Responding—or Not—to IT Project Risks: Conceptualizing Risk Response as Planned Behavior

Research-in-Progress

Mohammad Moeini
HEC Montréal
3000 Côte-Sainte-Catherine,
Montréal, Québec, H3T 2A7
Canada
mohammad.moeini@hec.ca

Suzanne Rivard
HEC Montréal
3000 Côte-Sainte-Catherine,
Montréal, Québec, H3T 2A7
Canada
suzanne.rivard@hec.ca

Abstract

Prior research suggests that IT project managers' risk response behavior sometimes differs from the prescriptions in the literature. Conceptualizing performing a risk response as planned behavior, this study draws upon the theory of planned behavior (TPB) and develops a model to enrich the understanding of the relationship between perceiving risk and enacting—or not—a risk response. The model includes the TPB constructs—behavioral attitude, perceived pressure and perceived control. It also leverages the notion of 'background factors' in TPB that allows the inclusion of antecedents of behavioral attitude, in the present study, perceived risk of project without the risk response and perceived risk of enacting the risk response. The research design comprises three studies. Study 1 selected three specific risk responses. Study 2 elicited IT project managers' beliefs about each risk response. Study 3 (in progress), tests the proposed model—enriched with the elicited beliefs—for each risk response.

Keywords: IT project risk management, perceived risk, risk response, theory of planned behavior, belief elicitation, survey

Introduction

While the systems delivered by information technology (IT) projects often hold the promise of substantial benefits, project failure can be damaging to organizations, to the point that a failed project can threaten the very existence of a firm (Bloch et al. 2012). Given such impacts and the still low success rate of IT projects (Flyvbjerg and Budzier 2011), researchers and practitioners seek to identify project management practices that would improve the chances of a successful system delivery. For several decades, risk management has been seen as such a practice (Alter and Ginzberg 1978; Barki et al. 2001; Boehm 1989; Keil et al. 1998; Kutsch et al. 2013).

Risk management involves assessing project risk and taking actions to mitigate it (Bannerman 2008). This might imply that in realizing risk management, perceiving a significant risk will lead to a decision to mitigate it. Yet, although risk management is widely agreed upon in principle, its actual realization in practice often differs from the prescriptions of the literature (Bannerman 2008; Kutsch et al. 2013; Taylor et al. 2012). In particular, when specific risks are noticed in IT projects, the specific responses prescribed in the literature to address these risks might not be enacted. For instance, Taylor (2005 p.441) found that the actual risk response planning "focused almost exclusively on the addition of contingency to the proposed schedule and budget," a course of action that significantly "differs from the range of possible risk responses recommended in the literature, which includes taking pro-active actions to eliminate or reduce risks that have been identified." It has even been suggested that risks might be intentionally ignored (Kutsch and Hall 2005).

Extant literature has addressed this issue from two different perspectives. The first view is based on models of risk taking (e.g., Sitkin and Pablo 1992). Studies from this view consider *not* performing a risk response as a risk taking behavior. This view asserts that beyond one's perception of risk, risk taking is influenced by one's risk propensity. For example, this view was adopted to study IT project escalation, that is, "whether to continue or abandon a troubled project" (Keil et al. 2000b, p.299). The second view is based on models of decision making that consider a decision as a choice between alternative courses of action, each having an expected utility (e.g., von Neumann and Morgenstern 1947). This view was adopted to study applying—or not—formal risk management practices, which include risk identification, risk evaluation, risk prioritization, risk response planning, and risk monitoring (Kutsch and Hall 2005; 2009; Kutsch et al. 2013).

Each view has its merits. While the former leads to more parsimonious models, the latter contributes to a richer explanation of a decision by providing a more complete list of the antecedents of action, e.g., the expected utilities. As such, it can help enrich the explanation of the relationship between perceiving risk and enacting—or not—a risk response. Until now, this perspective has been chiefly used to study formal risk management practices (e.g., Kutsch et al. 2013) but not specific risk responses, i.e., day-to-day project management activities that can address some specific project risks. In contrast, the objective of this paper is to provide a rich explanation of the project managers' decisions to perform—or not—specific risk responses by adopting this view.

To achieve this objective, this study conceptualizes performing a risk response as a planned behavior, and draws upon the theory of planned behavior (TPB, Ajzen 1991; 2011; Fishbein and Ajzen 2010) to develop a model of the antecedents of IT project managers' decisions to enact a risk response. TPB helps to accomplish the objective of the present study in two ways. First, the baseline TPB model not only includes three direct antecedents of the intention to perform a behavior—attitude, perceived pressure and perceived control—but also allows for the inclusion of antecedents of attitude—called background factors (Fishbein and Ajzen 2010)—such as perceived risk. Thus, a link could be made between TPB and risk management research. Second, TPB provides a balance between parsimony and richness by enabling the study of antecedents of decisions at two levels of abstraction. At a more abstract level, including the attitude, perceived pressure, and perceived control constructs helps identify the most influential antecedents of intentions for specific risk responses. At a less abstract level, it allows the inclusion of composites of beliefs that underlie the exogenous constructs. This paper applies TPB at both levels.

