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# An Exploratory Analysis of Gender Differences in IT Project Commitment, Continuation, and Escalation

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## Abstract

This study examines the IT project environment with a focus on understanding gender differences that exist in key constructs known to influence project continuation. These constructs were chosen from two key streams of project-based research known to influence intention to continue: commitment and escalation. Commitment is a multi-faceted construct reflecting an individual's need or desire to continue working on a project. Escalation is also multi-faceted construct that generally refers to an individual's inclination to continue working on a project even in the face of negative information. Findings from a web-based survey resulted in 199 usable responses with the sample consisting of 56.7% males and 43.2% females. Data analysis revealed that gender differences existed in both continuance commitment and intention to continue the project. Differences were also found in constructs identified as being related to escalation within IT projects: desire for project success, negative information/status, over optimism, and sunk cost. Implications for these findings as well as directions for additional study are provided.

**Keywords:** Gender, IT Projects, Project Continuation, Commitment, Escalation.

## 1. INTRODUCTION

Within the field of information technology (IT), many different areas have been researched and explored that focus on understanding how to create, maintain, and implement valuable IT products. IT projects have received specific attention as they provide the mechanisms through which systems and tools are designed and eventually introduced to the end user. IT Projects can be complicated due to the technical nature of technology in general and to the

management of interactions between individuals representing different project components.

Previous research has examined the IT project environment from many perspectives. Two primary areas include commitment and escalation as they relate to the continuation of projects (Keil, Mann, & Rai, 2000; Korzaan & Brooks, 2015; Newman & Sabherwal, 1996). Previous research has also acknowledged the lack of and need for research related to the examination of gender differences in the context of the project environment (Henderson & Stackman, 2010).

The field of project management has historically been male-dominated, but it has been found that women are taking on more roles (Henderson & Stackman, 2010). To begin examination of these issues and to better understand the evolution of project-based work, the current study takes an exploratory approach into the examination of differences that exist between males and females in IT project teams and investigates these differences in terms of project commitment constructs and psychological factors associated with project escalation.

The constructs that will be examined are established predictors of an individual's inclination or intention to continue investing time, money, and resources into an IT project. From a commitment theory perspective, we examine gender differences in affective commitment, continuance commitment, and normative commitment. From an escalation theory perspective, we examine gender differences in desire for project success, perceptions of negative information, over-optimism, the sunk cost effect, self-justification, and the completion effect.

We also examine differences in the outcome variable itself, intention to continue. Intention or inclination toward project continuation is important to success when the project is on track and is conversely a contributor to failure when the project is troubled and in need of termination or redirection (Korzaan & Brooks, 2015; Keil, et al., 2000; Lee, Keil, & Wong, 2015).

## 2. LITERATURE REVIEW

### Gender

Examining gender as it relates to the IT project environment can provide additional insight into why IT projects fail and why they succeed. Looking across the IT literature, the importance of gender and including it in research models becomes obvious. Differences between men and women have been found related to motivations, levels of computer anxiety, attitude, autonomy, adoption, and innovation (Ahuja & Thatcher, 2005; Venkatesh, Morris, & Ackerman, 2000). It has also been found that "women encounter problems gaining entry and acceptance in the project environment, because the culture of traditional project-based industries...is masculine in orientation" (Cartwright & Gale, 1995 p. 12). Many previous studies have focused on this concept. The project environment has historically been viewed as being one primarily defined by masculine characteristics (Cartwright & Gale, 1995), but it has been noted that a shift is occurring highlighting the importance of feminine

qualities as used to define project work (Buckle & Thomas, 2003).

Gender differences have also been noted in many other areas of study. For example, Feingold (1994) provided a summary of research related specifically to personality and how men and women differ across key traits. Research on financial decision-making has revealed that women and men differ in areas related to risk seeking behavior (Powell & Ansic, 1997). These types of findings highlight the potential for gender to play a role in project-based decisions and outcomes. The IT profession provides a unique environment in which to examine project work. Technology has been defined as a masculine issue (Lindgren & Packendorff, 2006). Additionally, within the IT profession in general, women have historically had low representation, which can play a role in defining areas of opportunities for IT and project work. The National Center for Women and IT found that in 2015 women accounted for 25% of computing-related occupations (Ashcraft, McLain, & Eger, 2016). When looking at all occupations in the same year, women accounted for 57% of the U.S. workforce. These numbers have been consistent throughout research on the IT profession (Ahuja & Thatcher, 2005).

