

**THE INFLUENCE OF EVALUATIVE REACTIONS TO ATTRIBUTE FRAMES AND  
ACCOUNTING DATA ON CAPITAL BUDGETING DECISIONS**

Christopher D. Allport

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Dr. Robert Brown, Co-Chair  
Dr. Sudip Bhattacharjee, Co-Chair  
Dr. Kimberly Moreno  
Dr. John Brozovsky  
Dr. Quinton Nottingham

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Christopher Douglas Allport

## (ABSTRACT)

The purpose of this dissertation was to analyze the susceptibility of capital budgeting decisions to bias. Based on the political nature of many of these decisions, attribute framing effects were analyzed in a capital budgeting decision context. Specifically, two independent variables were analyzed: accounting data and attribute frames. This research proposed that attribute framing effects would be conditional on the nature of the accounting data being considered. When the accounting data elicited a positive or negative evaluative reaction, attribute frames were expected to be unobtrusive to capital budgeting decisions. However, when the accounting data was neutral, eliciting an ambiguous evaluative reaction, attribute frames were predicted to bias these decisions. An experiment was conducted that considered the issue across two types of capital budgeting decisions: accept/reject decisions (dichotomous decision) and strategic alliance judgments (monetary allocations). Experimental findings strongly support the predicted relationships. These results suggest that persuasive descriptions are not effective in capital budgeting contexts when accounting data provides a clear picture as to the investment's future success; however, these tactics may be vitally important when accounting information is unclear about the investment's future success.

## **DEDICATION**

This dissertation is first dedicated to Almighty God: Father, Son, and Spirit. All things were created by Him and for Him, and I dedicate this dissertation for His honor and glory. Second, I dedicate this work to my wife. Lisa, your love and support has been constant and unconditional throughout this process, and your love and commitment to our little ones (Sarah and Nathan) has been a constant source of encouragement. Third, I dedicate this work to my parents, Mike and Linda, and brother, Mike. The three of you have not only given me strength for this process but also for the process of love and life. Fourth, I dedicate this work to my other parents, Roger and Jan, and sister, Lori. The wonderful additions each of you have contributed to my life have improved my abilities in preparing this dissertation, as well as being a better husband, father, and son. Finally, I dedicate this work to my extended family: grandparents, aunts and uncles, and cousins. The role you all have played in my growth and maturity has been vital in the successful completion of this goal. I thank you all!

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## TABLE OF CONTENTS

CHAPTER 1 INTRODUCTION .....	1
1.1 Purpose of the Study.....	4
1.2 Overview of Study.....	6
CHAPTER 2 LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT .....	7
2.1 Capital Budgeting .....	7
2.1.1 Capital Budgeting Decisions .....	7
2.1.2 Capital Budgeting and Political Decision Making.....	11
2.1.3 Capital Budgeting Research Findings .....	14
2.2 Framing Effects & Accounting.....	15
2.2.1 Framing Effects.....	15
2.2.2 Typology of Framing Effects & Accounting Research.....	17
2.2.3 Attribute Framing & Accounting Decisions .....	20
2.3 Affect & Accounting .....	24
2.3.1 Affect.....	25
2.3.2 Affect & Organizations .....	25
2.3.3 Affective Reactions & Accounting Decisions .....	27
2.3.4 Affect & Attribute Framing.....	29
2.4 Framing Effects, Accounting Decisions, & Ambiguity.....	30
2.4.1 Risky-Choice Framing & Ambiguity.....	30
2.4.2 Priming Mechanisms & Ambiguity .....	32
2.4.3 Accounting Decisions & Ambiguity.....	33
2.5 Literature Synthesis & Hypotheses .....	34
CHAPTER 3 RESEARCH METHODOLOGY .....	39
3.1 Overview .....	39
3.2 Experimental Task .....	39
3.2.1 Background .....	40
3.2.2 Investment Cues .....	41
3.2.3 Independent Variables .....	41
3.2.4 Dependent Variables .....	44
3.2.5 Additional Information.....	45

3.3 Participants .....	45
CHAPTER 4 RESULTS .....	47
4.1 Preliminary Analysis .....	47
4.2 Accept/Reject Decisions .....	48
4.2.1 Test of Assumptions: Accept/Reject Decision.....	48
4.2.2 Test of Hypotheses: Accept/Reject Decision.....	49
4.3 Strategic Alliance Judgments .....	50
4.3.1 Test of Assumptions: Strategic Alliance Judgment .....	50
4.3.2 Test of Hypotheses: Strategic Alliance Judgment .....	51
4.4 Additional Analysis .....	52
4.4.1 Memory Recall Scores .....	52
4.4.2 Gender .....	53
4.4.3. Information Objectivity.....	54
CHAPTER 5 CONCLUSION.....	56
5.1 Discussion.....	56
5.1.1 Accept/Reject Decisions .....	56
5.1.2 Strategic Alliance Judgments.....	57
5.1.3 Overall Study Implications .....	57
5.2 Limitations .....	59
5.3 Future Research .....	59
5.4 Summary.....	60
LITERATURE CITED .....	78
APPENDIX INSTRUMENT.....	92

