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IT Project Management & Managerial Risk: Effects of Overconfidence

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ABSTRACT

Due to high IT project failure rates, risk management in IT projects has attracted significant research interest and continues to be an important research and managerial concern. Recently, a stream of IS research has focused on the risks posed by managerial decision making on IT projects, by showing how managers themselves are a major source of risk by falling prey to various heuristics and biases while making decisions at various stages of IT project management. In this study, we explore one of the concepts i.e. overconfidence, and have proposed some potential areas of research. We hope that empirical examination of the propositions will give an insight into the details of how managers become victims of own biases through overconfidence thus causing severe yet systematic risks to the IT projects.

Keywords: IT Project Management, IT Project Risks, Overconfidence, Managerial Decision Risks

INTRODUCTION

Risk management in IT projects has attracted significant research interest and continues to be an important research and managerial concern due to high project failure rates (Cule, Lyytinen and Schmidt, 1998; Lyytinen and Robey, 1999). Recent Standish Group's study showed that 18% projects fail and 53% are completed over-budget, behind schedule, and contained fewer functions than originally specified (Hartmann, 2006). Lately, a new stream of IS research has focused on the risks posed by managerial decision making on IT projects. While 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 (Snow, Keil and Wallace, 2007; Keil, Depledge and Rai, 2007). 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, more theories from fields like behavioral economics need to be exploited in order to get a better understanding of the phenomenon (Khan and Kumar, 2009).

Investment decisions made by IT managers during the course of IT project, being economic in nature, can be looked at by theories focusing on investment decisions in general economic scenarios. Literature on IT project management gives various forms of IT project risks while synthesizing them with the project lifecycle approach to give a complete picture of potential IT project risks at various stages of IT project life cycle, along with IT project stages lacking research (Khan and Kumar, 2009). Focusing on those areas, this paper gives further potential areas of research by developing a case to look at the causes of managerial risks from the lens of overconfidence. Following the trend in IS literature (Massey and Montoya-Weiss, 2006), the paper rationalizes using the concept for the better understanding of managerial risks. By identifying managerial risks in IT project risk management, it is hoped that IT managers will be able to recognize the mistakes of all involved along with trying avoiding the mistakes to minimize risks.

The document is divided into four sections. The next section reviews the literature on IT project risk management and overconfidence. This is followed by propositions relating to overconfidence and its impact on the IT project life cycle management approach. The paper sums up with conclusions.

LITERATURE REVIEW

- IT Project Risk Management

IT project risk management is one of the critical factors of the overall IT project management. Because projects have a future orientation, they involve a certain amount of uncertainty at various levels of their progression cycle, which is commonly referred to as risk. Generally, the concept of project risk refers to the variation in the distribution of possible outcomes of a certain project (Arrow, 1970). When related to IT projects, the phenomenon is known as IT project risk. Risk in any form is something that is unavoidable, but it can be minimized as well as managed. IT project risk management is one of the major

challenges faced by organizations today, which drives the need for the identification, elimination and mitigation of risk factors as well as the relevant sources.

IT project risk management is generally defined as "the processes concerned with conducting risk management planning, identification, analysis, responses, and monitoring and control on a project", where "the objectives of project risk management are to minimize the probability and impact of potential risks while maximizing the probability and impact of potential opportunities", (Tesch, Kloppenborg and Frolick, 2007, pp 62). Failure to understand, identify, and manage risk is often considered as a major cause of IT project problems such as cost, schedule overruns, unmet user requirements, and the production of systems that do not provide business value (Tesch et al., 2007). Numerous sources of risks related to IT projects, identified so far, 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). Risk related to people is considered most critical because managers are responsible to assess risks constantly throughout the life of the project and to determine which risks are most critical (Tesch et al., 2007; Khan and Kumar, 2009). Therefore, people related risks are the focus of this paper.