### IT Project Continuation

One of the key dependent variables driving IT project research has been intention to continue. Regardless of the theory used or approach taken, the goal is often to understand what influences the continuation of a project. Within the literature, there have been several approaches taken to aid our understanding of projects in situations where success is likely and in situations where failure is probable. Two primary theoretical foundations that have provided some stability and insight into this stream of research are theories of commitment and escalation. Each of these theoretical foundations will be discussed along with specific constructs used to examine the models in totality.

### Commitment

Newman & Sabherwal (1996) identify project commitment to be important for IT project success but also acknowledge that too much commitment may lead to decisions to continue a failing course of action when the project is off track or spiraling out of control. Commitment has been identified as a key construct with both positive and negative implications based upon context, and has also been found to manifest in multiple discriminant constructs. These constructs include affective, continuance, and

normative commitment. All three forms of commitment have been found to be significant predictors of project continuation intentions (Korzaan & Brooks, 2015). The dependent variable in such studies is intention to continue, which taps into the individual willingness or inclination to persist and continue with the technology project as planned (Korzaan & Brooks, 2015).

Affective, continuance, and normative commitment were originally drawn from the organizational literature and applied to the context of IT projects (Korzaan & Brooks, 2015). Affective commitment is conceptually defined as an individual's emotional attachment and desire to work on the project. Affective commitment taps into involvement with the project, pride in working on the project, and a feeling of emotional attachment to the project. Continuance commitment indicates an attachment to a project resulting from a need to avoid the negative consequences associated with terminating the project. Such negative consequences may also include a loss of reward or incentives. Normative commitment arises from an individual's sense of obligation or duty toward the project (Korzaan & Brooks, 2015).

### **Escalation**

When looking at escalation, and the role that escalation plays in determining project continuation, several constructs have been found to play a significant role in these processes. These include desire for project success, negative information, an overly optimistic view of eventual project success, the sunk cost effect, perceived responsibility, and completion effect (Keil, et al., 2000; Lee, Keil, & Wong, 2015). Information about each of these key constructs will be discussed in the sections that follow.

### **Desire for Project Success (Goal Valence/Desirability)**

Goal theory has been used to guide prior escalation research (Lee, Keil, & Wong, 2015). In addition, escalation has been described as an instance of "persistence in goal-directed behavior" (Fox & Hoffman, 2002, p. 273) and is an extension of the factors that drive the initiation and sustainability of goal-directed behavior (Fox & Hoffman, 2002). Goal valence or goal desirability is a central concept in goal theory that influences inclinations to continue or escalate projects through its influence on commitment (Lee, Keil, & Wong, 2015). Goal valence refers to the degree to which achieving a goal is desirable or important to an individual with the underlying foundation of valence being rooted in an

individual's needs. The stronger an individual's need to meet the goal, then the higher the valence (Lewin, 1935). In the context of information technology projects, goal valence or desirability is conceptualized as the desire for project success and is defined as the degree of importance and attractiveness of the outcome of the project

### **Negative Information**

The awareness of and response to negative information about a project distinguishes between project escalation and project de-escalation (Keil and Robey, 1999; Montealegre and Keil, 2000). In other words, if the project is in trouble yet negative information about the project is either ignored or perceived as insignificant then the project will likely continue along its current course without corrective action being taken. This type of information asymmetry in turn sets up the project for escalating out of control (Montealegre and Keil, 2000; Keil, 1995; Keil et al., 2004).

### **Over Optimism**

Over optimism is a form of information bias that manifests in overestimating the likelihood of success (Newman & Sabherwal, 1996). It is surmised that this bias could occur when negative project status information is easily concealed, negative project status information is ignored, information that is contrary to existing beliefs is refuted, and/or only information that confirms beliefs in project success is used. Over optimism may also arise from cultural scripts such as "staying the course" and "weathering the storm" where a belief exists that persisting in the face of challenges will ultimately lead to overcoming the obstacle and achieving success (Keil, et al., 2000; Staw & Ross, 1987). Overall, the definition of over optimism adopted for this study is an absolute assurance and confident belief that the project will finish successfully (Keil, et al., 2000; Mayer & Schoorman, 1992). Optimistic bias has been shown to have a significant effect on escalation in failing projects (Meyer, 2014).

### **Sunk Cost Effect**

The sunk cost effect is an irrational tendency to continue in an unproductive or failing course of action precipitated by past investments. In the context of project management and escalation theory, the sunk cost effect is typically fueled by a belief that the extent of prior investment is a legitimate reason to continue with a project along its existing planned course. There is a focal point on the loss that would occur if the project is terminated (Keil, et al., 2000). The rational possibility that continuing with the project as

planned could result in even greater loss of time, money, and energy is forfeited for the conjecture that if a troubled project is continued at least some prior investment can be recaptured. The sunk cost effect is established in the literature as a key underlying influence in escalation, (Keil, et al., 2000; Sofis, Jarmolowics, Hudnall, & Reed, 2015) in addition strong effects of sunk cost have been noted in IT projects compared to non-IT project (Wang & Keil, 2007).