The research design comprises three studies. Since TPB requires specifying the focal behavior (Ajzen and Fishbein 1977), Study 1 surveyed 29 experts to identify three specific risk responses deemed (1) important, (2) relatively within project managers' control, and (3) not frequently practiced—but not rare—in IT projects. Study 2 interviewed 24 project managers to elicit their beliefs and provide modal sets of attitudinal, normative, and control beliefs (Fishbein and Ajzen 2010) about each risk response. Study 3 surveyed IT project managers to test the model for each of the three risk responses. Currently, the data collection for model testing is in progress.

This research-in-progress is expected to make two key contributions. First, it will contribute to the existing behavioral literature on IT project risk management by developing and testing a model of project managers' intentions to perform specific risk responses. In particular, it will demonstrate that the relationship between the perception of risk and performing a corresponding risk response is mediated through the attitude towards that specific risk response. Also, it will explain how this attitude is counterbalanced by the perceived risk of enacting the risk response itself. Second, it offers a rich conceptualization of constructs by providing access to granular underlying beliefs.

The paper briefly reviews the literature on IT project risk responses, and then describes the research model, defining its constructs and explaining its relationships. This is followed by an explanation of the research method and a discussion of the expected contributions.

Conceptual Background

Prior Research on Risk Responses and Their Link to IT Project Risk

Risk sources refer to threats to the objectives of projects (PMI 2008). The project management activities that aim at eliminating, mitigating, transferring, or controlling such potential threats to the objectives of projects are referred to as risk responses (also known as risk resolution techniques or risk reduction activities) (Barki et al. 2001; Charette 1996; Lister 1997; Lyytinen et al. 1998; McFarlan 1981; PMI 2008). For example, in the case of a project that suffers from scope creep, freezing requirements is suggested to be effective in preventing deviations from the project objectives (Keil et al. 1998). The literature has explored this relationship in detail by linking different risk sources to different risk responses. In particular, such relationships between risks and risk responses are often considered to be many-to-many: A risk could be reduced by various risk responses, and one risk response might affect various risks.

To further explore the relationship between risk sources and risk responses, we reviewed the literature and synthesized a matrix connecting various specific risk responses to specific risks (see Table 1). To create this matrix, we started by identifying higher level categories of risk responses and risk sources (highlighted in grey in the table) and then organizing more specific items under these categories. More precisely, specific risk responses are put under three categories of project management activities: internal integration, external integration, and formal planning (Barki et al. 2001; McFarlan 1981). Likewise, five categories for risk sources have been considered: user risks, team risks, requirements risks, planning and control risks, and technology and complexity risks (Wallace et al. 2004). Next, to populate the matrix, we began by including the responses listed by Barki et al. (2001). Then, we sought articles that link the multitude of risk sources and risk responses together (e.g., Alter and Ginzberg 1978; Barki et al. 2001; Boehm 1991; Lyytinen et al. 1998; McFarlan 1981; Nelson 2007; Tesch et al. 2007). Finally, we further developed this table by including other representative articles linking a risk source to a risk response.

Prior Research on Explaining Risk Management Behavior

In this subsection, we review the literature on the motivations behind performing risk responses. Early efforts to explain the risk response decision making have drawn upon the models of risk taking (e.g., Sitkin and Pablo 1992) and have included perceived risk as a direct antecedent of risk response decision. For example, Keil et al. (2000a p.151) found a significant relationship between the risk perception and the "decision of whether or not to continue with the project" which represents a "choice dilemma between a risky and safe course of action". From such a model, one would expect that a perception of a specific risk is correlated to a decision to enact the corresponding risk response, perhaps similar to the patterns depicted in Table 1.

Nevertheless, contrary to such expectations, other researchers found that the perception of a specific risk and the enactment of a corresponding risk response might not be correlated. More specifically, Ropponen and Lyytinen (1997) could not find such relationships between a multitude of particular risks and responses. Likewise, Taylor (2005) found that project managers often plan for generic contingencies rather than more specific risk responses. Moreover, Kutsch and Hall (2005) suggest that risks might even be intentionally ignored. Therefore, the perceived risk (i.e., one's subjective assessment of risk) construct does not adequately explain the IT project managers' decision to respond to risk and other phenomena should be included.

