our work offers new insights, though many interesting and important research

questions remain. Marketing scholars would be remiss to neglect the role of different types of information that project teams present at different stages of innovation development process.

References

- Ahmad, Sohail, Debasish Mallick, and Roger Schroeder (2013), "New Product Development: Impact of Project Characteristics and Development Practices on Performance," *Journal of Product Innovation Management*, 30 (2), 331-348.
- Bain & Company (2017), www.bain.com/insights/management-tools-and-trends-2017, (last accessed April 2021).
- Baron, Robert and Michael Ensley (2006), "Opportunity Recognition as the Detection of Meaningful Patterns: Evidence from Comparisons of Novice and Experienced Entrepreneurs," *Management Science*, 52 (9), 1331-1344.
- Baumeister, Roy F., Ellen Bratslavsky, Catrin Finkenauer, and Kathleen D. Vohs (2001), "Bad Is Stronger Than Good," *Review of General Psychology*, 5 (4), 323-370.
- Berscheid, Ellen, William Graziano, Thomas Monson, and Marshall Dermer (1976), "Outcome Dependency: Attention, Attribution, and Attraction," *Journal of Personality and Social Psychology*, 34 (5), 978-989.
- Birkinshaw, Julian, Cyril Bouquet and Jean-Louis Barsoux (2011), "The 5 Myths of Innovation," *MIT Sloan Management Review*, 54 (2), 43-50.
- Bolton, Lisa E. (2003), "Stickier Priors: The Effects of Nonanalytic Versus Analytic Thinking in New Product Forecasting," *Journal of Marketing Research*, 40 (1), 65-79.
- Cabantous, Laure, Denis Hilton, Howard Kunreuther, and Erwann Michel-Kerjan (2011), "Is Imprecise Knowledge Better Than Conflicting Expertise? Evidence from Insurers' Decisions in the United States," *Journal of Risk and Uncertainty*, 42, 211-232.
- Calantone, Roger, Jeffrey B. Schmidt, and Michael Song (1996), "Controllable Factors of New Product Success: A Cross-National Comparison," *Marketing Science*, 15 (4), 341-58.
- Chandy, Rajesh, Brigitte Hopstaken, Om Narasimhan, and Jaideep Prabhu (2006), "From Invention to Innovation: Conversion Ability in Product Development," *Journal of Marketing Research*, 43 (3), 494-508.
- Chen, Zoey, and Nicholas H. Lurie (2013), "Temporal Contiguity and Negativity Bias in the Impact of Online Word of Mouth," *Journal of Marketing Research*, 50 (4), 463-476.
- Chen, Xiao-Ping, Xin Yao, and Suresh Kotha (2009), "Entrepreneur Passion and Preparedness in Business Plan Presentations: A Persuasion Analysis of Venture Capitalists' Funding Decisions," *Academy of Management Journal*, 52 (1), 199-214.
- Christensen, Clayton, Stephen Kaufman, and Willy Shih (2008), "Innovation Killers: How Financial Tools Destroy Your Capacity to Do New Things," *Harvard Business Review*, 86 (1), 98-105.
- Cooper, Robert (1979), "The Dimensions of Industrial New Product Success and Failures," *Journal of Marketing*, 43 (3), 93-103.
- Cooper, Robert (2006), "Managing Technology Development Projects," *Research-Technology Management*, 49 (6), 23-31.
- Cooper, Robert (2008), "Perspective: The Stage-Gate® Idea-to-Launch Process: Update, What's New and NexGen Systems," *Journal of Product Innovation Management*, 25 (3), 213-232.
- Cooper, Robert (2013) "New Products—What Separates the Winners from the Losers and What Drives Success," in *PDMA Handbook of New Product Development*, 3rd ed., ed. K. B. Kahn, 3-34. Hoboken, NJ: Wiley.