**Perceived Responsibility**

Perceived responsibility for the outcome of a project is a representative construct in self-justification theory (Brockner, 1992; Cheng et al., 2009; Keil, 1995). In general, self-justification encompasses a disregard or bias in the interpretation of negative information to justify the choice of prior investments and resources in a course of action (Brockner, 1992; Keil, et al., 2000; Staw & Ross, 1987). Studies have shown that the effect of this bias is not limited to those who have actual responsibility for the project, but also includes those who feel a sense of responsibility toward the project (Schultz-Hardt, Thurow-Kroning, & Frey, 2009). This bias has been supported as a significant contributing factor in escalation situations with troubled projects (Keil, et al., 2000; Cheng, Schultz, & Booth, 2009).

**Completion Effect**

The completion effect is characterized by the proximity of project completion as a motivational force to increase commitment to continuing a project, whether the project is on target for meeting its goals and objectives or is off-track and headed toward failure. Finishing the project essentially replaces the project target goals and organizational goals for which the project was originally initiated; this is similar to the goal substitution effect (Sleesman, Conlon, McNamara, & Niles, 2012). Completion becomes the predominant motivational force. Individuals become focused on reaching the end of the project instead of meeting those original goals and objectives (Barsky & Zyphur, 2016; Conlon & Garland, 1993; Zeigarnik, 1927). The closer one perceives the project is to finishing, the stronger the motivation to continue. The completion effect is identified as a contributing factor to the phenomenon of escalation (Keil, et al., 2000; Barsky & Zyphur, 2016) including having a strengthening effect on the relationship between sunk costs and escalation when it is covaried with sunk costs (Sleesman et al., 2012).

**3. METHOD AND RESULTS**

Data for this study was gathered from a web-based survey administered to individuals currently working in information technology-related projects. Participants were identified through contact with upper management (e.g. CIO) at several Fortune 500 organizations. The resulting sample included IT project team participants and primary decision makers. Out of a sample of 222 responses, 23 identified themselves as the primary decision maker and of these 23 managers only two were female. These 23 responses from primary decision makers were removed from the sample to avoid potential bias. The remaining 199 responses were divided into a sample of 113 (57%) males and a sample of 86 (43%) females. These numbers provide an unexpected opportunity with a larger than expected representation of females working on these IT projects.

Respondents to the survey were primarily between the ages of 30 and 49 (75%) with at least a 4-year college degree (79%). They had on average 9.9 years of experience at their organization and an average of 9.8 years of experience in IT. Demographic information is also included in the Appendices.

As the purpose of this research is to take an exploratory approach in examining whether differences exist in the aforementioned constructs between men and women in the sample, a simple t-test for equality of means was conducted for each construct between the two samples. A discussion of the results follows organized by IT project continuation, commitment-related constructs, and escalation-related constructs.

**IT Project Continuation**

An analysis of the difference between men and women for IT Project Continuation revealed that women are more inclined to continue an IT project (p=.01). The results of this analysis are shown in Table 1.

Construct	Mean	Std Deviation	Sig. (2-tail)
<b>IT Project Continuation</b>			
<b>Male</b>	<b>5.5</b>	<b>1.4</b>	<b>.01</b>
<b>Female</b>	<b>6.0</b>	<b>1.2</b>	

**Table 1: IT Project Continuation Analysis Results**

**Commitment Constructs**

Findings from our examination of commitment-related items indicate that women present higher

levels of continuance commitment toward the project compared to men. There were no significant differences in their affective or normative commitment to the project. Detailed results for the commitment constructs can be found in Table 2.

Construct	Mean	Std Deviation	Sig. (2-tail)
<b>Continuance Commitment</b>			
<b>Male</b>	<b>3.4</b>	<b>1.4</b>	<b>.01</b>
<b>Female</b>	<b>4.0</b>	<b>1.4</b>	
Affective Commitment			.06
Male	5.1	1.4	
Female	5.5	1.3	
Normative Commitment			.07
Male	5.6	1.4	
Female	5.9	1.0	

**Table 2: Commitment Construct Analysis Results**

**Escalation Constructs**

Findings revealed that women were more likely to want or desire the project to be successful (goal valence/desirability) when compared to men. Women were less likely than men to perceive the project status as being negative or challenged and were more likely than men to be confident that the project would be successfully completed (over optimism).

