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Understanding Managerial Decision Risks in IT Project Management: An Integrated Behavioral Decision Analysis Perspective

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ABSTRACT

Given the importance of IT investments in today's organization, firms tend to spend increasing amounts of time and resources to better manage IT projects. However these projects continue to have high failure rates thus highlighting the need for improved risk management. A stream of IS research has focused on identifying several causes of managerial risks. The theory base that has been used in the context of IT risk management is limited compared to other fields such as economics and finance and also has been used in limited aspects of project management. This paper examines risk management at different phases of the project life cycle using theories from a behavioral decision analysis perspective. Under researched, yet important theories in the context of IT project management are identified along with illustrative propositions.

Keywords

IT Project Management, IT Project Risks, Behavioral Decision Analysis, Managerial Decision Risks

INTRODUCTION

Risk management in IT projects has attracted significant research interest (Keil, Cule, Lyytinen and Schmidt, 1998) and continues to be an important research and managerial concern due to high project failure rates (Lyytinen and Robey, 1999). Risk management is therefore an important aspect of IT project management. Recently, a stream of IS research has focused on the risks posed by managerial decision making on IT projects. Using different behavioral theories, it has been able to illustrate that managers who fall prey to various heuristics and biases while making decisions at various stages of IT project management are a major source of risk. One reason attributed to such a phenomenon is the high dependence of IT managers on judgment calls (Benaroch, Lichtenstein and Robinson, 2006). Although extant literature identifies several causes of managerial risks, the work is scattered and synchronization is required to create a complete picture along with exploiting more theories from the similar fields like psychology and behavioral economics.

We conceptualize the decisions taken at various stages of IT project management (referred to PM from here on) by managers, through a simple project life cycle approach. By exploring various theories and concepts from fields like cognitive psychology, behavioral economics and behavioral finance, we have tried to propose some potential areas of research. Our motivation is that by studying the PM through behavioral theories, researchers and practitioners can interpret the causes of project failure in a more complete manner to develop effective interventions based on the findings. With the identification of risks associated with people side of PM, it is hoped that IT managers will be able to (a). recognize their own mistakes and those of others involved in the project, (b). understand the reasons for mistakes, and (c) try avoiding mistakes to minimize risks posed by them.

This document is divided into three sections. The next section discusses the literature review on PM in the context of managerial decision making risks and behavioral theories for decision making. Based on the literature on PM and behavioral decision making, propositions follow that merit additional research. The study concludes on the discussion of the issues under consideration.

LITERATURE REVIEW

IT Project Management

The IT project lifecycle approach facilitates PM by providing a structured iterative business process view and by offering organizational learning from each phase of the IT project life cycle (Stewart, 2008). Looking at an IT project from the life cycle perspective, identifying the risk factors at each stage makes their mitigation easy. For this study, we focus on a relatively simple IT project lifecycle comprising of three essential phases i.e. (1) project selection, (2) implementation and monitoring, and (3) IT performance review which is similar to practitioner views of a project (Stewart 2008). Each phase is conducted as part of a continual, interdependent management effort i.e. information gained from one phase is used to support activities in each of the other two phases. Also information from the last stage is used for future projects. In PM, project-level risk assessment is a key discipline that helps project managers identify what aspects of a project need attention and supports them in making respective decisions (Du, Keil, Mathiassen, Shen and Tiwana, 2007). Today, many organizations are seeking to introduce risk management into their organizational and project management processes in order to capitalize on the potential benefits.

Failure to understand, identify, and manage risk is often cited as a major cause of IS project problems such as cost, schedule overruns, unmet user requirements, and the production of systems that do not provide business value (Tesch, Kloppenborg and Frolick, 2007). Numerous sources of risks can be categorized into three general categories: social subsystem risks, project management risks and technical subsystem risks, or people, process and product risks (Wallace, Keil, and Rai, 2004; Kappelman, McKeeman and Zhang, 2006). People related risks are the focus of this paper.