- Criscuolo, Paola, Linus Dahlander, Thorsten Grohsjean, and Ammon Salter (2017), "Evaluating Novelty: The Role of Panels in the Selection of R&D Projects," *Academy of Management Journal*, 60 (2), 433-460.
- Criscuolo, Paola, Linus Dahlander, Thorsten Grohsjean, and Ammon Salter (2021), "The Sequence Effect in Panel Decisions: Evidence from the Evaluation of Research and Development Projects," *Organization Science*, 32 (4), 987-1008.
- Crowley, Ayn E. and Wayne D. Hoyer (1994), "An Integrative Framework for Understanding Two-Sided Persuasion," *Journal of Consumer Research*, 20 (4), 561-574.
- Dane, Erik and Michael G. Pratt (2007), "Exploring Intuition and Its Role in Managerial Decision Making," *Academy of Management Review*, 32 (1), 33-54.
- Danneels, Erwin and Elko J. Kleinschmidt (2001), "Product Innovativeness from the Firm's Perspective: Its Dimensions and Their Relation with Project Selection and Performance," *Journal of Product Innovation Management*, 18 (6), 357-373.
- Day, George S. (2007), "Is It Real? Can We Win? Is It Worth Doing? Managing Risk and Reward in an Innovation Portfolio," *Harvard Business Review*, 85 (12), 110-120.
- DeRosia, Eric, D. and Ryan S. Elder (2019), "Harmful Effects of Mental Imagery and Customer Orientation During New Product Screening," *Journal of Marketing Research*, 56(4), 637-651.
- Du, N., D. V. Budescu, M. K. Shelly, and T. C. Omer (2011), "The Appeal of Vague Financial Forecasts," *Organizational Behavior and Human Decision Processes*, 114 (2), 179-189.
- Ernst, Holger, Wayne D. Hoyer, and Carsten Rubsamen (2010), "Sales, Marketing, and Research-and-Development Cooperation across New Product Development Stages: Implications for Success," *Journal of Marketing*, 74 (5), 80-92.
- Fuchs, Cristoph, Fabian Sting, Maik Schlickel, and Oliver Alexy (2019), "The Ideator's Bias: How Identity-Induced Self-Efficacy Drives Overestimation in Employee-Driven Process Innovation," *Academy of Management Journal*, 62 (5), 1498-1522.
- Girotra, Karan, Christian Terwiesch, and Karl T. Ulrich (2010), "Idea Generation and the Quality of the Best Idea," *Management Science*, 56 (4), 591-605.
- Goodwin, Paul and George Wright (2001), "Enhancing Strategy Evaluation in Scenario Planning: A Role for Decision Analysis," *Journal of Management Studies*, 38 (1), 1-16.
- Green, Stephen and Terence Mitchell (1979), "Attributional Processes of Leaders in Leader-Member Interactions," *Organizational Behavior and Human Performance*, 23 (3), 429-458.
- Haaijer, Rinus, Wagner Kamakura and Michel Wedel (2001), "The 'No-Choice' Alternative in Conjoint Choice Experiments," *International Journal of Marketing Research*, 43 (1), 93-106.
- Ho, Joanna, Robin Keller, and Pamela Keltyka (2002), "Effects of Outcome and Probabilistic Ambiguity on Managerial Choices," *Journal of Risk and Uncertainty*, 24 (1), 47-74.
- Hoetker, Glenn (2007), "The Use of Logit and Probit Models in Strategic Management Research: Critical Issues," *Strategic Management Journal*, 28 (4), 331-343.
- Hoffmann, Arvid O.I. and Thijs L. J. Broekhuizen (2010), "Understanding Investors' Decisions to Purchase Innovative Products: Drivers of Adoption Timing and Range," *International Journal of Research in Marketing*, 27 (4), 342-355.
- Hogarth, Robin M. and Howard Kunreuther (1995), "Decision making under ignorance: Arguing with yourself," *Journal of Risk and Uncertainty*, 10 (1), 15-36.
- Huang, Laura and Jone L. Pearce (2015), "Managing the Unknowable: The Effectiveness of Early-stage Investor Gut Feel in Entrepreneurial Investment Decisions," *Administrative Science Quarterly*, 60 (4), 634-670.