## LIST OF EXAMPLES

EXAMPLE 1: Individual and Overall Evaluative Reactions to Accounting Data and Attribute Frames .....	62
EXAMPLE 2: Asian Disease Problem (Tversky and Kahneman, 1981) .....	63
EXAMPLE 3: The Framing of Decision Questions, Information, and Outcomes in Capital Budgeting .....	64

## LIST OF TABLES

TABLE 1: Experimental Design – Accounting Data by Attribute Frame .....	65
TABLE 2: Summary of Methodological Differences in Risky Choice, Attribute, and Goal Framing .....	66
TABLE 3: Summary of Focal Studies in Attribute Framing Relating to Decision Questions, Decision Information, and Decision Outcomes .....	67
TABLE 4: Positive and Negative Frames for Ambiguous Capital Budgeting Information Items	68
TABLE 5: Participant Demographic Data .....	69
TABLE 6: Accept/Reject Decisions Across Accounting Data and Attribute Frame .....	70
TABLE 7: Logistic Regression Results for Accept/Reject Decisions .....	71
TABLE 8: Tests of Hypotheses for Accept/Reject Decisions .....	72
TABLE 9: Means and Standard Deviations for Strategic Alliance Judgments Across Accounting Data and Attribute Frame.....	73
TABLE 10: Tests of Hypotheses for Strategic Alliance Judgments.....	74
TABLE 11: Means and Standard Deviations for Memory Recall Scores Across Accounting Data and Attribute Frame .....	75
TABLE 12: Analysis of Attribute Frame Effects on Memory Recall Scores Across Accounting Data Groups .....	76

## LIST OF FIGURES

FIGURE 1: A Model of The New Product Decision Process.....	77
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## **CHAPTER 1**

### **INTRODUCTION**

Capital budgeting decisions are extremely important for organizational success (Brown and Solomon, 1993; Merchant, 1997; Swain and Haka, 2000). These decisions involve a high level of uncertainty due to the necessity to estimate the amount and timing of future cash flows, as well as future market conditions (Clancy, Collins, and Chatfield, 1982). Given this uncertainty, most capital budgeting information is communicated as the relative likelihood (i.e., probabilities) of possible outcomes (Ho, Keller, and Keltyka, 2002). For instance, managers may be informed that a project has an 80% chance of producing a positive cash flow, or a 20% chance of producing a negative cash flow. While these information items are economically equivalent, research in psychology suggests that these different presentation formats (positive cash flow vs. negative cash flow) can impact decision making (Tversky and Kahneman, 1981).

Levin, Schnieder, and Gaeth (1998) call this positive or negative labeling of economically equivalent information attribute framing. Research in psychology and applied fields show that attribute framing impacts both novice and expert decision makers in various fields (Loke and Tan, 1992; Marteau, 1989; Emby, 1994). Prior research illustrates that a positive attribute frame results in higher evaluations or more positive decisions than an equivalent negative attribute frame (Levin and Gaeth, 1988; Levin et al., 1998). Levin and Gaeth (1988) provide a popular example of attribute framing, presenting ground beef as either 75% lean or 25% fat. They find that participants give the 75% lean meat higher taste ratings and higher likelihood to purchase ratings than the 25% fat meat. Since capital budgeting decisions involve similar probabilistic information, attribute framing may be unavoidable in this context. For example, information items such as the likelihood of an acceptable (unacceptable) net present value, the level of defective (defect free) production, and the percentage of consumers who find a product appealing (unappealing) can all be framed positively or negatively, potentially leading to different decisions.

Capital budgeting decisions may be especially susceptible to attribute framing manipulations due to the characteristics of the decision process. Often the capital budgeting process is characterized as a formal decision process where members of upper management systematically analyze various investment opportunities and select the option(s) that maximizes

firm value (Farazmand and Neill, 1996). However, researchers have long claimed that capital budgeting decisions occur outside this formal channel of investment consideration (Hopwood, 1974; Pfeffer, 1981; Clancy et al., 1982). In fact, case studies indicate that over 99% of all capital budgeting proposals that reach this formal stage are accepted, suggesting that this formal process is a form of 'rubber stamping' (Morgan and Luck, 1973; Hirst and Baxter, 1993). These findings suggest that the most challenging hurdle in the capital budgeting process is gaining approval for a project in an informal network of low and mid-level managers (Clancy et al., 1982). Researchers have noted that this informal network fosters intense competition and persuasion tactics (Orme, Parsons, and Baxter, 1993; Farazmand and Neill, 1996; Corporate Executive Board, 2003). Project managers must compete for limited funds, and this competitive environment provides incentives for managers to attempt to persuade superiors. Steele and Albright (2004) note that talented managers spin projects by controlling the type of information considered and how it is presented to top management.

