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The Influence of Probability Discounting on Escalation in Information Technology Projects

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ABSTRACT

An experimental study was conducted with 17 experienced information technology (IT) project decision-makers. Each participated in a computer based simulation where they had to choose whether to continue an ongoing IT project despite negative feedback, (called escalation of commitment), or abandon it and sell the project as is. A titration procedure for sales price was manipulated over seven probability conditions for success of the project. The switching points where each participant would choose to sell the project instead of continuing development was determined, and probability discounting factors were calculated. The median switching point of the participant's subjective values of the project fit a hyperbolic discounting function well. An escalation factor was calculated and the results indicate that several participants in the study showed signs of escalation. These data demonstrate that the discounting framework may be a viable approach to understand the phenomenon of escalation in IT projects.

KEYWORDS

Decision-Makers, Decisions Under Risk and Uncertainty, Escalation, Experimental Study, Hyperbolic Discounting, IT Projects, Probability Discounting

INTRODUCTION

In early 1993, the London Stock Exchange abandoned the development of its Taurus paperless share settlement system after more than 10 years of development. USD 134 million was wasted, and almost all of the 360 or so workers involved in the project were jobless. In addition, USD 670 million were used in other organizations preparing for the new system (Drummond, 1996b). Car rental company Avis Europe canceled in 2004 an Enterprise Resource Planning (ERP) system after spending USD 54.5 million (Best, 2004). Up until then, the ERP project was substantially delayed and as a consequence increased costs related to problem with design and implementation. In 2008, the airline carrier Qantas pulled the plug after spending USD 40 million on its Jetsmart parts management system (Krigsman, 2008). Challenges in this project started as early as 2004 when employees were alerted that the system would increase workload. Decision-makers continued the project nonetheless. As these examples

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and others (Drummond, 1996a, 1996c; Ewusi-Mensah, 2003; Mähring & Keil, 2008; Simon, 2009; Zahra, Hamdi, & Ali, 2014) illustrate, many IT projects go wildly over budget, drag on long past their originally scheduled completion date, and do not deliver according to initial specifications. For example, Miller, Dawson, Miller, and Bradley (2008) found that only 42% of the IT projects covered by their study were completed within 10% of initial schedule, cost and functionality and the Standish Group International (2009) state that in 2000 and 2008 28% and 32% of IT projects were executed according to plan. Software- and trade magazines regularly publish a list of the top-ten corporate IT failures (Barker, 2007; Nash, 2000).

According to Drummond and Hodgson (2011) escalation involves a continuing cycle of active reinvestment beyond economic rationality in response to negative feedback. Ross and Staw (1986) state that according to classical economic rational choice theory, one would expect decision-makers to pull the plug as negative consequences and feedback is received. However, this does not seem to happen in many cases. Ewusi-Mensah (2003) contends that despite best efforts and well planned software projects, as much as one third of projects may end up as failures (Wright & Capps III, 2010) and sometimes become "runaway projects" endangering the entire organization (Bharadwaj, Keil, & Mähring, 2009). "Runaway systems" are, like a runaway train, projects that are out of control, hard to stop, and in need of redirection or termination (Keil, Rai, Cheney Mann, & Zhang, 2003; Mähring & Keil, 2008). Indeed, escalation situations in IT projects can have severe consequences (Keil & Mähring, 2010). According to Ewusi-Mensah (2003) the cost of software projects that fail or are abandoned amounts to billions of dollars a year in the United States alone.

Interest in escalation has persisted since the 1970s and many theories have been invoked to explain it including; self-justification theory, prospect theory, agency theory, approach avoidance theory (Keil et al., 2003), the sunk cost effect (Arkes & Blumer, 1985) and the completion effect (Keil, Truex, & Mixon, 1995). Keil, Mann, and Rai (2000) highlight self-justification theory, prospect theory, agency theory, and approach avoidance theory as the main theories that are used to understand the escalation in IT projects. Keil et al. (2000) tested six constructs from these four theories in a series of pairwise logistic regression models between groups of escalated vs. non-escalated projects. They found that all six constructs and therefore, all four theories were partially supported. It should be noted that these theories are not necessarily orthogonal, and also that none received unequivocal support. Park and Berente (2012) contend that the causes of escalation in IT projects remain still unclear, and that there may be other reasons why IT projects are frequently prone to escalation.

Temporal discounting may be another reason for escalation in IT projects, and one that has not been explored (Mobekk & Fagerstrøm, 2015). IT projects are necessarily extended in time and have an inherent risk (or probability of failure). This fundamental aspect of IT projects means that the value of any IT project is inevitably discounted. The discounting perspective postulates that the subjective value of an outcome is discounted (reduced) as a function of delay and/or probability (Green & Myerson, 2004; Vanderveldt, Green, & Myerson, 2015). Discounting is involved in any decision where the consequences are delayed or uncertain. The typical theories invoked to explain escalation such as self-justification theory, prospect theory, agency theory, and approach avoidance theory do not take into account temporal discounting, and in fact appear to ignore it entirely based on the typical operationalization of these constructs in one-shot decision scenarios. The aim of this study is, therefore, to contribute to understanding of how discounting may influence escalation in IT projects.

According to a standard economic rational choice discounted utility model, a person's subjective value of a reward decreases as a function of increasing delay or uncertainty; and this value would be expected to be a consistent, exponential function (Loewenstein & Prelec, 1992). Findings from behavioral economics studies suggest that the discount rate is not an exponential function of delay, as the standard discounted utility model implies, but is better described as a hyperbolic function (Ainslie, 1992, 2001; Chung & Herrnstein, 1967). Later work has shown that also probability discounting is better described with a hyperbolic discounting function (Estle, Green, Myerson, & Holt, 2006; Green & Myerson, 2004; Myerson, Green, Hanson, Holt, & Estle, 2003; Shead & Hodgins, 2009).