Table 1. Linking Risk Sources and Risk Responses in IT Projects

Risk Response Categories	Specific Risk Responses	User risk	Team risk	Requirements risk	Planning and control risk	Technology and complexity risk	Linking Risk Specific Responses to Specific Risk Sources
External Integration	**Increasing user participation [19]**	×		×			Lack of adequate user participation [11][12] [19]
	- Having end-user representatives as project team members. [2] [4] [8][9][10][11]	×		×			Failure to gain user commitment [11][10]; Lack of adequate user involvement [10][11]; Developing wrong user interface/functionalitites [4][8][11]; Misunderstanding the requirements [10][11])
	- Making users responsible to do a part of the project. [1][2][12]	×					Failure to gain user commitment [12]; Lack of adequate user involvement [12])
	- Getting users' formal approval on the work done. [2]	×		×			Failure to gain user commitment [8][12]; Misunderstanding the requirements
	- Having a project champion. [1]	×					Failure to gain user commitment [1] [13]; Conflict between user departments [13]; Failure to manage end-user expectations [14]
Internal Integration	**Appropriate staffing [2]**		×				
	- Staffing project team with appropriate expertise. [1][2][4]		×				Insufficient staffing [1][4][8]; Lack of required knowledge and expertise in the team[1]
	Improving team communication and coordination [2]		×				
	- Keeping project members informed about major decisions. [2]		×				Lack of [team] commitment (poor goals) [1]; Systems of communication that are inefficient, poor, and lack channels [1]
	- Putting every effort to coordinate project team members' work. [2]		×				Inappropritate work flow and coordination [1]; Systems of communication that are inefficient, poor, and lack channels [1]
	Putting every effort to reduce team member turnover. [1][2][16][17][18]		×				Team member turnover[1][16][17][18]
	- Appreciating team members' work in a tangible way during the project.		×				Team member turnover[1]
Formal Planning	**Appropriate project planning**				×		
	- Dedicating much effort to project planning. [2]				×		Unrealistic schedules and budgets [4][8]
	- Allocating significant resources to estimate project times and budgets.[2]				×		Unrealistic schedules and budgets [4][8]
	- Using tools such as PERT or CPM to closely follow the project's status. [2]				×		Misunderstanding the requirements[6]
	- Following an appropriate project management methodology. [2]				×		
	- Getting top management support of the project. [2][3]				×		Lack of top management commitment to the project [8]
	Managing the technology development			×	×	×	
	- Drawing up a formal agreement of work to be done.				×		Misunderstanding the requirements; Lack of top management commitment to the project [8]
	- Scope freeze			×	×		Changing scope [4]; Lack of frozen requirements [7]
	- requirements scrubbing [1][4]			×	×		Application complexity [2]
	- Incremental development. [2][4]			×	×	×	Unrealistic schedules and budgets [4]
	- Prototyping.[2][4]			×		×	Changing scope [4]; Developing wrong user interface and functionalities [4]; Misunderstanding the requirements[8]
	- Pilot testing.[2][4]	×		×	×	×	Changing scope [8]; Misunderstanding the requirements[8]; Real-time performance shortfalls [4]
	- Comprehensive testing before going live.[2][4]					×	Real-time performance shortfalls [4]

Representative References:
[1] Lyytinen et al. (1998)
[2] Barki et al. (2001)
[3] Schmidt et al. (2001)
[4] Boehm (1991)
[5] Nelson (2007)
[6] Ropponen and Lyytinen (1997)
[7] Keil et al. (1998)
[8] Tesch et al. (2007)
[9] Wallace et al. (2004)
[10] Heinbokel et al. (1996)
[11] Markus and Mao (2004)
[12] Hartwick and Barki (1994)
[13] Beath (1991)
[14] Petter (2008)
[15] Pee et al. (2008)
[16] Ahuja et al. (2007)
[17] Jiang and Klein (2002)
[18] Thatcher et al. (2002)
[19] Jun He and King (2008)
[20] Alter and Ginzberg (1978)

One such construct that researchers have often included in the early literature to explain the risk response decision has been risk propensity (e.g., Keil et al. 2000a), which refers to one's tendency to take or avoid risks (Sitkin and Pablo 1992). Moreover, since a project managers' experience might imply familiarity with various risks and risk responses, the experience construct has been included to explain the risk response decision in the IT project management context (Huff and Prybutok, 2008).

More recent studies, nevertheless, show that a wider array of project managers' beliefs and perceptions could influence the risk-related decisions in the IT project management context. For example, regarding the decision to apply formal risk management practices, Kutsch and Hall (2013) found five influential beliefs, which are:

1. "fact" or the belief that "risks needed to be tangible, perceptible and real" (p.8),
2. "value" or the belief that "risk management must be demonstrably useful" (p.7),
3. "legitimacy" or the belief about the "expectation and pressure to conform to the prescribed routine of risk management" (p.7),
4. "competence" or the belief about "one's ability to control risk" (p.8), and
5. "authority," which lacking it has resulted in a common belief that IT project managers were "powerless and had limited authority to act" (p.9).

While the first identified belief concerns the presence of a 'real' risk and is related to the notion of perceiving risk, the other beliefs contribute to an additional understanding of the motivations behind—not—enacting formal risk management practices. For example, the third belief highlights the role of an external pressure on IT project managers for or against such decision.

We believe that exploring such underlying beliefs helps to further our understanding of the relationship between specific risk sources and responses. Yet, in order to do so, two conceptual gaps should be addressed: First, an integrative model that comprises different categories of such influential beliefs is still lacking. Second, the extant literature (e.g., Kutsch and Hall, 2013) only explores such beliefs with regards to applying formal risk management practices, but not more specific risk responses. Thus, beliefs about specific risk responses should be further scrutinized. In the next section, we conceptualize the risk responses as planned behaviors and we discuss how the theory of planned behavior (TPB, Ajzen 1991; 2011) can be instrumental in addressing these gaps. In particular, we propose an integrative model of the IT project managers' risk responses based on the TPB.

A Behavioral Model of IT Project Managers' Risk Response

The theory of planned behavior, (TPB, Ajzen 1991; 2011; Fishbein and Ajzen 2010) aims at explaining and predicting individual behaviors. It has been successfully used across various contexts, including IS adoption and use behaviors (e.g., Pavlou and Fygenson 2006; Taylor and Todd 1995). In brief, TPB suggests that a person's intention *reasonably* follows the person's attitude, the perceived pressure to exhibit or avoid the behavior, and the perceived control over performing the behavior (Ajzen 1991). Furthermore, and of particular importance here, TPB can be expanded to include 'background factors' such as perceived risk that influence the attitude (see Fishbein and Ajzen 2010, p.22).