While this suggests that managers will use positive attribute frames when proposing capital projects, other factors may motivate them to frame projects negatively. Research suggests that concerns over compensation, reputation, and job mobility may cause managers to favor short-term projects over long-term projects (Chang, Ho, and Lin, 2002). Therefore, in some cases managers may be motivated to negatively frame long-term projects, while positively framing short-term projects. The ability of managers to control the information presentation coupled with the incentives to sell or undermine projects suggests that attribute framing may be a persuasive tactic used by managers. It is therefore important to understand how attribute framing impacts the capital budgeting decision process.

Levin and colleagues link attribute framing to automatic visceral reactions. Decision makers may have positive or negative visceral reactions to attribute frames, and these visceral reactions result in positive or negative evaluations. These positive or negative evaluations result in more favorable decisions with positive attribute frames and less favorable decisions with negative attribute frames. Therefore, affective (evaluative) reactions have been proposed as a mechanism driving attribute framing effects (Levin et al., 1998). Affect has been considered increasingly important in judgment and decision making research (Mitchell and Beach, 1990; Keren, 1996; Mellers, 2000), and many researchers have recognized the need to include affect in judgment and decision making models (Keren, 1996; Loewenstein, 1996; Strack and Neumann,

1996; Finucane, Alhakami, Slovic, and Johnson, 2000; Mellers, 2000). Considering the ability of attribute frames to elicit positive or negative affective reactions and the impact these reactions have on decisions, it is important to further explore the role affective reactions from attribute frames play in capital budgeting decisions.

Accounting researchers have found that affect plays an important role in accounting decisions (Kida and Smith, 1995; Kida, Smith, and Maletta, 1998; Kadous, 2001; Kida, Moreno, and Smith, 2001; Bhattacharjee and Moreno, 2002; Moreno, Kida, and Smith, 2002). Affect is a broad term used to refer to a wide range of emotions, moods, and evaluations (Fiske and Taylor, 1991; Kida and Smith, 1995). Emotions are complex assortments of affective reactions (e.g., fear, anger, joy, and happiness), moods are general affective states, and evaluations are positive or negative reactions to a target (Moreno et al., 2002). Accounting researchers have analyzed both emotional reactions (Kadous, 2001; Kida et al., 2001; Bhattacharjee and Moreno, 2002; Moreno et al., 2002) and evaluative reactions (Kida and Smith, 1995; Kida et al., 1998). The current study focuses on evaluative reactions and the impact these reactions have on capital budgeting decisions. Kida and Smith (1995) develop a numerical information-encoding model based on positive and negative evaluations. They propose that numerical information is encoded in multiple forms including actual numbers, comparisons, and evaluative reactions, and they demonstrate that evaluative reactions are the most durable and retrievable form (Kida et al., 1998). While Kida and Smith's (1995) framework analyzes affective reactions toward accounting data, attribute frames create an affective reaction toward the information presentation. Considering that attribute framing is likely in a capital budgeting context, understanding how these separate affective reactions (one to the data and one to the attribute frame) interact could improve our understanding of accounting decision making.

For example, when analyzing a capital budgeting proposal, managers may have two distinct affective reactions. Consider a manager asked to assess the two investments (A and B) in Table 1. The information on these two investments can be presented in one of two ways, with a positive attribute frame or a negative attribute frame. Investment A has an 80% chance of producing a positive cash flow (positive frame), and a 20% chance of producing a negative cash flow (negative frame). Investment B has a 15% chance of producing a positive cash flow (positive frame), and an 85% chance of producing a negative cash flow (negative frame). Addressing the investment's success (positive cash flow) creates a positive affective reaction,

and focusing on the investment's failure (negative cash flow) creates a negative affective reaction. In addition, the manager is likely to have a positive affective reaction to the accounting data for investment A because it is likely to generate positive cash flows, and a negative affective reaction to the accounting data for investment B because it is likely to generate negative cash flows. In assessing each investment alternative, these two affective reactions must be integrated to develop a single overall evaluation. The current proposal will attempt to further explain the role of affect in accounting decisions by integrating various affective reactions that impact decision makers' interpretation of accounting information. Specifically, the current proposal suggests that attribute framing creates an evaluative (i.e., affective) reaction that will interact with the evaluative reaction created by the accounting data (Kida and Smith, 1995; Kida et al., 1998).

### 1.1 Purpose of the Study

This research focuses on the effect of attribute frames on accounting information in capital budgeting decisions. Capital budgeting decisions are important for organizational success and viability, and these decisions have been criticized for their political and competitive nature. Attribute frames have been shown to consistently affect decisions in both psychological and applied decisions, and capital budgeting decisions provide the opportunity for both positive and negative frames. Levin et al. (1998) propose evaluative reactions as the ultimate cause for attribute framing effects, as positive frames elicit a positive reaction and negative frames elicit a negative reaction. Accounting researchers have noted that evaluative reactions also play an important role in the interpretation of accounting information. Kida and Smith (1995) propose that accounting information is encoded and retrieved primarily based on evaluative reactions, and Kida et al. (1998) provide evidence that evaluative reactions can govern the use of accounting information. This research seeks to understand how these separate evaluative reactions, one to the information frame and one to the information content, are integrated to impact accounting decisions.