Tesch et al. (2007) identifies ninety two IT project risk factors, where several of them are related to managerial actions and include ignoring the obvious and conflicts. These managerial actions are often based on individual perceptions of situations and are made under conditions of uncertainty regarding project factors. These actions could occur at different points in the project life cycle. Typically, decisions, made under uncertainty are affected by the beliefs and preferences of the agent (Mellers, Schwartz, and Cooke, 1998), thus deviating them from assumptions regarding rational behavior. Figure 1 depicts different stages of a project (based on Stewart, 2008) and managerial decisions that could be influenced by individual biases, due to the inherent uncertainty in each stage. Looking at the decision making of IT managers during different stages of projects under uncertainty, it can be well argued that their decisions are likely to deviate from rationality. Thus behavior of managers, based on their beliefs and preferences is reflected in their decisions, in the form of irrational decisions.

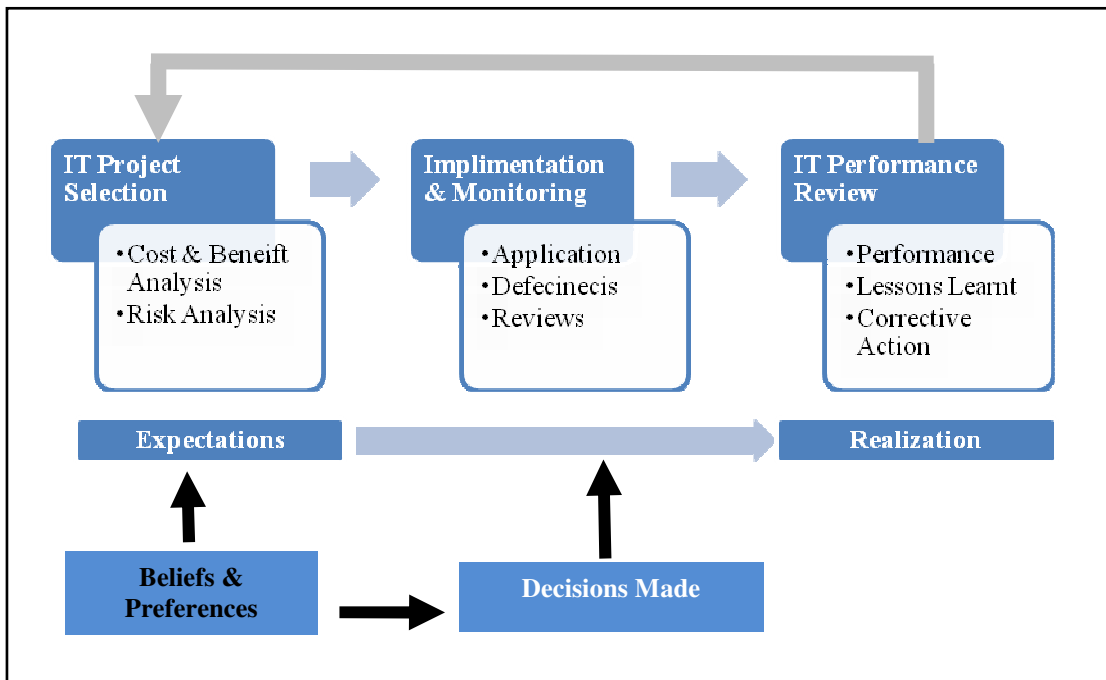


Figure 1: Beliefs and Preferences Affecting Decisions During the IT Project Management (Project Management Lifecycle by Stewart, 2008)

A rich stream of IS literature exploring the causes of managerial risk from behavioral perspective (Table 1) exists. It considers a variety of risks, ranging from recognition of risks posed by managerial decision making (de Camprieu, Desbiens and Feixue, 2007; Du et al., 2007) and various biases affecting certain decisions regarding PM like project reporting (Snow, Keil and Wallace, 2007; Keil, Im and Mähring, 2007), real options thinking (Lankton and Luft, 2008; Tiwana, Wang, Keil, and Ahluwalia, 2007; Tiwana, Keil and Fichman, 2006; Benaroch et al., 2006), and project escalation decisions (Keil, Depledge, and Rai, 2007; Keil, 1995). Table 1 highlights the major findings of these studies. Table 3 is created, by categorizing this literature based on the three-stage project life cycle mentioned above. This categorization helps to understand different types of biases and underlying theories at different stages of the project life cycle and indicates that a large amount of research has studied the implementation phase, with some research in each of the other two phases. We now augment this stream of literature with additional theories from behavioral decision theory from economics and focus on the project selection and project review phases due to space constraints.