- Jørgensen, Brian and Martin Messner (2010), "Accounting and Strategising: A Case Study from New Product Development," *Accounting, Organizations and Society*, 35(2), 184-204.
- Kaplan, Steven and Per Stömberg (2004), "Characteristics, Contracts, and Actions: Evidence from Venture Capitalist Analyses," *The Journal of Finance*, 59 (5), 2177-2210.
- Kelley, Harold H. and John L. Michela (1980), "Attribution Theory and Research," *Annual Review of Psychology*, 31, 457-501.
- Keum, Dongil D. and Kelly E. See (2017), "The Influence of Hierarchy on Idea Generation and Selection in the Innovation Process," *Organization Science*, 28 (4), 653-669.
- Kirsch, David, Brent Goldfarb, and Azi Gera (2009), "Form or Substance: The Role of Business Plans in Venture Capital Decision Making," *Strategic Management Journal*, 30 (5), 487-515.
- Koller, Tim, Dan Lovallo, and Zane Williams (2012), "Overcoming a Bias against Risk," *McKinsey Quarterly*, (August).
- Kornish, Laura J., and Karl T. Ulrich (2014), "The Importance of the Raw Idea in Innovation: Testing the Sow's Ear Hypothesis," *Journal of Marketing Research*, 51 (1), 14-26.
- Laczniak, Russell N., Thomas E. DeCarlo, and Sridhar N. Ramaswami (2001), "Consumers' Responses to Negative Word-of-Mouth Communication: An Attribution Theory Perspective," *Journal of Consumer Psychology*, 11 (1), 57-73.
- Lee, Kyoungmi and Sharon Shavitt (2009), "Can McDonald's Food Ever Be Considered Healthful? Metacognitive Experiences Affect the Perceived Understanding of a Brand," *Journal of Marketing Research*, 46 (2), 222-233.
- Louviere, Jordan J. and George Woodworth (1983), "Design and Analysis of Simulated Consumer Choice or Allocation Experiments," *Journal of Marketing Research*, 20 (4), 350-367.
- Lu, S., K. M. Bartol, V. Venkataramani, X. Zheng, and X. Liu (2019), "Pitching Novel Ideas to the Boss: The Interactive Effects of Employees' Idea Enactment and Influence Tactics on Creativity Assessment and Implementation," *Academy of Management Journal*, 62, 579-606.
- March, James G. and Zur Shapira (1987), "Managerial Perspectives on Risk and Risk Taking," *Management Science*, 33 (11), 1404-1418.
- Mintz, Ofer and Imran S. Currim (2013), "What Drives Managerial Use of Marketing and Financial Metrics and Does Metric Use Affect Performance of Marketing-Mix Activities?" *Journal of Marketing*, 77 (2), 17-40.
- Nagji, Bansi, and Geoff Tuff (2012), "Managing Your Innovation Portfolio," *Harvard Business Review*, May, 66-74.
- Nenkov, Gergana Y., J. Jeffrey Inman, John Hulland, and Maureen Morrin (2009), "The Impact of Outcome Elaboration on Susceptibility to Contextual and Presentation Biases," *Journal of Marketing Research*, 46 (6), 764-76.
- Noordhoff, Corine, Kyriakos Kyriakopoulos, Christine Moorman, Pieter Pauwels, and Benedict G.C. Dellaert (2011), "The Bright Side and Dark Side of Embedded Ties in Business-to-Business Innovation," *Journal of Marketing*, 75 (5), 34-52.
- Ohanian, Roobina (1990), "Construction and Validation of a Scale to Measure Celebrity Endorsers' Perceived Expertise, Trustworthiness, and Attractiveness," *Journal of Advertising*, 19 (3), 39-52.
- Olson, Eric M., Orville C. Walker, and Robert W. Ruekert (1995), "Organizing for Effective New Product Development: The Moderating Role of Product Innovativeness," *Journal of Marketing*, 59 (1), 48-62.

- Podsakoff, Philip M., Scott B. MacKenzie, Jeong-Yeon Lee, and Nathan P. Podsakoff (2003), "Common Method Biases in Behavioral Research: a Critical Review of the Literature and Recommended Remedies," *Journal of Applied Psychology*, 88(5), 879-903.
- Reitzig, Markus and Olav Sorenson (2013), "Biases in the Selection Stage of Bottom-up Strategy Formulation" *Strategic Management Journal*, 34 (7), 782-799.
- Revelt, David and Kenneth Train (1998), "Mixed Logit with Repeated Choices: Households' Choices of Appliance Efficiency Level," *Review of Economics and Statistics*, 80 (4), 647-657.
- Rosenkopf, L. and P. McGrath (2011), "Advancing the Conceptualization and Operationalization of Novelty in Organizational Research," *Organization Science*, 22(5), 1297-1311.
- Roxburgh, Charles (2009), "The Use and Abuse of Scenarios," *McKinsey Quarterly*, (November).
- Sandor, Zsolt and Michel Wedel (2001), "Designing Conjoint Choice Experiments Using Managers' Prior Beliefs," *Journal of Marketing Research*, 38 (4), 430-443.
- Schoemaker, Paul J. H. (1992), "How to Link Strategic Vision to Core Capabilities," *Sloan Management Review*, 34(1), 67-81.
- Schoemaker, Paul J.H. (1993), "Multiple Scenarios Development: Its Conceptual and Behavioral Foundation," *Strategic Management Journal*, 14(3), 193-213.
- Schoemaker, Paul J.H. (1995), "Scenario Planning: A Tool for Strategic Thinking," *Sloan Management Review*, 36 (2), 25-40.
- Sethi, Rajesh and Zafar Iqbal (2008), "Stage-Gate Controls, Learning Failure, and Adverse Effect on Novel New Products," *Journal of Marketing*, 72 (1), 118-134.
- Sethi, Rajesh, Zafar Iqbal, and Anju Sethi (2012), "Developing New-to-the-Firm Products: The Role of Micropolitical Strategies," *Journal of Marketing*, 76 (2), 99-115.
- Sloman, Steven A. (1996), "The Empirical Case for Two Systems of Reasoning," *Psychological Bulletin*, 119 (1), 3-22.
- Slotegraaf, Rebecca J. and Kwaku Atuahene-Gima (2011), "Product Development Team Stability and New Product Advantage: The Role of Decision-Making Processes," *Journal of Marketing*, 75 (1), 96-108.
- Train, Kenneth (2009), *Discrete Choice Methods with Simulation*, 2nd ed. Cambridge, UK: Cambridge University Press.
- Weber, Elke U. and Christopher Hsee (1998), "Cross-Cultural Differences in Risk Perception, but Cross-Cultural Similarities in Attitudes towards Perceived Risk," *Management Science*, 44 (9), 1205-1217.
- Weber, Elke U., Ann-Renee Blais, and Nancy E. Betz (2002), "A Domain-Specific Risk-Attitude Scale: Measuring Risk Perceptions and Risk Behaviors," *Journal of Behavioral Decision Making*, 15 (4), 262-90.
- Zelner, Bennet A. (2009), "Using Simulation to Interpret Results from Logit, Probit, and Other Nonlinear Models," *Strategic Management Journal*, 30 (12), 1335-48.