Tesch et al. (2007), after synthesizing the relevant literature, identified ninety two IT project risk factors, where several of them are related to managerial actions, e.g., deviation from timetable and budget, poorly communicated goals, lack of documented project plan etc. These managerial actions are often based on individual perceptions of situations and are made under conditions of uncertainty regarding project factors, thus such managerial decisions cannot be categorized as rational. Also, given the number of risk factors identified, a closer look reveals that the managerial actions related to them could occur at different points in the project life cycle (Khan and Kumar, 2009). For example, lack of top management commitment can prevail through the whole project lifecycle whereas changing scope and objectives can hurt the project during the implementation stage.

Given that most of the IT project risks are associated with managerial decision making, in economic terms, it can be said that managers do not always make rational decisions. Typically, decisions, made under uncertainty are affected by the beliefs and preferences of the people (Mellers, Schwartz and Cooke, 1998), thus deviating them from assumptions regarding rational behavior (Khan and Kumar, 2009). Figure 1 depicts the different stages of an IT project with the potential of being influenced by biased managerial decisions. Such deviation also prevails throughout the lifecycle of the IT project and raises a need to look into the causes of such behavior among managers, from a behavioral perspective (Khan and Kumar, 2009).

Recent IS literature exploring the causes of managerial risk from behavioral perspective exists, considering risks ranging from recognition of risks posed by managerial decision making (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; Benaroch et al., 2006), and project escalation decisions (Keil et al., 2007). This stream of research, once categorized based on the three-stage project life cycle, facilitates the understanding of different types of biases and underlying theories at different stages of the project life cycle, while indicating that a large amount of research has studied the implementation phase, with some research in each of the other two phases (Khan and Kumar, 2009). This paper augments this stream of literature with additional theory from behavioral economics, i.e. overconfidence, and focus on its effects on the project selection and performance evaluation phase.

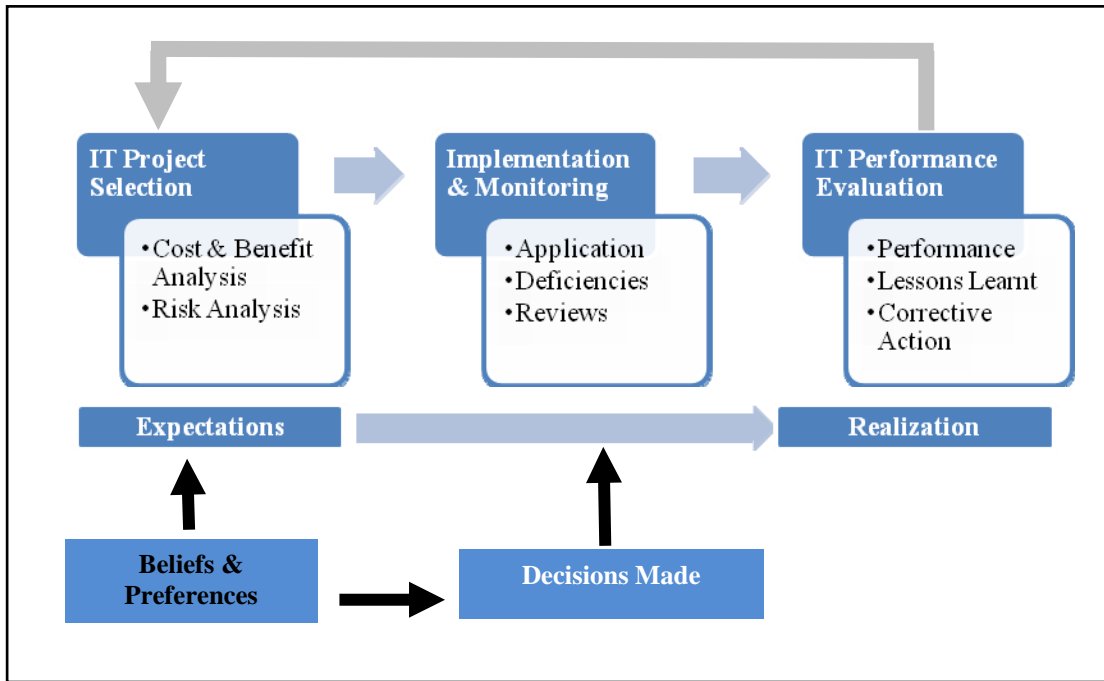


Figure 1: Beliefs and Preferences Affecting the IT Project Management
(Khan and Kumar, 2009)