Analyzing the impact attribute frames have on capital budgeting decisions extends our knowledge of accounting and psychology in a number of ways. First, this study provides initial evidence regarding the susceptibility of capital budgeting decisions to bias. Much has been written concerning the persuasive and manipulative nature of the capital budgeting decisions

process, however very little research has been conducted to analyze the impact these tactics have on decision makers. This research analyzes a non-quantitative form of persuasion, by changing the verbiage relating to quantitative likelihoods for accounting data. This results in quantitatively equivalent scenarios with differing emphases on the positive versus negative nature of the information. This form of persuasive speech is not as pervasive as some forms of manipulation mentioned in the capital budgeting literature, but it has been shown to be meaningful in applied decisions. These findings should provide guidance for future research in the area of capital budgeting manipulation.

Second, this research continues the analysis of framing effects in the accounting domain. Framing effects have been studied extensively in accounting, and this research has considered framing effects in managerial accounting (Luft, 1994), auditing (Emby, 1994), and taxation (Newberry, Reckers, and Wyndelts, 1993). These research studies have been helpful in understanding and moderating some types of framing effects. The current research analyzes a type of attribute framing that has received little attention from accounting researchers. I analyze the effect of framing decision information (i.e., the information cues directly relevant to the judgment of interest), which has only been analyzed in the accounting literature with regards to the ability of information frames to moderate recency effects (Rutledge, 1995b). In addition, I extend the general understanding of attribute frames by analyzing when these effects have their greatest impact. Specifically, I analyze the differing impacts of information frames with accounting data displaying varying degrees of positive versus negative content.

Finally, this research continues a current trend in accounting research towards better understanding the role of affect in accounting decisions. Affect and affective reactions have received significant attention over the last ten years, and this study extends this literature by analyzing the integration of two separate affective reactions in a single judgment. Specifically, attribute frames cause an evaluative reaction based on the information description, and accounting data creates an evaluative reaction based on the information content. These reactions must be integrated to provide a summary evaluation of the accounting information (i.e., description and content), and this information is then used to make an overall judgment. This study develops hypotheses based on theoretical and empirical research in psychology and tests these hypotheses to better understand what governs this integrated evaluation. This research

joins the recent work of Mercer (2005) in analyzing the impact multiple affective reactions have on accounting decisions.

## 1.2 Overview of Study

This study investigates the impact of attribute frames on capital budgeting decisions by manipulating the content and description of capital budgeting information. More directly, three capital budgeting scenarios are developed, one with accounting data that suggests a high likelihood of success, one with accounting data that suggests a low likelihood of success, and one with accounting data that suggests neither a high nor low likelihood of success (neutral/moderate). Within each of these scenarios the equivalent capital budgeting information is described either positively or negatively. Hence, I analyze how the information content (positive, neutral, or negative accounting data) interacts with the information description (positive or negative attribute frame). For each scenario, participants are asked to decide whether or not to invest in the project, and in addition, participants are presented with an opportunity to share the risks and rewards of the investment with an investment partner. The study requires a 2 (Information Frame) X 3 (Information Content) between-subject design.

## **CHAPTER 2**

### **LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

This chapter includes a review of the relevant literature for the current study. This literature can be broadly categorized as capital budgeting, framing effects and accounting, affect and accounting, and framing effects, accounting decisions, and ambiguity. Within each category there will be further classification, and after this review, the literature will be synthesized and specific hypotheses will be developed.

#### 2.1 Capital Budgeting

This category includes a review of the general nature of capital budgeting decisions and the relevant behavioral, empirical, and analytical research findings relating to this process. The discussion of the nature of capital budgeting decisions will include a definition of capital budgeting decisions, the variables and techniques necessary to consider these decisions, and difficulties and complexities in this decision process. The discussion of past capital budgeting research considers research on escalation of commitment; as well as, studies addressing the impact of information load, hurdle rates, and other contextual issues.

##### *2.1.1 Capital Budgeting Decisions*

Capital budgeting is, “the process of allocating funds for long-term projects or purchases” (Clancy et al., 1982). These decisions generally span the entire organization, involving inputs from accounting, finance, engineering, and project management (Lynch, 2002). Capital budgeting decisions generally involve negotiations, cross-functional and interdivisional teams (Chalos and Poon, 2000), and managerial delegation (Harris and Raviv, 1998). Chang et al. (2002) categorize resource allocation decisions as routine and non-routine. Routine decisions are frequent allocations of resources, and these decisions involve frequent feedback, multiple or repeated observations, and limited risk and uncertainty. Non-routine decisions involve limited feedback, few observations, and a high level of risk and uncertainty<sup>1</sup>. The current study analyzes

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<sup>1</sup> Risk is generally defined as the known probability distribution for expected outcomes, and uncertainty includes additional unknown or non-quantified probability distributions or outcomes (Accola, 1994). Some authors use risk and uncertainty synonymously, and consider ambiguity the additional unknown

a non-routine capital budgeting decision. Specifically, the study analyzes a new product development (NPD) decision.