Construct	Mean	Std Deviation	Sig. (2-tail)
<b>Desire for Project Success</b>			
<b>Male</b>	<b>5.9</b>	<b>1.1</b>	<b>.02</b>
<b>Female</b>	<b>6.2</b>	<b>.8</b>	
<b>Negative Information</b>			<b>.01</b>
<b>Male</b>	<b>4.7</b>	<b>1.2</b>	
<b>Female</b>	<b>4.2</b>	<b>1.4</b>	
<b>Over Optimism</b>			<b>.01</b>
<b>Male</b>	<b>4.7</b>	<b>1.7</b>	
<b>Female</b>	<b>5.2</b>	<b>1.3</b>	
<b>Sunk Cost Effect</b>			<b>.01</b>
<b>Male</b>	<b>4.3</b>	<b>1.8</b>	
<b>Female</b>	<b>4.9</b>	<b>1.4</b>	
Perceived Responsibility			.74
Male	4.6	1.6	
Female	4.7	1.6	
Completion Effect			.06
Male	4.5	1.7	
Female	4.9	1.3	

**Table 3: Escalation Construct Analysis Results**

In addition, women were more likely than men to view previous resource investments in the project

as a good reason for continuing the project (sunk cost effect). There were no significant differences in their perception of perceived responsibility or their perception that the project was too close to completion to abandon. Specific findings can be found in Table 3.

**4. DISCUSSION**

This study indicates that differences exist in the level of commitment that men and women have to completing an IT project. There are many potential explanations for this study’s findings rooted in previous research examining gender differences. While an exhaustive presentation of potential explanations is beyond the scope of the present work, a few potential explanations are outlined below.

One possible explanation for the differences we found in women and men’s levels of project commitment might have to do with gender differences in risk aversion. Research has shown that women tend to be more risk averse than men (Croson & Gneezy, 2009; Eckel & Grossman, 2008). This may contribute to a tendency for women to remain committed to an existing project (even if challenged) rather than taking the risk of moving on to another project. Facebook Chief Operating Officer Sheryl Sandberg observed, “in my experience, more men look for stretch assignments and take on high-visibility projects, while more women hang back.” (Sandberg, 2013 p. 62) She cited research stating this is especially true in situations where individual performance is emphasized and when women are working closely with men (Pater, Van Vianen, Fischer, & Van Genkil, 2009). Given that one or both of these elements is typically at work in the IT project environment, it might be that the environment itself contributes to increased levels of risk aversion for women, and hence a stronger desire to continue working on a given project.

Another potential explanation for why women would exhibit a higher continuance commitment and intention to continue is that women are more likely to perceive project failure as a form of personal failure. Previous research has shown that women are more likely than men to attribute failure to a lack of ability rather than external factors (Beyer, 1998). If project failure equates to personal failure, then there would be greater fear of negative professional consequences associated with project termination.

From an escalation theory standpoint, the fear of being associated with a project failure might also explain why the women in this study reported a

stronger desire for project success and higher levels of over-optimism related to project success. That over-optimism might also explain why women were less likely to perceive a project as being challenged and more likely to experience the sunk cost effect. It may be that women are generally more willing to turn a blind eye to problems because they are more deeply invested in seeing the project through to completion.

Women might also be more likely to consider project termination to be a form of negative performance feedback. Prior research has shown that women experience greater drops in self-confidence and self-esteem than men when presented with negative feedback (Roberts & Nolan-Hoeksema, 1989; Johnson & Helgeson, 2002). To the extent that women consider project failure to be reflective of personal performance, they may exhibit higher continuance commitment as a means of avoiding these negative outcomes.

## 5. LIMITATIONS AND FUTURE RESEARCH

This study opens several interesting avenues for future research. As detailed in the discussion section, there are many possible explanations for the findings presented here. Each of those explanations detailed above - as well as others drawing from other relevant research streams - could serve as the basis for a future research.

In terms of limitations, the convenience sample used in the analysis only includes project team members, not those who identified as primary decision-makers. Future research direction would be examining whether the gender differences identified in this study hold when focusing on those with the power to make project decisions.

## 6. CONCLUSION

This study extends the existing literature by demonstrating that gender differences exist for some project commitment and escalation constructs. Previous research related specifically to project-based environments did not find differences in success factors when comparing males and females in key areas such as satisfaction and importance of meeting user requirements (Muller & Turner, 2007). Given the practical importance of learning more about the nuances of project success, there is great value in exploring gender differences

Two opportunities emerged from this research. First, we were able to examine the context of the IT project. Second, the data collected resulted in higher levels of females on the projects examined

when compared to general expectations driven by the number of females in the profession. This could also warrant additional investigation related to the types of jobs women have in IT. Overall the numbers may be low, but in certain areas, like project management, they are higher.