Table 1 – Key Empirical Studies on Innovation Project Selection

Paper	Empirical Basis	Variables of Focus	Decision-Making Process (P) / Context (C)	Theoretical Lens	Key Findings
Girotra, Terwiesch, and Ulrich (2010)	<ul style="list-style-type: none"> Lab experiment (N = 44 students) 	<ul style="list-style-type: none"> Group structure (team vs. hybrid) 		Decision-makers' group structure differences in problem solving and information processing	Individuals working in a hybrid structure (first individually and then as a team) are better able to discern high quality ideas than individuals working in teams.
Reitzig and Sorenson (2013)	<ul style="list-style-type: none"> Secondary data (11,975 proposals submitted to a large multinational consumer goods and manufacturing firm between 2006 and 2008) 	<ul style="list-style-type: none"> Decision-makers' shared business unit or site with project team members Decision-maker tenure Proposal length and tone 		Decision-makers' in-group evaluation biases	Decision-makers are biased in favor of projects submitted by project teams from the same division and facility. Proposals with moderate length and that highlight the project's benefits rather than the current problems it solves have higher selection likelihood.
Criscuolo et al. (2017)	<ul style="list-style-type: none"> Secondary data (556 funding decisions at a professional services firm) Interviews (21 project teams and 8 innovation decision-makers) 	<ul style="list-style-type: none"> Project novelty Project selection committee workload, expertise diversity, and shared location with the project team 		Decision-makers' limited attention and information overload	Decision-makers are more likely to fund projects with intermediate levels of novelty. Committee's workload and shared location with the project team reduce, whereas expertise diversity increases committee's preference for novel projects.
Keum and See (2017)	<ul style="list-style-type: none"> Online experiment (N = 101) Secondary data (16 in-house brands from a multinational fashion retailer) and a survey (13 designers) 	<ul style="list-style-type: none"> Hierarchy of authority among decision-makers 		Decision-makers' self-censoring and internal filtering due to managerial oversight	A committee of decision-makers with a hierarchical structure is better at project selection than a committee with no hierarchical structure.
Fuchs et al. (2019)	<ul style="list-style-type: none"> Secondary data (N = 944 ideas from an automotive supplier) Six follow-up interviews 4 online experiments (N=744 Mturks subjects) 	<ul style="list-style-type: none"> High vs. low organizational level Collaborative vs. individual ideation 		Project teams' self-efficacy and overconfidence	Projects from employees at a higher (vs. lower) organizational level and generated collaboratively (vs. individually) are more prone to an ideator's bias.
Lu et al. (2019)	<ul style="list-style-type: none"> Survey data from a video game and animation company (N = 246) Lab experiment (N = 264 students) 	<ul style="list-style-type: none"> Idea enactment (e.g., presentation of demos, prototypes) Upward influence tactics 	<ul style="list-style-type: none"> Idea novelty (C) 	Project teams' issue-packaging and issue-selling process	Project teams' idea enactment and use of upward influence tactics reinforce their positive effects on decision-makers' assessment of the ideas' creativity and, in turn, implementation intention.
DeRosia and Elder (2019)	<ul style="list-style-type: none"> 6 online experiments (N = 1,001 managers) 	<ul style="list-style-type: none"> Customer orientation Mental imagery about customer 		Stimulation of decision-makers' mental imagery	Mental imagery about customers makes innovation decision-makers unrealistically optimistic and bias their project selection decisions. The authors identify effective de-biasing techniques for this effect.
Criscuolo et al. (2021)	<ul style="list-style-type: none"> Secondary data (588 funding decisions at a professional services firm) Interviews (21 project teams and 8 innovation decision-makers) 	<ul style="list-style-type: none"> Sequence of projects Order of assessment 		Sequence effects in group decision-making and decision-makers' limited attention	Projects following a funded project are less likely to receive funding and especially so when their evaluation occurs late (vs. early) in a selection meeting.
This paper	<ul style="list-style-type: none"> Two online conjoint experiments (N = 2,425 innovation managers) Interviews (11 senior executives) 	<ul style="list-style-type: none"> Scenario presentation (small-range, large-range, vs. no scenarios) 	<ul style="list-style-type: none"> Perc. project team expertise (P) Perc. project risk (P) Type of innovation (C) Method of scenario development (C) Project's strategic merit (C) 	Decision-makers' attributions about the project team and the project	Small-range scenario presentation is more beneficial for transformational than for core innovations. The effect of project team expertise on project selection likelihood is less positive when project teams develop scenarios intuitively (vs. analytically) and for high (vs. low) strategic merit projects.