New product development decisions are capital budgeting decisions related to the creation or enhancement and commercialization of a company product. Capital budgeting decisions relating to new product development are particularly important because nearly one-half of the average firm's sales and profits are derived from products less than five years old (Page, 1993). Brown and Eisenhardt (1995) note that NPD decisions are a potential source of competitive advantage, and that these decisions are often catalysts for organizational diversity, adaptation, and rediscovery. Wind states that, "If companies can improve their effectiveness at launching new products, they could double their bottom line." (in Power, Kerwin, Grover, Alexander, and Hoff, 1993: 77). Despite their importance, researchers characterize new product development decisions as intensely competitive (Cooper and Kleinschmidt, 1986), politically motivated and driven (Ancona and Caldwell, 1992), and often unsuccessful (Boulding, Morgan, and Staelin, 1997).

New product development decisions are generally described in terms of stages and gates (see Figure 1; Cooper, 1990 and 1994). The stages represent various activities performed to make an idea or product design an actual product offering. These activities are aimed at providing information and solving problems throughout the process of developing and marketing the product. They are generally performed by experts from various functional domains and may include marketing, technological, and business/financing concerns. In a broad construction, the process includes three stages: idea generation, product testing, and commercialization. At the end of each stage is a gate or project review point. These gates or review points represent a decision process that considers whether to continue or discontinue projects, the appropriate prioritization of acceptable projects, and the necessary and appropriate commitment of resources (See Figure 1 below; Cooper, 1993).

While the new product development process is well understood, it is not always well executed. Boulding et al. (1997) note that the failure rate for new product development projects has remained between 35 – 45% over the last twenty-five years, and Schmidt and Calatone (2002) suggest that this rate has remained constant despite improved forecasting tools. While a

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outcome or probability distribution (Einhorn and Horgarth, 1986; Ho et al., 2002). Ho et al. (2002) consider non-exact estimates of the probability distribution for outcomes a form of uncertainty.

great deal of research has analyzed the financial, technological, and marketing ‘stages’ of successful new products (see Brown & Eisenhardt, 1995 for a review and Henard and Szymanski, 2001 for a meta-analysis), relatively little research has analyzed the ‘gates’ or decision points (Schmidt and Calatone, 1998; Schmidt, Montoya-Weiss, and Massey, 2001; Schmidt and Calatone, 2002). This limitation in research is particularly troubling considering that stringent stop/go decisions have been shown to lead to more successful products, and that managers are generally least confident about this aspect of the new product development process (Cooper, 1996).

Capital budgeting decisions, like commercializing a new product, involve considerable complexity and uncertainty. In an effort to improve these decisions, many valuation techniques have been developed. These techniques are designed to appropriately value capital budgeting options to determine which options are most economically advantageous. These techniques include net present value, internal rate of return, payback period, accounting rate of return, and residual income (Horngren, Datar, and Foster, 2003). Survey research suggests that decision makers generally use multiple techniques, and that theoretically preferred present value techniques (internal rate of return and net present value) have increased in popularity and are often favored (Ryan and Ryan, 2002).

While using these techniques improve the quantitative rigor of these decisions, researchers have noted that the estimation necessary involves considerable risk and uncertainty (Clancy et al., 1982; Farazmand and Neill, 1996). Predicting the timing and amount of future cash flows is an extremely difficult task, and researchers have noted that companies often fail to adequately account for this and other risks (Courtney, Kirkland, and Viguerie, 1997). In an effort to simplify risk consideration, various methods of risk quantification have been developed. Accola (1994) broadly classifies these methods as moment-oriented and dimension-oriented<sup>2</sup>.

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<sup>2</sup> Many methods of risk consideration adjust the discount rate in a quantitative analysis to account for additional risks; this results in a final point-estimate for the chosen quantitative measure allowing for additional return based on additional risk (NPV, IRR, etc.). However, Ronen and Sorter (1972) argue that it is theoretically inappropriate to assess expected cash flows and risks associated with these cash flows with a single measure. As Accola (1994: 21) states, “models used [for risk consideration] should enable managers to measure and evaluate expected cash flows separately from the risks associated with them.” These methods can also be criticized due to the fact that they result in a single point estimate for project outcome. Courtney et al. (1997) state that when forced to ‘incorporate’ various risks into single point estimates, managers are likely to underestimate the number and impact of these risks, leading to inferior decisions. Norgaard and Killeen (1990) even suggest that a project’s variability and expected value (i.e., a point estimate) should be considered of equal importance. They argue that the possibility of extreme