One of the first items of interest to note related to our original sample for this analysis. Only two females held roles that defined them as the primary project decision-makers. There are many research studies that have examined this from several different contexts. A consensus coming from this body of research provides that when there are no women in higher level positions, there will tend to be fewer numbers of women in mid-level positions.

As noted, we are fortunate to have a nice representation of females in the sample we analyzed. As noted, the females did not hold positions of power. It would be interesting to look at women who are in the position to make decisions.

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#### **Editor's Note:**

*This paper was selected for inclusion in the journal as a CONISAR 2017 Distinguished Paper. The acceptance rate is typically 7% for this category of paper based on blind reviews from six or more peers including three or more former best papers authors who did not submit a paper in 2017.*

## Appendices

<b>IT Project Continuation (Bhattacharjee, 2001; Korzaan &amp; Brooks, 2015)</b>	
Given the choice of whether or not to continue this project, how likely is it that you personally would	
IC1	Continue with the project
IC2	Persist until the project is completed
IC3	Continue with the project as planned
IC4	Keep investing resources in the project
<b>Continuance Commitment (Mayer &amp; Schoorman, 1992; Korzaan &amp; Brooks, 2015)</b>	
CC1	It would be hard on me if the project was cancelled at this time and I had to switch to a different project
CC2	I would be missing out on a lot if this project was cancelled
CC3	There would be significant costs for me if this project is abandoned now
CC4	It would be quite a loss for me if this project was cancelled
<b>Affective Commitment (Mayer &amp; Schoorman, 1992; Korzaan &amp; Brooks, 2015)</b>	
AC1	For me, this is one of the best projects to work on
AC2	I am proud to tell others that I am working on this project
AC3	I talk up this project to my colleagues as a good project to work on
AC4	This project inspires the best in me in the way of job performance
<b>Normative Commitment (Akhtar and Tan, 1994; Korzaan &amp; Brooks, 2015)</b>	
NC1	I feel that it is my duty to support the project
NC2	I feel a sense of obligation toward this project
NC3	I feel a strong sense of responsibility toward this project
<b>Desire for Project Success (Goal Valence/Desirability) (Bagozzi et al, 2003; Elliot et al, 2000; Dholakia &amp; Bagozzi, 2002)</b>	
DPS1	It is important to me that the project be successfully completed
DPS2	It is my desire for this project to be successfully completed
DPS3	I care very much about whether the project is successful or not
DPS4	I am often motivated on this project by my desire to see the project succeed

**Table 4: Survey Items for Commitment Constructs and IT Project Continuation**

<b>Negative Information (Keil et al., 2004; Keil and Robey, 1999; Montealegre and Keil, 2000)</b>	
While working on the project I often feel	
NI1	There are many challenges that must be overcome before this project can succeed
NI2	This project will need to overcome several obstacles
<b>Over Optimism (Mayer &amp; Schoorman, 1992; Korzaan &amp; Brooks, 2015)</b>	
Regarding this project, I am often	
OO1	Completely sure the project will finish successfully
OO2	Absolutely positive that this project will be a success
<b>Sunk Cost Effect (Keil et al., 2000)</b>	
Consider your reaction to the possible reasons for continuing this project:	
SCE1	Past investments in this project are a good reason to continue with this project
SCE2	There has been too much invested in this project to cancel the project
SCE3	There have already been too many resources allocated to this project to quit now
<b>Completion Effect (Keil et al., 2000)</b>	
Consider your reaction to the possible reasons for continuing this project:	
CE1	We have come too far on the project to quit now
CE2	We are close enough to the end of the project that we should keep going
CE3	Every day we get closer to the end of this project, so we should not quit the project
<b>Perceived Responsibility (Schoorman &amp; Holahan, 1996)</b>	
RES1	The project's performance is a reflection on me personally
RES2	I am responsible for the project's outcome
RES3	I am accountable for the project's success

**Table 5: Survey Items for Escalation Constructs**

	Male	Female
Gender	57%	43%

	20-29 yrs	30-39 yrs	40-49 yrs	>= 50 yrs
Age	12%	30%	45%	13%

	High School	Some College	Associate's Degree	4-year Degree	> 4-year Degree
Education	6%	9%	6%	61%	18%

**Table 6: Respondent Demographics**