In this study we draw upon TPB and offer a model to explain and predict project managers' intention to perform specific risk responses (see Figure 1). Nevertheless, we adapt the TPB to the risk management context by suggesting the overall behavioral attitude construct to be formed by two opposing risk perceptions: the perceived risk of problems arising in the project without the specific risk response and the perceived risk of performing the specific risk response.

TPB provides two levels of granularity for the constructs of behavioral attitude, perceived pressure, and perceived control: the overall construct and the corresponding belief composite. According to TPB, belief composites comprise the strength of beliefs multiplied by the evaluation of those beliefs, summed over salient beliefs. In order to increase the granularity of the understanding of the constructs, for each exogenous construct in the model, we follow TPB and include the corresponding composite construct. Nevertheless, and considering our adaptation of TPB, instead of an attitudinal belief composite, we explore belief composites that underlie each of the perceived risk constructs. An explanation of the included belief composites is provided in Table 2.

By modeling the exogenous constructs in both composite (formative) and reflective ways, we indeed adopt a MIMIC approach (Diamantopoulos and Winklhofer, 2001) in Mode C (see Petter et al., 2007, p.642). More precisely, in Figure 1, the reflective manifestation of the constructs are represented with ovals, composites are represented with rectangles, and the relationship between a pair of a construct and its corresponding composite is illustrated with a dotted line (ideally, they should be perfectly correlated).

The IT project risk management literature, defines perceived risk as: "the belief that there exist sources of risk with potential to adversely affect project outcomes" (Du et al. 2007, p.272), which "may reflect both the likelihood of various risks occurring and the extent to which they could materially impact project outcomes" (ibid). Such conceptualization of perceived risk captures the beliefs about the gravity of undesired outcomes if the corresponding risk response is not performed.