Study	Findings	Explanation
de Camprieu et al., (2007)	<ul style="list-style-type: none"> • People in different societies perceive and evaluate the risk of a complex project significantly different way. 	Cultural biases significantly affect the PM risk perceptions of managers.
Du et al., (2007)	<ul style="list-style-type: none"> • Attention-shaping tools have a significant effect on both risk perception and decision-making. • Individuals with greater expertise perceive significantly higher levels of risks. • Level of expertise has no influence on decision-making. • Perceived control influence both risk perception and decision-making. 	Among individuals with low expertise, risk shaping tools exhibit a significant but dual-sided effect on risk perception. They help identify risks captured by the attention-shaping tool but simultaneously introduce blind spots in their risk awareness.
Lankton and Luft (2008)	<ul style="list-style-type: none"> • As uncertainty increases, individuals judge deferral options as more valuable (consistent with real options theory) than growth options (inconsistent with real options theory). • Competitor's presence decreases judged deferral option values while increasing growth option values. 	Prediction is that option specific decisions are based on expected utility payoffs and anticipated regret, consistent with behavioral economic theories.
Tiwana et al. (2007)	<ul style="list-style-type: none"> • IT managers show bounded rationality bias in real option valuation for four kinds of options i.e. growth, scaling, switching and abandonment. • In case of scale options, managers value the flexibility to change scale irrespective of project NPV, unlike for staging and deferral options. 	Reason for managers only search for more information to support the project when project's NPV is low (searching). With high NPV they do not assess real options (satisficing).
Tiwana et al., (2006)	<ul style="list-style-type: none"> • Managers correctly recognize and value the presence of real options in troubled IT projects. • Managers intuitively value growth options more than operational options, thus making the influence of real options on project continuation decision mediated by perceived value of options than added value. 	Possible reasons for differences across option types are ascribed to signaling effects, exercise difficulty, framing effects, and an antifailure bias.
Benaroch et al., (2006)	<ul style="list-style-type: none"> • Managers follow options based risk management mostly based on intuition. • Such intuitive decisions lead to suboptimal or counterproductive risk management practices. 	Managers intuitively think for forms of flexibility (options thinking) as the level of risk rises in a particular project.
Keil et al., (2007)	<ul style="list-style-type: none"> • There is an inverse relationship between problem recognition and escalation i.e. escalation behavior arises from a failure to recognize the significance of a problem. 	Two cognitive biases i.e. selective perception and illusion of control significantly affect both problem recognition and escalation.
Keil (1995)	<ul style="list-style-type: none"> • Escalation is promoted by a combination of project, psychological, social, and organizational factors. 	The psychological factors promoting escalation behavior include 1). Prior history of successes, 2). High degree of personal responsibility or the outcome of the project, 3). Error in information processing, and 4). Emotional attachment to the project.

Snow et al., (2007)	<ul style="list-style-type: none"> IT project status reports are biased (60% of the time) Very few (about 10–15%) of biased project status reports are accurate only when pessimistic bias offset project management status errors. The frequency of the use of biases in project reporting is independent of project risk level. 	While both optimistic and pessimistic biasing occur in project reporting, optimistic biasing tends to outweigh pessimistic biasing by twice the amount of likelihood.
Keil et al., (2007)	<ul style="list-style-type: none"> The effects of the presence of a blame-shifting opportunity and willingness to report bad news for troubled projects is culturally dependent (i.e. found significant effect on US subjects' willingness to report bad news, contrary to the case of Korean subjects). 	Channeling blame away from oneself and placing it on an outside vendor is a culturally adequate strategy for face-saving in the USA, but not in South Korea.