Table 2 – Study 1: Parameter Estimates for the Perceived Expertise and Perceived Risk Models

	Perceived Expertise			Perceived Risk		
	<i>Parameter</i>	<i>SE</i> ^{a,b}	<i>Hyp.</i>	<i>Parameter</i>	<i>SE</i> ^{a,b}	<i>Hyp.</i>
Intercept	2.78	.28***		16.93	5.11***	
Std. Dev. of Random Coefficient	.75	.20***		12.03	3.61***	
<i>Conjoint Factors</i>						
Innovation Type (Transformational = 1)	-.22	.02***		9.30	.53***	
Std. Dev. of Random Coefficient	.28	.01***		7.71	.37***	
Small-Range Scenarios	.16	.03***		-1.55	.72**	
Std. Dev. of Random Coefficient	.10	.02		9.56	.51***	
Large-Range Scenarios	-.11	.04***		14.39	.74***	
Std. Dev. of Random Coefficient	.63	.03***		10.58	.52***	
Small-Range Scenarios × Innovation Type	.07	.03**	H ₁ (+)	-2.53	.63***	H ₂ (-)
Large-Range Scenarios × Innovation Type	.06	.03**	H ₁ (+)	-1.27	.65**	H ₂ (-)
<i>Control Variables</i>						
Depth of Elaboration on Potential Outcomes	.14	.04***		-1.89	.74**	
Risk Attitude in Investment Decisions	.38	.05***		2.80	.95***	
Age	-.01	.00***		-.16	.06**	
Gender (Male = 1)	-.02	.06		-2.00	1.14*	
Education	.00	.02		.74	.36**	
Familiarity to Financial Concepts	-.01	.04		-.75	.71	
Knowledge in Investing	.10	.04**		1.86	.67**	
Quantitative Background	.05	.03**		1.26	.47**	
Training in Metrics	.11	.04***		2.00	.71**	
Task Complexity	.00	.02		1.61	.42***	
N (number of observations)	4,470			4,470		
Akaike information criterion (AIC)	12,795			40,378		
Bayesian information criterion (BIC)	12,833			40,416		

Notes: We use effects coding for the *type of innovation* factor (where core = -1 and transformational = 1). We use dummy coding for the *scenario presentation* factors (i.e., small-range scenario = 1 if small-range scenarios are presented, 0 otherwise; large-range scenario = 1 if large-range scenarios are presented, 0 otherwise). We use dummy coding for *gender* (gender = 1 for males, 0 for females).

a. We computed the significance levels for the main parameters (i.e., the population means) from t-tests.

b. We computed the significance levels for the variances of the random coefficients from z-tests.

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 3 – Study 1: Parameter Estimates for the Project Selection Models (Mixed Logit Models with Repeated Choices)

	Baseline Project Selection Model (Perceived Expertise and Risk)			Full Project Selection Model (incl. Scenario Presentation and Interactions)		
	<i>Parameter</i>	<i>SE</i> ^a	<i>Hyp.</i>	<i>Parameter</i>	<i>SE</i> ^a	<i>Hyp.</i>
Expertise	.18	.03***	H _{3a} (+)	.10	.03***	H _{3a} (+)
Std. Dev. of Random Coefficient	.38	.04***		.02	.09	
Risk	-.02	.00***	H _{3b} (-)	-.01	.00***	H _{3b} (-)
Std. Dev. of Random Coefficient	.02	.00***		.01	.00***	
Expertise × Risk	.00	.00**		.00	.00*	
<i>Conjoint Factors</i>						
Innovation Type (Transformational = 1)				-.12	.03**	
Std. Dev. of Random Coefficient				.77	.03***	
Small-Range Scenarios				.78	.03***	
Std. Dev. of Random Coefficient				.40	.04***	
Large-Range Scenarios				-.51	.03***	
Std. Dev. of Random Coefficient				.62	.04***	
Small-Range Scenarios × Innovation Type				.11	.04**	
Large-Range Scenarios × Innovation Type				-.13	.02***	
N (number of observations)		22,350			22,350	
Akaike information criterion (AIC)		14,299			12,558	
Bayesian information criterion (BIC)		14,339			12,663	

Notes: The dependent variable is a binary choice variable indicating whether or not a participant decided to fund an innovation project. Given the nonlinearity in logit specifications, we center Expertise and Risk at the mean and use effects coding for the *type of innovation* (where core = -1 and transformational = 1) and the *scenario presentation* factors (i.e., small-range scenario = 1 if small-range scenarios are presented, 0 if large-range scenarios are presented, and -1 otherwise; large-range scenario = 1 if large-range scenarios are presented, 0 small-range scenarios are presented, and -1 otherwise).

a. We computed the significance levels from z-tests.