Moment-oriented models require a greater amount of information, including potential outcomes and their related probability distribution functions. When this information is available, or can be estimated, multiple measures of variation can be derived. Complex models of capital budgeting risk and uncertainty are moment-oriented in nature (Hillier, 1963; Hertz, 1964; Norgaard and Killeen, 1990; Washburn, 1992). Dimension-oriented models require less information about the relevant factors, and are generally used when all necessary information is not available for moment-oriented models. Dimension-oriented models do not consider the entire probability function of a factor (such as cash flows), but rather analyze only an aspect (or dimension) of the associated risks. Generally, dimension-oriented designs are employed to analyze ‘loss’ dimensions. In other words, companies only focus on the probability of excessive losses on a project. An excellent example of a dimension-oriented approach is the analysis of below target returns (via semi-variance). Decision makers are generally not as interested in the risks related to above target earnings or cash flows, so likelihood information is only developed for below target performance (Mao, 1970). Moment- and dimension-oriented models greatly enhance the opportunity to consider risks and uncertainty in the capital budgeting process. Boulding et al. (1997) note that large firms like Merck and DuPont have recently committed to better recognizing these uncertainties by using risk analysis models. They describe the process of recognizing uncertainties and running multiple ‘what-if’ simulations to develop cash flow distributions, which allow decision makers to consider a project’s likelihood of succeeding or failing. In addition, recent work on risk analysis techniques has shown that advances in personal computer technologies (specifically, spreadsheet applications and macro command availability) allow for accessible and beneficial Monte Carlo simulation techniques that can provide meaningful information about project risks for businesses of all sizes (Amirkhalili, 1997; Fordham and Marshall, 1997). Whatever the method of risk assessments, researchers have noted that capital budgeting decisions are generally made by assessing potential outcomes and the relative likelihood of their occurrence (Chang et al., 2002; Ho et al., 2002).

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loss and the impact such a loss could have on an organization can be vital to organizational continuance. Therefore, they conclude that project variability should be a part of any project consideration.

### *2.1.2 Capital Budgeting and Political Decision Making*

Many researchers and writers have viewed organizations and strategic organizational decisions as political systems and processes (March, 1962; Allison, 1971; Hinings, Hickson, Pennings, and Schneck, 1974; Salancik and Pfeffer, 1974; Pfeffer, 1992). This view assumes that organizations are composed of individuals with competing interests and goals due to differences in position, desires, and biases (Allison, 1971; Eisenhardt and Zbaracki, 1992). In this political paradigm, individuals with the most power determine decision outcomes (March, 1962; Hinings et al., 1974), and political tactics are employed in situations of conflict to shift the balance of power, resulting in favorable outcomes for the more politically savvy individual(s) (March, 1962; Pfeffer, 1981). Eisenhardt and Zbaracki (1992: 26) define political tactics as, “observable, but often covert, actions by which people enhance their power to influence a decision.” Examples of political tactics include coalition formation, co-optation, employment of outside experts, lobbying, strategic use of information, and withholding and/or controlling agendas (Pettigrew, 1973; Pfeffer, 1981,1992).

Case study research has largely confirmed the basic tenets of the political paradigm; supporting the contention that organizations are political systems and that political tactics are important to the outcome of organizational decisions. Many studies have shown conflicting interests among individuals within organizations (Allison, 1971; Baldrige, 1971; Pettigrew, 1985; Eisenhardt and Bourgeois, 1989). These studies have justified the characterization of political systems to government, large corporations, and high technology firms (Eisenhardt and Zbaracki, 1992). The findings of Dean and Sharfman (1992), Eisenhardt and Bourgeois (1988), Quinn (1980), and Grandz and Murray (1980) strongly confirm the existence of politics in business industries and situations. These studies provide strong support for March’s (1962: 663) argument that the proper view of the business organization is as a political system. In addition, political tactics have been shown to be pervasive in organizations. Pfeffer (1981, 1992), Eisenhardt and Bourgeois (1988), and Eisenhardt and Zbaracki (1992) all emphasize the wide variety of political tactics employed in organizations. Eisenhardt and Zbaracki (1992) note two examples that are particularly relevant examples for the current study. First, Pettigrew (1973) analyzes computer adoption at a British retail company. He finds a blatantly political system, and specifically, a manager (Mr. Kenny) who was able to successfully block, control, and

manipulate information channels. Not only was Mr. Kenny able to limit the access of other managers to the board of directors, but he also 'slanted' information from outside vendors to favor his position. Second, Sapolski (1972) analyzes the development of the Polaris submarine. He notes that the success of the project was dependent upon the Polaris team eliminating competitors, outmaneuvering reviewing agencies, and co-opting congressmen and admirals.

The overall state of the political decision making literature has been clearly stated by Eisenhardt and Zbaracki (1992: 27):

In summary, most scholars accept the central ideas of the political perspective: that (1) organizations are comprised of people with partially conflicting preferences, (2) strategic decision making is ultimately political in the sense that powerful people get what they want, and (3) people engage in political tactics such as cooptation, coalition formation, and use of information to enhance their power.