Table 1: Research Identifying Various Managerial Biases Affecting IT Project Management

IT Project Life Cycle Stages			
Theories	Selection	Implementation	Review
Regret Theory		Lankton and Luft (2008)	
Escalation of Commitment		Keil et al., (2007) ; Tiwana et al., (2006)	Keil et al., (2007); Tiwana et al., (2006)
Bounded Rationality		Tiwana et al., (2007) - Selective search and satisficing	
Heuristics and Biases	de Camprieu et al., (2007) – cultural bias Du et al., (2007) - Expertise and perceived control	Du et al., (2007) - Expertise and perceived control Keil et al., (2007) – Cognitive Biases Snow et al. (2007) - Project reporting Tiwana et al., (2006) – Framing effects and anti failure bias Keil (1995) - biases	Keil et al., (2007) – Cognitive Biases Snow et al., (2007) - Project reporting Tiwana et al., (2006) – Framing effects and anti failure bias
Face Saving		Keil et al., (2007)	Keil et al., (2007)

Table 2: Managerial Decision Risks at Various Stages of IT Project Management

Overview of the Behavioral Economics Approach

In the course of making decisions, people follow a general path of starting from making observations, process the data and arrive at judgments (Shefrin, 2005). Economics, for a very long time has assumed that each individual has stable and coherent preferences, and they maximize those preferences rationally, while making a decision (Rabin, 1998). Application of economic theories in IS research, conveniently adopt the same assumption. By making its way into economics, cognitive psychology showed that decision makers violate these assumptions especially under uncertainty. Behavioral economics challenges the rationality assumptions of traditional economic theories by proving that agents are irrational in their decision making, due to the presence of several heuristics and biases (Rabin, 1998). The systematic biases that arise when people make decisions under uncertainty occur at two stages: when people form beliefs, and when these beliefs affect their decision preferences. Extant experimental evidence of these biases exists in economics and finance literature. The following section explores some of the concepts from this literature and proposes some potential research questions in order to better understand the causes of managerial decision risks on PM.

CONCEPTUALIZING THE APPLICATION OF BEHAVIORAL ECONOMICS IN IT PROJECT MANAGEMENT

Behavioral economics deals with the effect of psychological biases on managerial economic decision making and includes multiple theories. Some of these theories have been used in prior IS research as summarized in Table 2. In this section, we propose some potential theories/ concepts related to behavioral decision making for the use in understanding managerial decision risks in the context of IT project management. Propositions are discussed at each life cycle stage of IT project. Table 3 provides a brief overview of the propositions. Selected propositions are discussed below.

IT Project Selection

Typically during the IT project selection phase, a comprehensive list of potential risk factors is developed followed by relevant control strategies in an IT project risk management approach. The identification of risk factors is challenging due to the potential of human judgment to affect the risk assessment. The PM literature recognizes this when it tests for the effects of perceived control in IT project risk assessment (Du et al., 2006). When a particular risk has the potential to negatively impact project success, a sense of control can increase the expectation that risks can be avoided (Keil et al., 1998), thus it is down played or ignored in the identification stage. Similarly, effects of cultural biases like trends in different societies for project risk perception and evaluation for complex projects (de Camprieux et al., 2007) can affect the project selection stage in the PM cycle.

We discuss some of the biases based on behavioral decision theory that could potentially affect project selection below.

Overconfidence

Typically, people are overconfident in their judgments, where people are poorly calibrated while estimating probabilities (Barberis and Thaler, 2003). Such behavior stems from two other biases i.e. self-attribution bias and hindsight bias. Self-attribution bias refers to people's tendency to ascribe any success they have in some activity to their own talents, while blaming failure on bad luck, rather than on their ineptitude. This leads people to the pleasing but erroneous conclusion that they are very talented (Gervais and Odean, 2001). On the other hand, hindsight bias is the tendency of people to believe, after an event has occurred, that they predicted it before it happened. If people think they predicted the past better than they actually did, they may also believe that they can predict the future better than they actually can (Barberis and Thaler, 2003).