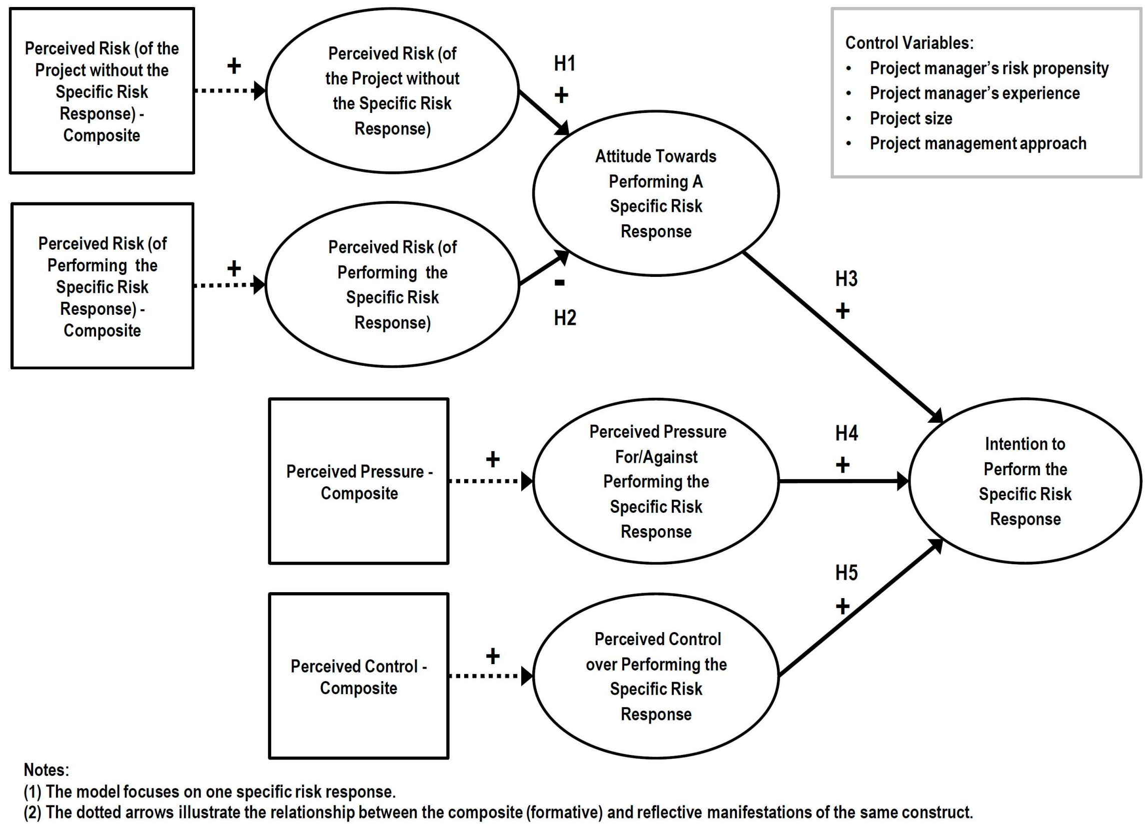

Figure 1. Research Model

Table 2. Explanation of the Composite Constructs

Perceived Risk (of the Project without the Specific Risk Response) -Composite	$= \sum_{i=1}^{\substack{number\ of salient\\ undesired\ outcomes}} probability\ of\ undesired\ outcome_i\ to\ occur\ without\ the\ risk\ response \times extent\ of harmfulness\ of\ undesired\ outcome_i$
Perceived Risk (of Performing the Specific Risk Response) - Composite	$= \sum_{i=1}^{\substack{number\ of\ salient\ side\ effects\\ of\ the\ risk\ response}} probability\ of\ side\ effect_i\ to\ occur\ due\ to\ the\ risk\ response \times extent\ of harmfulness\ of\ side\ effect_i$
Perceived Pressure -Composite	$= \sum_{i=1}^{\substack{number\ of\ salient\\ sources\ of\ pressure}} stength\ of\ a\ pressure\ for\ or\ against\ the\ the\ risk\ response\ from\ source_i \times motivation\ to\ comply\ with\ source\ _i$
Perceived Control -Composite	$= \sum_{i=1}^{\substack{number\ of\ salient\\ resources\ or\ conditions}} probability\ of\ having\ resource_i\ or\ existence\ of\ condition_i \times power_i\ of\ that\ resource\ or\ condition\ to\ facilitate\ the\ risk\ response$

We thus define perceived project risk as the extent to which significant undesired outcomes might happen, assuming the corresponding specific risk response is not carried out. We argue that if the project is perceived to be exposed to certain risks, then enacting the corresponding specific risk response would be more desirable than when perceived risk is low. To capture such desirability of behavior, the construct of overall attitude towards performing a specific risk response is included and is defined as the extent to which an IT project manager is predisposed to evaluate performing a specific risk response in a particular project as favorable or unfavorable. For example, requirement scrubbing is known to contribute to mitigating the risk of gold plating (Boehm 1991). As such, if a project manager's perceived exposure to the risk of gold plating is high, the manager would evaluate requirements scrubbing more favorably in comparison with those whose perceived exposure to the risk of gold plating is low. Thus,

H1 *The higher an IT project manager's perceived risk of the project (without performing a specific risk response) in a particular project, the more positive his or her overall attitude towards performing that specific risk response in that project.*

Besides its risk-mitigating effects, enacting a specific risk response could have some risk-increasing effects. For example, increasing user participation, although reducing the risk of user resistance, might lead to low project team effectiveness (Heinbokel et al. 1996) "partly because users feel too ill-informed to contribute to IT decisions" (Damodaran, 1996 p.365). Therefore, one's overall attitude towards performing a risk response is influenced by the perceived risks of performing the risk response, which we define as the extent to which significant undesired outcomes might happen, assuming the specific risk response is carried out. In formal terms,

H2 *The higher an IT project manager's perceived risk of performing a specific risk response in a particular project, the more negative his or her overall attitude towards performing the specific risk response in that project.*

In TPB, one's decision (plan) to perform a behavior is captured by using the intention construct. Here the intention to perform a specific risk response is defined as an IT project manager's subjective probability of enacting a specific risk response in a particular project. If one deems a behavior in a specific context as favorable, it is reasonable to expect that the person decides to perform that behavior (Fishbein and Ajzen 2010). As such, attitude is a key determinant of intention. For example, attitudinal beliefs are found to be among the key motivations behind not applying formal risk management practices (Kutsch et al. 2013). Adapting this argument to the present context, we suggest

H3 *The more positive an IT project manager's overall attitude towards performing a specific risk-response in a particular project, the stronger his or her intention to perform that specific risk-response in that project.*

Beyond ones' own evaluation of favorableness or unfavorableness of performing a behavior, the pressures exerted from the other people or entities are influential. For example, one source of pressure on project managers' decision to not apply the formal risk management process is their upper management's requests (Kutsch and Hall 2009). To capture this, we define perceived pressure for or against performing a specific risk response as an IT project manager's perception that important parties or entities desire performing or avoiding a specific risk response in a particular project. We propose

H4 *The higher an IT project manager's perceived pressure for (or against) performing a specific risk response in a particular project, the stronger his or her intention to perform (or not to perform) that specific risk response in that project.*

Performing a behavior requires the possession of certain facilitating factors such as resources, knowledge, or authority. Therefore, the perception of having or lacking these factors influences one's decision to do the behavior (Fishbein and Ajzen 2010). This is incorporated here by using the construct of perceived control over performing a specific risk response, defined as an IT project manager's perceived ability to perform a specific risk response in a particular project. For example, for having user representatives—an activity that can respond to the risk of user resistance—a required resource is the availability of such users to represent the others (Damodaran 1996), which might be lacking in some but available in other projects.

H5 *The stronger an IT project manager's perceived control over performing a specific risk response in a particular project, the stronger his or her intention to perform that specific risk response in that project.*

Research Methodology – A Three-study Design

This research design comprises three studies. *Study 1* selected three specific risk responses to be investigated. *Study 2* elicited beliefs about each of the risk responses selected in Study 1. Building on the composite constructs that were created based on the findings of *Study 2*, *Study 3* was a survey to test the research model for each of the risk responses selected in *Study 1*.

Study 1: Selection of Risk Responses to Be Investigated

One representative activity from each category of risk response (i.e., internal integration, formal planning, and external integration, Barki et al. 2001) was identified. To do so, sixty IT project managers and experts were invited to complete a web survey. They were presented with a list of risk responses (presented in Table 1) and asked to rate each risk response on the dimensions of (a) importance for responding to project risks, (b) the extent of an IT project manager control over them, and (c) the frequency of use in IT projects. Thirty-nine questionnaires were completed, 29 of which were complete and useful (response rate 48.3%). Fifty-seven percent of the respondents were IT project managers, the rest were academics with IT project management expertise. Most respondents had 11 to 15 years of experience in the IT project management context.