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 4 – Study 2: Parameter Estimates for the Perceived Expertise and Perceived Risk Models

	Perceived Expertise			Perceived Risk		
	<i>Parameter</i>	<i>SE</i> ^{a,b}	<i>Hyp.</i>	<i>Parameter</i>	<i>SE</i> ^{a,b}	<i>Hyp.</i>
Intercept	2.56	.30***		2.93	.30***	
Std. Dev. of Random Coefficient	1.21	.21***		1.17	.21***	
<i>Conjoint Factors</i>						
Innovation Type (Transformational = 1)	-.15	.02***		.49	.02***	
Std. Dev. of Random Coefficient	.30	.01***		.57	.01***	
Small-Range Scenarios	.82	.03***		-.61	.04***	
Std. Dev. of Random Coefficient	1.04	.02***		1.23	.03***	
Large-Range Scenarios	.65	.03***		.70	.03***	
Std. Dev. of Random Coefficient	1.10	.02***		.94	.02***	
Small-Range Scenarios × Innovation Type	.15	.02***	H ₁ (+)	-.04	.02*	H ₂ (-)
Large-Range Scenarios × Innovation Type	.05	.02***	H ₁ (+)	-.04	.02**	H ₂ (-)
<i>Between-Subject Factors</i>						
Method of Scenario Devel. (Intuitive = 1)	.03	.06		-.04	.06	
Strategic Merit (High = 1)	-.07	.06		-.02	.06	
<i>Control Variables</i>						
Depth of Elaboration on Potential Outcomes	.08	.04**		.13	.04***	
Risk Attitude in Investment Decisions	.61	.06***		.42	.06***	
Age	-.03	.00***		-.03	.00***	
Gender (Male = 1)	-.22	.08**		.23	.08***	
Education	-.02	.02		.00	.02	
Familiarity to Financial Concepts	-.06	.04		.00	.04	
Knowledge in Investing	.20	.03***		.11	.03***	
Quantitative Background	.17	.03***		.16	.03***	
Training in Metrics	.13	.04***		.06	.04	
Task Complexity	.01	.02		.09	.02***	
N (number of observations)	36,960			36,960		
Akaike information criterion (AIC)	142,040			152,060		
Bayesian information criterion (BIC)	142,091			152,111		

Notes: We use effects coding for the *type of innovation* factor (where core = -1 and transformational = 1). We use dummy coding for the *scenario presentation* factor (i.e., small-range scenario = 1 if small-range scenarios are presented, 0 otherwise; large-range scenario = 1 if large-range scenarios are presented, 0 otherwise), *method of scenario development* (i.e., method of scenario development = 1 if scenarios are developed intuitively and 0 if scenarios are developed analytically), and *strategic merit* (i.e., strategic merit = 1 for the high level, 0 for the low level). We use dummy coding for *gender* (gender = 1 for males, 0 for females).

a. We computed the significance levels for the main parameters (i.e., the population means) from t-tests.

b. We computed the significance levels for the variances of the random coefficients from z-tests.

* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 5 – Study 2: Parameter Estimates for the Project Selection Models (Mixed Logit Models with Repeated Choices)