In general, overconfidence causes people to overestimate their knowledge, underestimate risk and exaggerate their ability to control events (Nofsinger, 2005). Relating to risk assessment in the project planning and selection stage, it has been seen that perceived control and level of expertise affect project risk assessment (Du et al., 2006). However the phenomenon of overconfidence, leading to overestimated knowledge about the project, illusion of control and underestimation of project risk yet need to be explored. Such a bias may lead managers to sub-optimal decisions about the project itself.

Proposition 1: At project selection stage, overconfidence in IT managers may lead to overestimation of their knowledge and illusion of control over the project, leading to the underestimation of project risks.

	Theory/ Concept	Concept Description	Project Management Illustration
Project Selection	Overconfidence	People are overconfident in their judgments and poorly calibrate while estimating probabilities thus causing them to overestimate their knowledge, underestimate risk and exaggerate their ability to control events.	Overconfidence may lead managers to overestimate knowledge about the project, illusion of control and underestimation of project risk.
	Optimism and Wishful Thinking	People tend to display unrealistically optimistic view of their prospects and abilities leading to systematic planning fallacy i.e. being optimistic about the completion of a particular task.	Optimism in project selection stage may lead project managers to planning fallacy about the project thus increasing the chances of risks like excessive schedule and deviation from timetable/budget.
	Ambiguity Aversion	People don't like situations where the probability of outcome is uncertain thus causing aversion to ambiguity.	Ambiguity aversion may lead managers to ignore the situations where they feel less confidence about the probability of outcome.
	Herding Behavior	People tend to make decisions similar to the ones made in the past, without being justified by the current information.	Herding behavior have a potential to affect the checklists made initially for IT project risk assessment thus having a long term impact on the project.
Performance Review	Belief Perseverance/ Confirmation Bias	People value their initial opinion and don't welcome evidence going against it by treating it with excessive skepticism, lead to confirmation bias.	Managers may show confirmation bias while doing project performance reviews, thus affecting the subsequent corrective actions.
	Mental Accounting & Narrow Framing	Mental accounting matches the emotional pain and emotional joy with a particular decision thus leading people to narrow framing.	IT managers might frame the outcomes from a particular project according to their perceptions (mental accounting), leading them to narrow framing in future projects.

Table 3: Proposed Theories To Explore Heuristics and Biases Affecting IT Project Management

Optimism and Wishful Thinking

When it comes to judging own talents and abilities, people tend to display unrealistically optimistic view of their prospects and abilities (Weinstein, 1980). Such people are prone to systematic planning fallacy i.e. being optimistic about the completion of a particular task (Buehler, Griffin and Ross, 1994). In case of project managers, such optimism in project selection stage may lead them to planning fallacy about the project thus increasing the chances of risks like excessive schedule pressure and deviation from timetable/budget (Tesch et al., 2007)

Proposition 2: At project selection stage, optimism and wishful thinking lead project managers to planning fallacy thus increasing the schedule related risks in the project.

Ambiguity Aversion

This risk factor in IT projects is related to the level of uncertainty of a particular outcome. The general findings in psychology in regards to uncertain situations is that people don't like situations where the probability of outcome is uncertain (Ellsberg, 1961), thus causing aversion to ambiguity. Further, ambiguity aversion has much to do with how competent an individual feels s/he is at assessing the relevant distribution of probabilities of outcome (Heath and Tversky, 1991). The opposite of ambiguity aversion is "preference for the familiar". In case of IT managers, at selection stage, their perceived level of confidence and competency in predicting the level of risk and relevant outcome during the course of project might

lead them to take actions as per the phenomenon thus leading them to ignore the situations where they feel less confidence about probability of outcome.

Proposition 3: At project selection stage, the perceived level of confidence and competence in predicting the outcome among managers might lead them to ignore new yet complex projects (ambiguity aversion) and go for familiar ones (preference for familiar)

Herding Behavior

Risk assessment under economic decision making involving forecasting situations is affected by herding behavior (Trueman, 1994) in which the decisions are made similar to the ones made in the past, without being justified by current information. In case of IT project risk assessment, such a bias have a potential to affect the risk checklists made initially thus having a long term impact on the project.