This general agreement on the political nature of strategic decisions makes important implications concerning capital budgeting decisions, and more specifically, new product development decisions. Managers and subordinates are likely to use political tactics to enhance their power and improve their individual outcomes. Research relevant to capital budgeting has clearly shown this inclination in these decision processes. Researchers have noted that persuasion and personality play an important role in capital budgeting decisions (Orme et al., 1993; Steele and Albright, 2004). Ancona and Caldwell (1992) note that successful product development teams need to use communication for lobbying and impression management.

In addition, capital budgeting research suggests that capital expenditure decisions are rarely made by members of top management, but rather the decisions of low and mid-level managers create momentum that upper management rarely counteracts (Morgan and Luck, 1973; Hopwood, 1974; Pfeffer, 1981; Clancy et al., 1982; Hirst and Baxter, 1993). In making these decisions, information is provided about a capital budgeting project with bottom-up communication processes, and this provides an opportunity for low and mid-level managers to distort the information they present to their superiors (Sridhar, 1994). In other words, managers have the opportunity to manipulate capital expenditure information that superiors will then use to determine the appropriate course of action. This opportunity makes the incentives of managers important in determining the likelihood of internal reporting distortions (Sridhar, 1994). Manager reputation has been suggested as an important incentive in determining manager

reporting in situations of information asymmetry (Hirshleifer, 1993; Sridhar, 1994; Chang et al., 2002). For instance, manager reputation can strongly affect preferences for short versus long-term investments (Rumelt, 1987; Hirshleifer, 1993; Chang et al., 2002). Highly talented managers may prefer short-term investments because they clearly and quickly display their superior talent (Hirshleifer, 1993) and increase their job mobility opportunities (Rumelt, 1987; Mannix and Loewenstein, 1993). In situations where more talented managers choose a mixture of short and long term investments, less talented managers are likely to prefer long-term investments to mask their inabilities (Hirshleifer, 1993). Sridhar (1994) explicitly analyzes the tendency of inferior managers to distort internal reports, and finds that distortions may be dependent on the ‘talent gap’ between superior and inferior managers. Supporting Hirshleifer’s (1993) conclusions, Sidhar suggests that in a choice situation between a short and long-term investment opportunity, inferior managers who perceive the talent gap as large will positively distort long-term investments and negatively distort short-term investments, and further concludes that when the talent gap is small, inferior managers will randomly choose between distortions to favor short or long-term investments. In addition, Sridhar (1994) finds that in a more general investment environment, large talent gaps will cause inferior managers to negatively distort all investment opportunities to prevent talent comparisons, and thereby shift the blame to environmental factors (343). In situations of small talent gaps, inferior managers will again randomly choose between distortions to favor investment or non-investment.

Managers must also justify their decisions to superiors and other stakeholders (Brown and Solomon, 1993; Chang et al., 2002). While these decisions are often evaluated based on outcomes (Chang et al., 2002), the procedural justice literature suggests that evaluative judgments of manager decisions should be based on decision processes rather than outcomes (Bies and Shapiro, 1988; Folger and Konovsky, 1989; Greenberg, 1990; Moorman, 1991). In addition, research indicates that process-based evaluations serve to mitigate escalation behaviors (Simonson and Staw, 1992). However, process-based evaluations provide managers with the opportunity to distort information considered in their decisions. Auditing research suggests that auditors are likely to selectively choose information and stylize information presentation to support their conclusions (Solomon and Trotman, 1997), and this behavior seems more likely in a managerial setting because incorrect decisions are generally unalterable.

### *2.1.3 Capital Budgeting Research Findings*

Much of the research on capital budgeting and new product development decisions has focused on escalation of commitment (Staw and Ross, 1987; Rutledge, 1995a; Boulding et al., 1997). Escalation of commitment occurs when decision makers continue to pursue and fund an investment option despite clear indications of a negative financial and/or organizational outcome (Staw, 1976; Staw and Ross, 1987). Escalation tendencies have been shown in many domains and contexts (Bazerman, Giulano, and Appelman, 1984; Brockner, Houser, Lloyd, Nathanson, Birnbaum, Deitcher, Rubin, 1986; Whyte, 1991; Rutledge and Harrell, 1993; Boulding et al., 1997; Schmidt and Calantone, 1998; Schmidt et al., 2001), and initial investment responsibility has consistently been shown to be the most important factor in escalating behavior (Bazerman et al., 1984; Boulding et al., 1997; Rutledge and Harrell, 1993; Schmidt and Calantone, 2002). Escalation behaviors are closely linked theoretically to entrapment effects (Brockner et al., 1986) and sunk cost effects (Arkes and Blumer, 1985), and efforts to provide a more general theoretical explanation of escalation often involve prospect theory (Rutledge and Harrell, 1993; Sharp and Salter, 1997) or agency theory (Harrell and Harrison, 1994; Sharp and Salter, 1997). In addition to the general importance of responsibility, other relevant findings relating to escalation include the international generalizability of the effects (Chow, Harrison, Lindquist, and Wu, 1997; Sharp and Salter, 1997), and the tendency for escalation with high product/project innovativeness (Schmidt and Calantone, 1998, 2002). Debiasing techniques for escalation generally include review by individuals not responsible for the initial investment decision (Rutledge and Harrell, 1993) and eliminating sunk cost information from decision consideration (Boulding et al., 1997).