Overview of Overconfidence

- Application of economic theories in IS research, conveniently adopts the assumption of rationality, according to which agents maximize their stable and coherent preferences rationally while making a decision. Behavioral economics challenges the rationality assumptions by proving that agents are irrational in their decision making, due to the presence of several anomalies like 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. The violations in rational behavior occur in each step of decision making through non-standard preferences (i.e., time preference, risk preference and social preference), non-standard beliefs (i.e., systematic overconfidence, law of small numbers, projection bias) and non-standard decision making (i.e., framing effects, menu effects, social pressure and persuasion, and emotions). Extant experimental evidence of these biases exists in the economics and finance literature, focusing on individuals involved in several economic decisions (DellaVigna, 2008).
- The purpose of this study is to look at one of the phenomena from behavioral economics that deviate people from rationality when it comes to economic decision making, i.e., overconfidence. Overconfidence occurs when an individual's certainty that his or her predictions are correct exceeds the accuracy of those predictions (Klayman, Soll, González-Vallejo, and Barlas, 1999). Extensive evidence shows that typically, people are overconfident in their judgments and about their abilities. For example, Svenson (1981) showed that 93% of subjects considered in the study rated their driving skill as above the median, compared to the other subjects in the experiment. Most individuals underestimate the probability of negative events such as hospitalization (Weinstein, 1980) and the time needed to finish a project (Buehler, Griffin, and Ross, 1994).

Overconfidence is more likely to occur when individuals make predictions regarding less repetitive decisions (Murphy and Winkler, 1977). Another factor increasing the chances of overconfidence is receiving little or ambiguous feedback about prior decisions (Winkler and Poses, 1993) or delayed feedback (Keren, 1991). In such situations, agents have a much more difficult time learning to calibrate their judgments than those who receive accurate and quick feedback.

The reason for selecting this phenomenon is twofold. One, overconfidence is considered one of the main anomalies related to beliefs and preferences that affect economic decision making, due to which, it can explain further anomalies (DellaVigna, 2008), like information precision and disposition effect (Odean, 1999) among others. Secondly, overconfidence can explain the risks posed by managers in the project selection stage, which lacks theoretical explanation, as compared to other stages of the life cycle.

In the economics literature, evidence is found for overconfidence appearing in multiple forms: e.g., overconfidence about self control (O'Donoghue and Rabin, 2001), overconfidence about managerial ability and overconfidence about precision of information (DellaVigna, 2008). Among them, overconfidence about managerial ability and about precision of information seemed more relevant to the aim of this study. A literature summary for them is as follows.

- ***Overconfidence about managerial ability***

In the context of managerial ability, overconfidence's effects have been studied in a variety of settings. Some of them include the effects of overconfidence on the ability to trade securities (Gervais and Odean, 2001), ability to perceive risk under ill-structured decision environments (Simon and Houghton, 2003), ability to manage corporate investments (Malmendier and Tate, 2005), and ability to enter competitive markets (Camerer and Lovallo, 1999). Simon and Houghton (2003) examined the effects of overconfidence on ill-structured decisions made by managers focused on product introductions. Through an empirical study with real data, they found that in high-technology firms overconfidence is positively related to the degree to which product introductions were risky. They also found that managers who are extremely certain that they would achieve certain success factors are more likely to introduce pioneering (risky) rather than incremental products. Also, managers introducing pioneering (risky) products were more apt to express extreme certainty about achieving success, where products didn't achieve much success.

In the context of strategic management, Malmendier and Tate (2005) provided evidence on overconfidence by CEOs about their ability to manage a company. The study hypothesized that CEOs are likely to overestimate their ability to pick successful projects and to run companies. As such, these top managers are likely to invest in too many projects, and to overpay for mergers. Also, they overinvest when they have abundant internal funds, but curtail investment when they require external financing. They found that CEOs are 55% more likely to undertake a merger, and particularly so if they can finance the deal with internal funds. In other words, overconfident CEOs are averse to seeking external financing, since they deem it overpriced. In summary, this study showed that managerial overconfidence provides one explanation for the underperformance of companies undertaking mergers.