Proposition 4: At project selection stage, presence of herding behavior among managers may cause them to take decisions based on past experience while ignoring current information.

IT Project Performance Review

This phase heavily depends on the development and implementation of IT performance measures based on which the evaluations are done (Stewart, 2008). Learning from this phase goes a long way and is applied in multiple projects. As development of performance measures and carrying learning from one experience to another requires human judgment and decision making, it can be inferred from previous discussion that this phase can be affected by psychological biases as well.

PM literature focuses on some biases affecting this phase of project management. Bad news reporting behaviors in the presence of blame shifting opportunities (Keil et al., 2007) and biased IT status reports (Snow et al., 2007) show how various biases kick in this PM phase. Keeping the focus on performance evaluation only, while taking into account the dependence of this phase on the implementation and monitoring phase, with the potential of learning in this phase for future reference, there can be series of biases effects that can be carried forward from previous stages, thus causing a chain reaction. Two of them are discussed as follows.

Belief Perseverance/ Confirmation Bias

People value their initial opinion for a very long time by showing reluctance to search for more evidence that may go against their beliefs. Even if they find such evidence, they don't welcome it by treating it with excessive skepticism (Lord, Ross and Lepper, 1979). Such heuristics lead to confirmation bias, where people misinterpret evidence that goes against their hypothesis as actually being in their favor. The evidence of bounded rationality in case of real options valuation (Tiwana et al., 2007) is similar. With the evidence of irrationality in decision making, managers may show confirmation bias while evaluating deficiencies in the project and doing project reviews. It can affect project review stage, where performance reviews are performed, followed by subsequent corrective actions.

Proposition 5: In project performance review stage, confirmation bias may lead to misestimation and misinterpretation of performance reviews, thus affecting project performance evaluations and the subsequent corrective actions.

Mental Accounting & Narrow Framing

Learning from one IT project can be applied in future projects. Experience plays a role in project management as it affects the risk perception of individuals (Du et al., 2007). In general how individuals refer to their experience with similar situations in the past in order to make decision in the present has been the center of study in behavioral economics. Among relevant concepts, mental accounting (Thaler, 2000) and narrow framing (Barberis and Thaler, 2003) are two of the well tested concepts in this area.

Mental accounting matches the emotional pain and emotional joy with a particular decision (Nofsinger, 2005). The way people frame a gamble and associate pain and joy to the outcomes effects their decisions. In case of IT managers, they might frame the outcomes from a particular project according to their perceptions and then associate pain and joy accordingly and

use the learning as per their assigned weights. Naturally, they will try to avoid regret thus might end up ignoring the experiences associated with emotional pain, or treating every project as independent and totally new one, a phenomenon known as narrow framing.

Proposition 6: Due to mental accounting, project managers might end up with narrow framing leading them to not making use of their past experiences properly in future projects.

DISCUSSION

Prior IS research has examined managerial bias in project management. However, the conceptualizations are limited in theoretical base and issues that are addressed. There is a need for additional research to better understand the different types of biases at each stage of the project life cycle and their relative importance. It is possible that behavioral decision theory from behavioral economics has a strong potential for a theory base to explain the phenomenon of managerial biases in IT project decisions better. We propose some theories (due to space limitation) to explore PM at various stages, from behavioral perspective. Some of the proposed theories are found in current PM literature, but their context of use is different.

Given the vast array of potential psychological risks, IS literature lacks their testing in real scenarios. The issues identified in this paper can be explored by first empirically testing the propositions developed in this study. Due to the broad scope of the related literature on behavioral decision making and PM, systematic case studies could help to further refine the propositions. Subsequent testing through either survey or experiments will give a deeper understanding of the phenomenon. As the unit of analysis is individual decision making under a particular situation, there is a potential to concurrently test multiple propositions in a project life cycle (e.g. framing effects and overconfidence).

Empirical examination of the propositions will give an insight into the details of how managers become victims of their own biases thus causing severe yet systematic risks to the IT project. Such research will facilitate the development of relevant risk assessment and mitigation tools helping project managers to control for such biases.

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