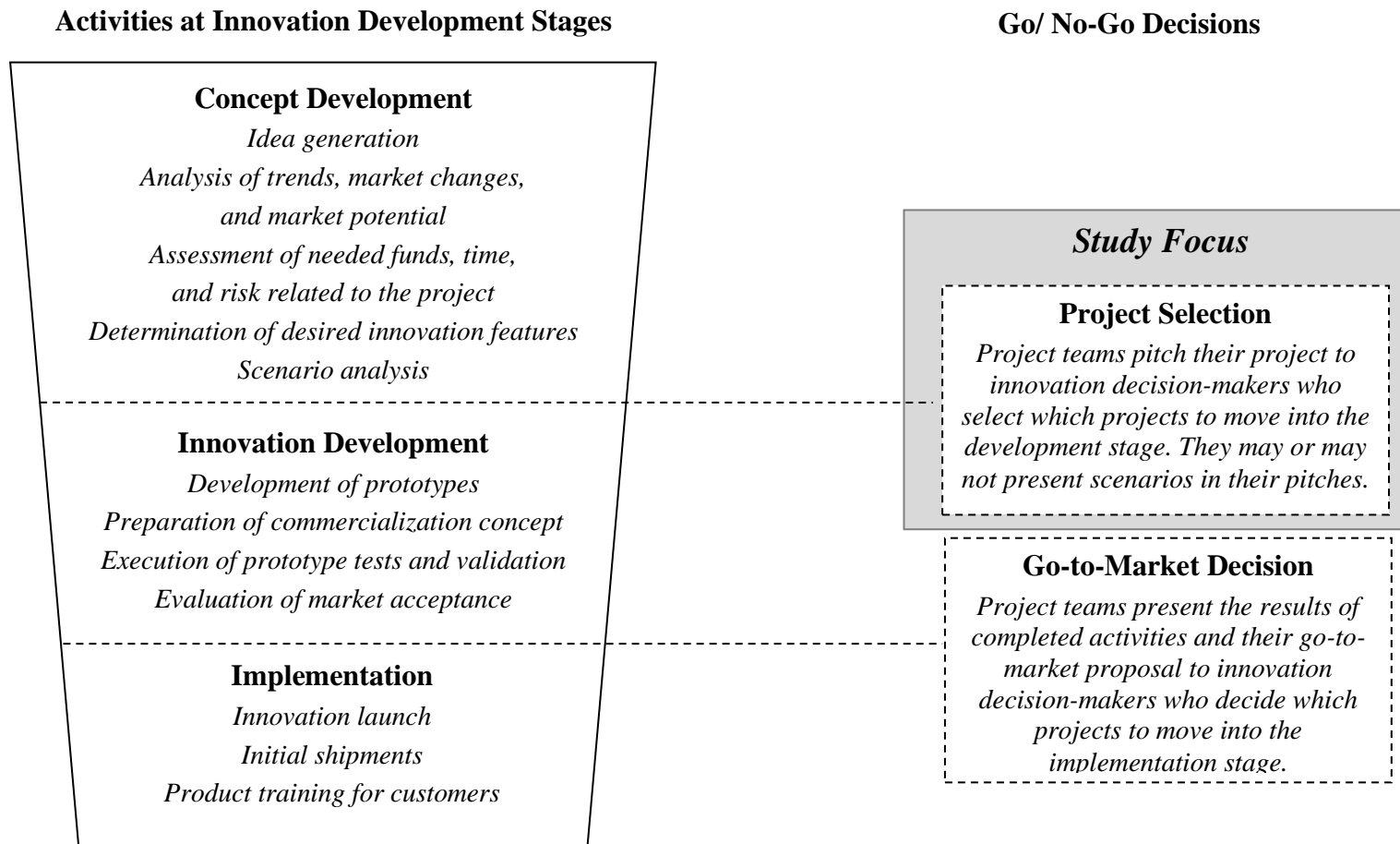
	Baseline Project Selection Model (Perceived Expertise and Risk)			Full Project Selection Model (incl. Manipulated Factors)		
	Parameter	SE ^a	Hyp.	Parameter	SE ^a	Hyp.
No-Choice Constant	-2.46	.09***		-2.49	.09***	
Std. Dev. of Random Coefficient	2.25	.08***		2.25	.08***	
Expertise	.31	.01***	H _{3a} (+)	.31	.01***	H _{3a} (+)
Risk	-.28	.01***	H _{3b} (-)	-.22	.01***	H _{3b} (-)
Expertise × Risk	.001	.003		.004	.003	
<i>Conjoint Factors</i>						
Innovation Type (Transformational = 1)				-.02	.01*	
Small-Range Scenarios				.38	.02***	
Large-Range Scenarios				-.20	.02***	
Small-Range Scenarios × Innovation Type				.03	.01**	
Large-Range Scenarios × Innovation Type				-.02	.01	
<i>Interactions with Between-Subject Factors</i>						
Expertise × Method of Scenario Devel. (Intuitive = 1)				.04	.02**	H _{4a} (+)
Risk × Method of Scenario Devel. (Intuitive = 1)				-.02	.01	H _{4b} (-)
Expertise × Strategic Merit (High = 1)				-.06	.02***	H _{5a} (-)
Risk × Strategic Merit (High = 1)				-.02	.01	H _{5b} (+)
N (number of observations)	55,440			55,440		
Akaike information criterion (AIC)	29,769			29,318		
Bayesian information criterion (BIC)	29,814			29,443		

Notes: We center Expertise and Risk at the mean. In line with Haaijer, Kamakura, and Wedel (2001), we account for the presence of no-choice alternative as follows: (i) we use effects coding for the *type of innovation* (where core = -1 and transformational = 1) and the *scenario presentation* factors (i.e., small-range scenario = 1 if small-range scenarios are presented, 0 if large-range scenarios are presented, and -1 otherwise; large-range scenario = 1 if large-range scenarios are presented, 0 if small-range scenarios are presented, and -1 otherwise); (ii) we code all attribute levels of no-choice alternative as 0; (iii) we add a no-choice constant that = 1 if an alternative is a no-choice option, and 0 otherwise. We use a random coefficient for the no-choice constant to account for the correlation among utilities for different alternatives that each decision-maker evaluates (Train 2009). We use dummy coding for the *method of scenario development* (i.e., method of scenario development = 1 if scenarios are developed intuitively and 0 if scenarios are developed analytically) and *strategic merit* (i.e., strategic merit = 1 for the high level, 0 for the low level).

a. We computed the significance levels from z-tests.