Managers do not tend to remain overconfident throughout their career. The insight into the phenomenon was given by Gervais and Odean (2001), by studying trading behavior of active traders. They developed a multi-period market model describing both the process by which traders learn about their ability and how a bias in this learning can create overconfident traders. They found investors to be most overconfident early in their careers. And with more experience, self-assessment becomes more realistic and overconfidence more subdued.

- ***Overconfidence about precision of own information***

Overconfidence is also a manifestation of the tendency to overestimate the precision of own information, which is also a skill. The most cited study for the issue is by Alpert and Raiffa (1982), in which a group of 100 MBA students were asked to provide answers for 10 numeric queries such as 'the number of foreign automobiles imported into the U.S. in 1967 in thousands' and 'the total egg production in millions in the U.S. in 1965', along with 98% confidence intervals. If the students estimated correctly the precision of their information, their confidence intervals should contain the correct answer in approximately 980 of the 1000 responses. Instead, the intervals contained the correct answer in only 574 of the 1000 cases.

In managerial decision making, Odean (1999) provided field evidence consistent with overconfidence, among discount brokers. The indication of overconfidence in trading behavior was that if the investors overestimate the precision of their information about individual companies, they will trade too much. They found that the investors traded on average 1.3 times per year in the sample, with a commission cost for buying or for selling a security of over 2 % per transaction. In addition to these substantial transaction costs, the individual investors paid a return cost to trading, since the stocks sold over-performed the purchases by about 3 % over the next year. This showed that, for individual investors, overconfidence has a substantial impact on returns. Interestingly, there is a gender differential in over-trading that is consistent with the psychology findings, which suggests that men are more overconfident than women about financial decisions: men trade 45% more than women, and hence pay a larger returns cost (Barber and Odean, 2001).

• CONCEPTUALIZING THE ROLE OF OVERCONFIDENCE IN IT PROJECT MANAGEMENT

From the evidence shown above, it’s apparent that overconfidence causes people to overestimate their knowledge (precision of information), underestimate risk (managerial ability) and exaggerate their ability to control events (e.g. planning fallacy). When it comes to IT project management, these conclusions can lead us to propositions, aiming towards testing the presence of the phenomenon of overconfidence and its effects on the process. In this section, this paper discusses how overconfidence can affect IT project risk estimation, cost and benefit estimation and project planning, as well as under which situations it can be expected to be present. The summary of propositions is given in Table 1, with a comprehensive model in Figure 2.

•	• Propositions	• Explanation
• Project Risk	• IT managers are prone to be overconfident with projects that are more pioneering (risky) than incremental.	• Project management for new (pioneering) IT projects is riskier than for incremental IT projects. As managers are more vulnerable to overconfidence under risky product management, project managers are more prone to show overconfidence for risky projects.
• Planning Fallacy	Overconfidence in IT project managers can lead them to a planning fallacy, especially at the project planning stage.	• In case of project managers, optimism about completing tasks during the project selection stage may lead them to a planning fallacy about the project, thus increasing the chances of risks like excessive schedule pressure and deviation from timetable/budget.
• Managers’ Experience	IT project managers tend to be overconfident in the early stages of their career and the level of overconfidence decreases as they gain experience.	• IT project managers can be more overconfident in the early stages of their career (when they have less experience) with recent successes. As they gain experience, the overconfidence levels off.
	Overconfidence about their own abilities can lead project managers to select more risky projects, thus jeopardizing project performance.	• IT project managers overconfident about their skill as compared to their peer group can end up taking more risky projects, thus impacting project performance (i.e., causing project failure)
• Project Reviews	Overconfidence about project information can lead project managers to create optimistic bias in project reports, thus affecting required corrective action.	IT project managers overconfident about their information on project performance can end up painting a wrong picture about the project, especially in the case a project is not doing good, thus affecting the required corrective actions to keep the project in alignment with the predetermined objectives.