Risk responses that, on a scale of low-medium-high, had medium to high importance, medium to high extent of control, and low to medium frequency of practice were kept for analysis. By looking for the minimum the Euclidean distance of respondents' ratings from the desired profile, one risk response was selected per category: Having end-user representatives as project team members (external integration), appreciating team members' work in a tangible way during the project (internal integration), and dedicating much effort to project planning (formal planning). Each of these risk responses corresponds to some critical risk sources, including: user resistance, team member turnover, and unrealistic schedules and budgets (Lyytinen et al. 1998).

Study 2: Developing Belief Composites for Each Selected Risk Response

To enrich the conceptualization of the principal constructs, modal sets of beliefs—5 to 9 salient (i.e., readily accessible) beliefs that are common across a representative subset of target respondents—should be identified (Fishbein and Ajzen 2010). To do so, a belief-elicitation procedure (Fishbein and Ajzen 2010) about each of the three risk responses was carried out by interviewing a convenient sample of 24 IT project managers. The belief elicitation was continued until saturation was reached. Respondents had a mean experience of 11.3 years, 45.8% were PMP certified, and their project budgets ranged from $100k to $135m. The beliefs were extracted by coding the elicited responses in an open-coding fashion (Charmaz 2006). The beliefs that were observed in more than 20% of the responses were kept.

A modal set of 5 to 9 beliefs was developed for perceived risks, normative, and control constructs across the three risk-responses. To name a few examples, for the risk response activity of having user representatives, a modal belief about risk-mitigation effect of enacting it was "preventing end-user resistance" (45.5% of respondents) and a belief about its risk-increasing effects was "leading to leaking of project's inside information to end-users" (36.4%). Likewise, for showing tangible appreciation to team members during the project, such modal set of beliefs included "preventing project team members' turnover" (25.0%) and "leading to team members feeling they are not being treated fairly" (30.0%). Concerning dedicating much effort to planning, the modal set of beliefs included "providing an estimation of the project schedule and budget" (28.5%) and "leading to producing a detailed work plan likely to change later" (71.4%). Indeed, respondents associated each of the selected risk responses with the ability to mitigate some project risks as well as the side effect of increasing the exposure to some other risks.

Study 3: Model Testing

Study 3 aims to extend knowledge about IT project managers' enactment of risk responses in two ways. First, it will investigate how adapted TPB constructs can explain the risk response intentions; also, it will examine to what extent the perceived risk construct explains the behavioral attitude. In doing so, the explanation power of the proposed model will be compared to that of a baseline model inspired by Sitkin and Pablo (1992). Second, it will investigate to what extent the developed belief composites explain the corresponding constructs.

The survey instrument includes two types of items: reflective items and belief composite items. Most reflective items were adapted from the literature. To validate the measures, multiple rounds of cardsorting were performed. The non-agreed-upon items were discussed and improved until the acceptable agreement was achieved (Kappa = 0.84). Several control variables were added to the survey including risk propensity, experience, project size, and software development approach—if applicable. To reduce the common method variance, a marker variable was included (Podsakoff et al. 2012). Moreover, the belief composites were created based on the beliefs elicited in Study 2. The instrument was discussed with project managers and experts multiple times and several adjustments were made to make sure the questions made sense, were clear, and did not convey more than one meaning. The survey is available from the authors upon request.

The respondents will be recruited through a data collection company. The data from a pilot study (n=50 per each risk response) will be used to assess the psychometric properties of the constructs. For the main test, we target n>100 useful responses for each of the three risk responses.

To analyze the data, a separate PLS model for each of the three risk responses will be run. For the MIMIC constructs which are modeled in Mode C (please see Petter et al., 2007, p.642), the correlation between the composite and the reflective construct will be investigated. Here, we expect a mean correlation>0.5 (Fishbein and Ajzen 2010). Moreover, our proposed TPB-based model will be compared to the baseline model (Sitkin and Pablo, 1992), which includes the risk perception and risk propensity as direct antecedents of intention. To do so, first, the added explanation will be examined. To do so, the *adjusted* R^2 will be used to penalize for having more predictors (Theil, 1961). Second, the mediation of the relationship between perceived risk and intention by the attitude construct will be tested using Preacher and Hayes's (2008) mediation test in SPSS.

Conclusion

This research-in-progress presents a study that draws upon TPB and proposes a model of the IT project managers' intention to perform specific risk responses. In this model, attitude towards performing a specific risk response is suggested to impact intentions. Two opposing perceived risks impact the attitude. Normative and control constructs relevant to performing risk response are also included in the model. To empirically test the model, three (1) important, (2) within locus of control, (3) yet less frequently enacted risk responses were identified. Then, a modal set of beliefs about each risk response was developed. A survey instrument was developed and validation analyses were performed. The main survey is in progress.

One limitation of this study is the need to focus only on three risk responses. As pointed out by one of the reviewers, the current data is skewed toward the risk responses that are not used very frequently. However, due to the data collection limitations, we could not increase the number of studied risk responses. Future research can investigate other risk responses from each category.

The expected contributions of this study are threefold. First, it offers an explanation for IT project managers' intention to perform specific risk responses. It illustrates that the influence of perceived risk on the decision to respond to risk is mediated by an overall attitude, which is counterbalanced by perceived risks of performing the risk response itself. The presented model also explains more variance of risk response decision compared to existing models. Second, it identifies the fine-grained beliefs for three of such actions, thus a rich and persuasive understanding of the factors that influence decisions to enact these risk responses. Third, the proposed model is empirically tested.