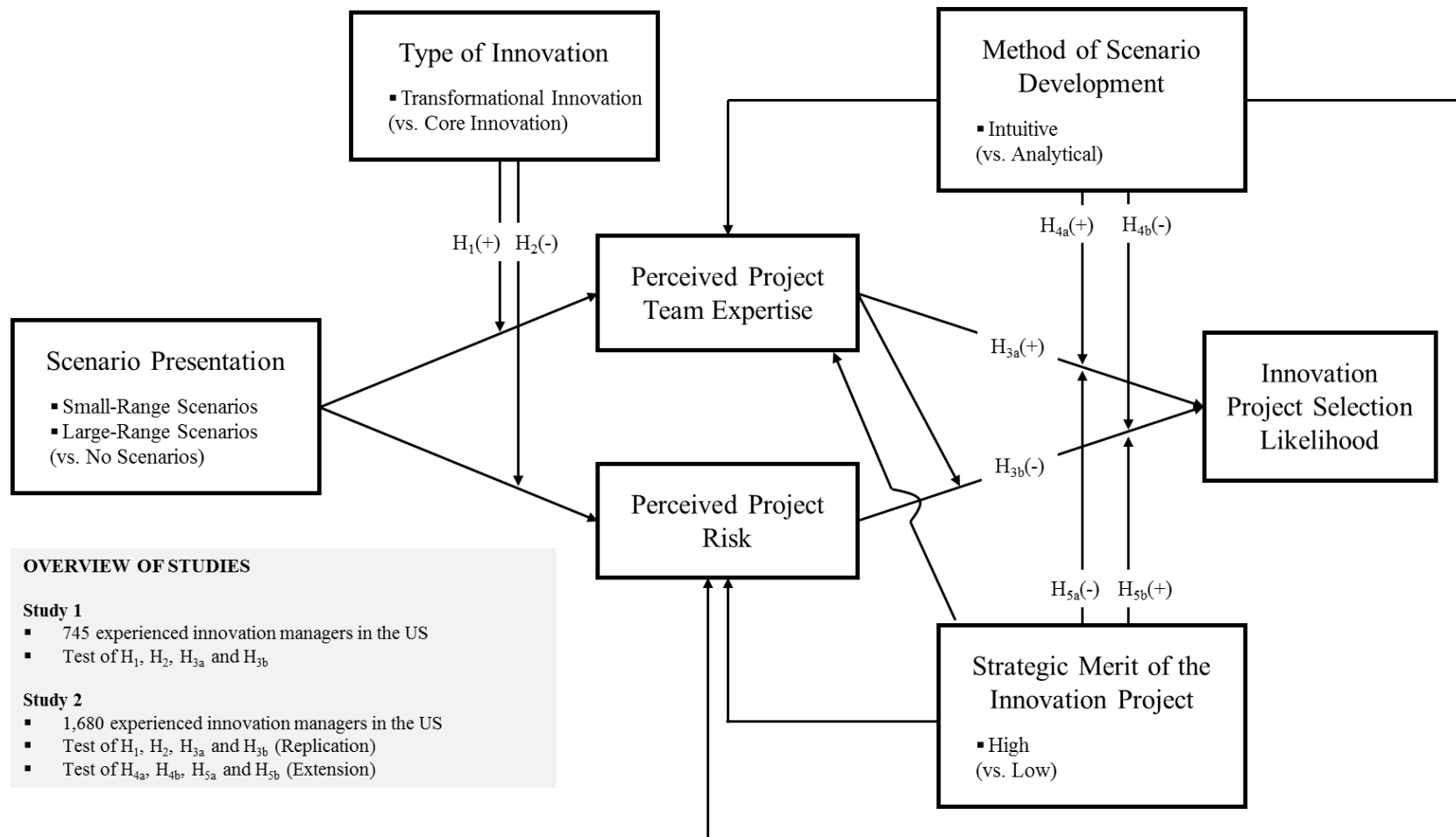
* $p < .10$, ** $p < .05$, *** $p < .01$.

Figure 1 – Innovation Development Stages



Note: Figure adapted from Ernst, Hoyer, and Rubsaamen (2010).

Figure 2 – Conceptual Framework



Notes: We indicate our hypotheses next to the corresponding arrows followed by an indication, in parentheses, of their expected signs. For H₁, H₂, H_{3a}, H_{3b}, H_{4a} and H_{5a} we find empirical support. We do not find support for H_{4b} and H_{5b}.