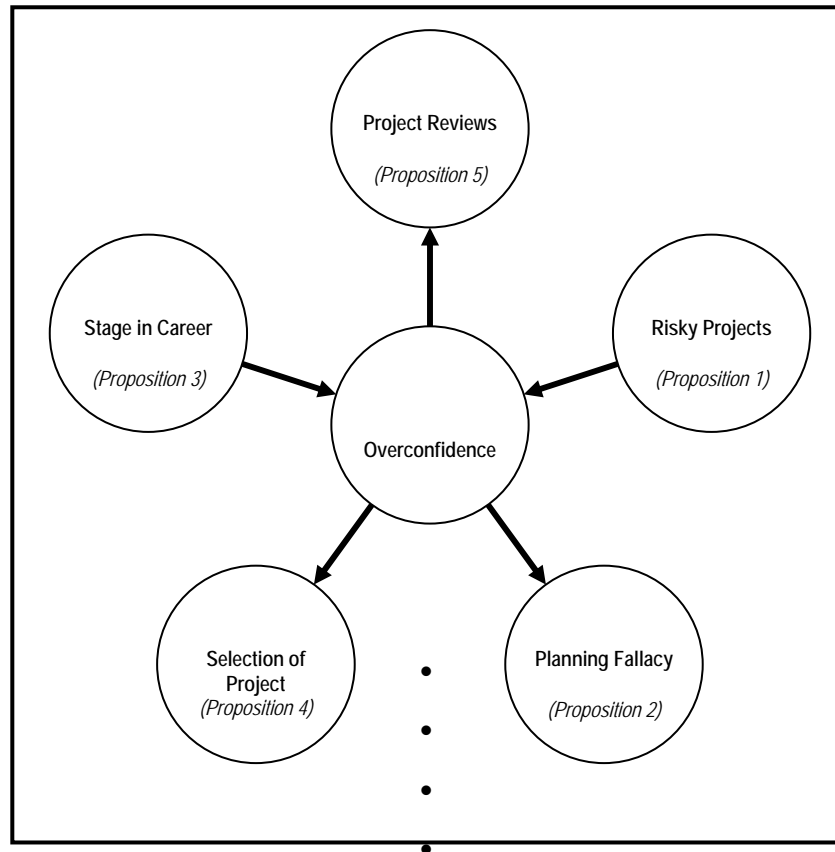
• Table 1: Summary of Propositions

• Overconfidence and Project Risk

Literature on overconfidence has shown how managers fall prey to the overconfidence under ill-structured decision making situations (Simon and Houghton, 2003), which leads them to misperceive risk. Strategic business decisions occur in extremely ill-structured decision environments, lacking discrete input variables or measurement calibration. The IT project management situation is not different, especially for projects critical for firms’ strategic intent. Such projects are typically pioneering in nature and are ill structured in terms of requirements that contributed towards their risk profile. In such ill structured decision environments, overconfidence may be especially prevalent.

Proposition 1: IT managers are prone to be overconfident with projects that are more pioneering (risky) than incremental.

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). Literature shows that overconfidence leads to perceived control issues, e.g., planning fallacy (Buehler, Griffin and Ross, 1994). The situation can be studied in the context of IT project management in order to explore project control issues.



• Figure 2: Role of Overconfidence in IT Project Management

• Overconfidence and Planning Fallacy

People overconfident about the completion of a particular task (optimistic people) are prone to systematic planning fallacy (Buehler et al., 1994). The theoretical analysis of the planning fallacy suggests that people can use singular and distributional information when predicting task completion (Kahneman and Tversky, 1979). Singular information relates to aspects of the specific target task that might lead to longer or shorter completion times, whereas distributional information concerns how long it took to complete other, similar tasks (by them or by others). Kahneman and Tversky (1979) suggested that people who focus on case-based or singular information adopt an internal perspective: They concentrate on working out how they will complete the target task. In contrast, people who primarily consider distributional information embrace an external perspective: They compare the present task with past projects. In most cases, people should derive their predictions from both case-based and distributional information. However, the existence of the planning fallacy implies that people typically adopt an internal perspective when predicting their own completion times and they seemingly fail to consider relevant distributional information as their previous experiences with similar tasks (Buehler et al., 1994). In case of project managers, such trend at the project selection stage will lead them to a 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: Overconfidence in IT project managers leads them to planning fallacy, especially at the project planning stage.