If the potential results are yielded as expected, this paper has some implications for risk management practice and research. For practice, understanding the antecedents of a behavior is the key to changing that behavior (Fishbein and Ajzen 2010). If one has the objective of promoting a certain risk response, the granular beliefs about the activity become very important. For research, two avenues are opened. First, the same approach can be taken for other important risk responses that were not studied in this paper. Second, the granular beliefs identified in this study can be used to develop risk management practices that better suit project managers' needs; for example, those which would have less side effects.

References

Ahuja, M. K., Chudoba, K. M., Kacmar, C. J., McKnight, D. H., and George, J. F. 2007. "IT road warriors: Balancing work-family conflict, job autonomy, and work overload to mitigate turnover intentions," *Mis Quarterly* (31:1), pp. 1–17.

Ajzen, I. 1991. "The theory of planned behavior," *Organizational behavior and human decision processes* (50:2), pp. 179–211.

Ajzen, I. 2011. "The theory of planned behaviour: Reactions and reflections," *Psychology & Health* (26:9), pp. 1113–1127.

Ajzen, I., and Fishbein, M. 1977. "Attitude-behavior relations: A theoretical analysis and review of empirical research.," *Psychological Bulletin; Psychological Bulletin* (84:5), pp. 888–918.

Alter, S., and Ginzberg, M. 1978. "Managing uncertainty in MIS implementation," *Sloan Management Review* (20:1), pp. 23–31.

Bannerman, P. L. 2008. "Risk and risk management in software projects: A reassessment," *Journal of Systems and Software* (81:12), pp. 2118–2133.

Barki, H., and Benbasat, I. 1996. "Contributions of the theory of reasoned action to the study of information systems : foundations, empirical research, and extensions," in *Proceedings of the 4th European conference on information systems*, Lisbon/Portugal.

Barki, H., Rivard, S., and Talbot, J. 2001. "An integrative contingency model of software project risk management," *Journal of Management Information Systems* (17:4), pp. 37–69.

Beath, C. M. 1991. "Supporting the information technology champion," *MIS quarterly* , pp. 355–372.

Bloch, M., Blumberg, S., and Laartz, J. 2012. "Delivering Large-Scale IT Projects On Time, On Budget, And On Value," *McKinsey Quarterly* , pp. 2–7.

Boehm, B. W. 1991. "Software risk management: principles and practices," *IEEE Software* (8:1), pp. 32–41.

Boehm, B. W., and DeMarco. 1997. "Software Risk Management," *IEEE Software* (14:3), pp. 17–19.

Carr, M. J. 1997. "Risk management may not be for everyone," *IEEE Software* (14:3), pp. 21–24.

Charette, R. N. 1996. "Large-scale project management is risk management," *IEEE Software* (13:4), pp. 110–117.

Charmaz, K. 2006. "Coding in Grounded Theory Practice," in *Constructing grounded theory*, SAGE.

Damodaran, L. 1996. "User involvement in the systems design process-a practical guide for users," *Behaviour & information technology* (15:6), pp. 363–377.

Diamantopoulos, A., and Winklhofer, H. M. 2001. "Index construction with formative indicators: an alternative to scale development," *Journal of Marketing Research* (38:2), pp. 269–277.

Fishbein, M., and Ajzen, I. 2010. *Predicting and Changing Behavior*, New York: Psychology Press (Taylor & Francis).

Fishbein, and Ajzen. 1975. "Attitude, Intention and Behavior: An Introduction to Theory and Research," Reading, Mass: Addison-Wesley Pub. Co., pp. xi, 578.

Flyvbjerg, B., and Budzier, A. 2011. "Why Your IT Project May Be Riskier Than You Think," *Harvard Business Review* (89:9), pp. 23–25.

Gefen, D., Straub, D. W., and Boudreau, M. C. 2000. "Structural equation modeling and regression: Guidelines for research practice," *Communications of the Association for Information Systems* (4:7), pp. 1–77.

Hartwick, J., and Barki, H. 1994. "Explaining the role of user participation in information system use," *Management Science* (40:4), pp. 440–465.

Heinbokel, T., Sonnentag, S., Frese, M., Stolte, W., and Brodbeck, F. C. 1996. "Don't underestimate the problems of user centredness in software development projectsthere are many!," *Behaviour & Information Technology* (15:4), pp. 226–236.

Huff, R. A., and Prybutok, V. R. 2008. "Information systems project management decision making: The influence of experience and risk propensity," *Project Management Journal* (39:2), pp. 34–47.

Jiang, J. J., and Klein, G. 2002. "A discrepancy model of information system personnel turnover," *Journal of Management Information Systems* (19:2), pp. 249–272.

Jun He, and King, W. R. 2008. "The Role of User Participation in Information Systems Development: Implications from a Meta-Analysis," *Journal of Management Information Systems* (25:1), pp. 301–331.

Keil, M., Cule, P. E., Lyytinen, K., and Schmidt, R. C. 1998. "A framework for identifying software project risks," *Communications of the ACM* .

Keil, M., Li, L., Mathiassen, L., and Zheng, G. 2008. "The influence of checklists and roles on software practitioner risk perception and decision-making," *Journal of Systems and Software* (81:6), pp. 908–919.