Overconfidence and Managers' Experience

Also, it can be argued that the level of expertise is a subjective assessment, where perception plays a critical role. In IT literature, expertise is usually associated with knowledge and experience, implying the dynamic nature of the phenomenon, i.e. expertise does not remain the same. Behavioral literature shows a deep link between expertise and overconfidence (Gervais and Odean, 2001). In an economic set up, agents tend to be overconfident when they are not fully aware of their

abilities. This is because they infer their ability from their success and failures, while taking too much credit for their successes. As they learn about their abilities, their overconfidence levels decrease.

In the case of IT project managers, it can be argued that they tend to be more overconfident in the early stages of their career with recent successes, i.e. when they have less experience.

Proposition 3: IT project managers tend to be overconfident in the early stages of their career and the level of overconfidence decreases as they gain experience.

Overconfidence is also observed when it comes to relative skill perception among peers (Camerer and Lovo, 1999). Such overconfidence is caused by optimism about relative skill and along with a noisy performance feedback, causes managers to take undue risk. Such economic behavior causes negative returns. Although studies exploring this idea have been focusing on strategic actions like business entry into markets (Camerer and Lovo, 1999), it can be argued that IT project managers who are overconfident about their skill as compared to their peer group take on more risky projects, thus impacting project performance (i.e., causing project failure).

Proposition 4: Overconfidence about own abilities lead IT project managers to select more risky projects, thus jeopardizing project performance.

Overconfidence and Project Reviews

Overconfidence in own information can lead to suboptimal decision making and subsequent actions (Odean, 1999). The evidence is found in stock markets (Odean, 1999; Barber and Odean, 2001), where trading behavior is studied in the light of overconfidence. In the case of IT projects, project reviews play a critical role. They provide timely feedback on project performance that helps managers to keep the project on track until it's fully implemented. Thus correct and precise project reviews are important for a project's success. Literature on IT project management has pointed some factors that can impact project reviews. Presence of optimistic and pessimistic biases in project reporting (Snow et al., 2007) along with the effects of culture on bad project reporting (Keil et al., 2007) have a tendency to affect the project performance severely.

Extending on the occurrence of optimistic biasing in project reporting, it can be explored if it's the overconfidence of the project managers in their information regarding project performance that causes such bias. Such personal traits with a tendency to alter project performance information can be unhealthy for a project's health, as they can not only project a wrong picture about the project, especially in case the project is not doing well, but can also affect the corrective actions required to keep the project in alignment with the predetermined objectives.

Proposition 5: Overconfidence about project reviews leads project managers to create optimistic bias in project reports, thus affecting required corrective action.

CONCLUSIONS

Current research findings place managerial decision making risk as an important component of IT project management. In order to explore the phenomenon, keeping in view the nature of decisions of managers, theories from behavioral economics seem most promising. This paper proposes some research areas related to overconfidence of IT managers that cannot be ignored as long as human intervention in terms of decision making is involved in the IT project management process.

As a next step, the issues identified in this paper need further examination, in order to be refined before tested empirically. Such an endeavor can rely on studies on overconfidence in behavioral economics, which can prove to be a good reference and can provide a guideline to conduct sound empirical research in case of IT project management.

With the focus on generalizability of results while having appropriate control over data gathering scenarios, the propositions presented in this paper are planned to be tested through field experiment with conjoint experiment design (Loui, 1988; Tiwana, Keil and Fitchman, 2006). The strength of this research design is that it combines the control of a laboratory experiment with the external validity of a survey. 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., planning fallacy issues and manager's experience). The sample will constitute actual IT managers that are actively involved in IT project management.

Through this effort, we have proposed a new area of research in IT project management while integrating theory from multiple fields based on the nature of problem under consideration. Further empirical examination of these propositions will give an insight into the details of how managers become victims of their own biases thus causing severe 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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