Keil, M., Tan, B. C. Y., Wei, K.-K., Saarinen, T., Tuunainen, V., and Wassenaar, A. 2000b. "A Cross-Cultural Study on Escalation of Commitment Behavior in Software Projects," *MIS Quarterly* (24:2), pp. 299–325.

Keil, M., Wallace, L., Turk, D., Dixon-Randall, G., and Nulden, U. 2000a. "An investigation of risk perception and risk propensity on the decision to continue a software development project," *Journal of Systems and Software* (53:2), pp. 145–157.

Kutsch, E., Denyer, D., Hall, M., and Lee-Kelley, E. L. 2013. "Does risk matter? Disengagement from risk management practices in information systems projects," *European Journal of Information Systems* (22:6), pp. 637–649.

Kutsch, E., and Hall, M. 2005. "Intervening conditions on the management of project risk: dealing with uncertainty in information technology projects," *International Journal of Project Management* (23:8), pp. 591–599.

Kutsch, E., and Hall, M. 2009. "The rational choice of not applying project risk management in information technology projects," *Project Management Journal* (40:3), pp. 72–81.

Lauer, T. W. 1996. "Software project managers risk preferences," *Journal of Information Technology* (11:4), pp. 287–295.

Lister, T. 1997. "Risk management is project management for adults," *IEEE Software* (14:3), pp. 20, 22.

Lyytinen, K., Mathiassen, L., and Ropponen, J. 1998. "Attention shaping and software risk-A categorical analysis of four classical risk management approaches," *Information Systems Research* (9), pp. 233–255.

Markus, M. L., and Mao, J. Y. 2004. "Participation in development and implementation–updating an old, tired concept for today's IS contexts," *Journal of the Association for Information Systems* (5:11-12), pp. 514–544.

McFarlan, F. W. 1981. "Portfolio approach to information systems," *Harvard Business Review* (59:5), pp. 142–150.

Nelson, R. R. 2007. "IT Project Management: Infamous Failures, Classic Mistakes, and Best Practices.," *MIS Quarterly Executive* (6:2), pp. 67–78.

Von Neumann, J., and Morgenstern, O. 1947. *Theory of games and economic behavior*, (2nd ed.) Princeton: Princeton University Press.

Nyfjord, J., and Kajko-Mattsson, M. 2008. "Software risk management: practice contra standard models," in *Second International Conference on Research Challenges in Information Science, 2008. RCIS 2008*, Presented at the Second International Conference on Research Challenges in Information Science, 2008. RCIS 2008, pp. 65 –70.

Pavlou, P. A., and Fygenson, M. 2006. "Understanding and Predicting Electronic Commerce Adoption: An Extension of the Theory of Planned Behavior," *MIS Quarterly* (30:1), pp. 115–143.

Petter, S. 2008. "Managing user expectations on software projects: lessons from the trenches," *International Journal of Project Management* (26:7), pp. 700–712.

Petter, S., Straub, D., and Rai, A., 2007. "Specifying formative constructs in information systems research." *MIS Quarterly* (31:4), pp. 623-656.

Podsakoff, P. M., MacKenzie, S. B., and Podsakoff, N. P. 2012. "Sources of Method Bias in Social Science Research and Recommendations on How to Control It," *Annual Review of Psychology* (63:1), pp. 539–569.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. Behavior Research Methods, 40, 879-891.

Ringle, C. M., Wende, S., and Will, A. 2005. *SmartPLS 2.0 (beta)*, Hamburg, Germany.

Ropponen, J. 1999. "Risk assessment and management practices in software development," in *Beyond the Productivity Paradox*, L. P. Willcocks and S. Lester (eds.), Chichester: John Wiley & Sons, pp. 247–266.

Ropponen, J., and Lyytinen, K. 1997. "Can software risk management improve system development: an exploratory study," *European Journal of Information Systems* (6:1), pp. 41–50.

Schmidt, R., Lyytinen, K., Keil, M., and Cule, P. 2001. "Identifying software project risks: An international Delphi study," *Journal of Management Information Systems* (17:4), pp. 5–36.

Sitkin, S. B., and Pablo, A. L. 1992. "Reconceptualizing the Determinants of Risk Behavior," *The Academy of Management Review* (17:1), pp. 9–38.

Taylor, H. 2005. "Congruence between risk management theory and practice in Hong Kong vendor-driven IT projects," *International Journal of Project Management* (23:6), pp. 437–444.

Taylor, H., Artman, E., and Woelfer, J. P. 2012. "Information technology project risk management: bridging the gap between research and practice," *Journal of Information Technology* (27:1), pp. 17–34.

Taylor, S., and Todd, P. A. 1995. "Understanding information technology usage: A test of competing models," *Information systems research* (6:2), pp. 144–176.

Tesch, D., Kloppenborg, T. J., and Frolick, M. N. 2007. "IT project risk factors: the project management professionals perspective," *Journal of Computer Information Systems* (47:4), p. 61.

Thatcher, J. B., Stepina, L. P., and Boyle, R. J. 2003. "Turnover of information technology workers: Examining empirically the influence of attitudes, job characteristics, and external markets," *Journal of Management Information Systems* (19:3), pp. 231–261.

Theil, H. 1961. *Economic Forecasts and Policy, 2nd Edition*, North-Holland, Amsterdam.