In addition to escalation, research has considered other characteristics of the capital budgeting process. Analytical models have been used to assess the impact of information asymmetry on capital budgeting decisions. This research has shown that in situations of information asymmetry, managers may have incentives to over or under-invest and/or choose non-optimal projects (Harris and Raviv, 1996; Antle, Bogetoft, and Stark, 1999; Tan, 2000). Information load has been shown to reduce information search and increase search pattern variability, and information sharing has been proposed to limit these effects (Chalos and Poon, 2000; Swain and Haka, 2000). Affect has also been shown to impact capital budgeting decisions. Kida et al. (2001) analyze the impact emotional reactions have on capital budgeting, and find that positive or negative emotional reactions have a significant impact on investment decisions.

The current proposal attempts to extend the work of Kida et al. (2001) by considering the impact of evaluative reactions on capital budgeting decisions. More specifically, I will analyze how various evaluative reactions interact to impact capital budgeting decisions.

## 2.2 Framing Effects & Accounting

This section is further categorized into a review of the literature on framing effects, based on the work of Levin and colleagues. Then accounting research will be analyzed in view of the Levin framework of framing effects, and finally, this accounting research will be further delineated to more fully understand when and how framing impacts accounting decisions.

### *2.2.1 Framing Effects*

Framing effects occur when information described positively results in different decisions than equivalent information described negatively (Levin et al., 1998). Tversky and Kahneman (1981) first introduced framing effects with their well-known Asian Disease problem. This scenario, along with the choice proportions is shown in Example 2. The Asian Disease problem produces results consistent with prospect theory (Kahneman and Tversky, 1979), as gain frames (people saved) produce risk aversion and loss frames (people die) produce risk seeking. While Tversky and Kahneman used these results to question the description invariance assumption of expected utility theory, other researchers continued to analyze framing effects in diverse ways and settings. This research resulted in seemingly conflicting results, with gain and loss frames sometime supporting prospect theory and other times contradicting the theory. Levin et al., (1998) reviewed the framing literature and harmonized the findings based on three specific frame types: risky-choice framing, attribute framing, and goal framing. Levin et al. (1998) distinguish between frame types based on what is being framed, what is affected, and how the effect is measured (see Table 2, p. 24).

Risky choice framing describes both options available to the decision maker either positively or negatively. Risky-choice framing includes the traditional Asian Disease problem (see Example 2). Risky choice problems generally include a certain option and a risky option, and they affect the individuals risk preference. Results are generally consistent with prospect theory, and they are analyzed by comparing the choice proportions for the different frame scenarios. Attribute framing describes particular characteristics or attributes of an object or

event either positively or negatively. Levin and Gaeth (1988) use attribute framing when labeling meat as either 75% lean or 25% fat, they find that the positively framed meat (75% lean) receives higher quality and taste ratings. Attribute frames may impact how a question is asked, or how information about a situation or decision is presented. They affect the evaluation of the framed characteristic or attribute, which impacts the individual or overall rating of the object or event<sup>3</sup>. Finally, goal framing describes the same action or behavior with either positive or negative consequences. Meyerowitz and Chaiken (1987) use goal framing by describing self-breast exams in terms of the positive consequences of performing self-exams versus the negative consequences not performing self-exams. They find that women are more likely to perform self-breast exams when the negative consequences of not performing self-exams are emphasized. Goal framing is distinct from the other forms of framing effects because frames are used to persuade individuals toward a particular goal or behavior. Results are broadly consistent with the negativity bias, and they are analyzed by comparing behavior adoption rates.

Levin et al. (1998) review a large body of framing literature to show that their tripartite categorization of framing effects is effective in understanding the differing impacts of description frames. They conclude in their review that risky choice frames generally result in gain frames producing risk aversion and loss frames producing risk seeking. They further conclude that the effects of risky choice frames are consistent and robust across a wide range of participants and settings. Likewise, they conclude that attribute frames consistently and robustly result in positive frames producing higher evaluations and negative frames producing lower evaluations (see Janiszewski, Silk, and Cooke, 2003 for an exception to this general rule). However, they conclude that goal framing is generally weak and often ineffective in producing differences in behavior. While the majority of findings are consistent with the negativity bias (see the summary above of Meyerowitz and Chaiken, 1987), these differences are relatively small and more prone to switch, with the positive consequences of an action having a more persuasive effect than the negative consequences. Levin, Gaeth, Schreiber, and Lauriola (2002) provide empirical support for these conclusions by performing power analyses on the three types of

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<sup>3</sup> While Levin et al.'s (1998) table emphasize the rating of the individually framed item, attribute framing research also includes the consideration of multiple framed characteristics or attributes in a single decision context and how these framed attributes impact the overall rating or decision (Dunegan, Duchon, and Ashmos, 1995; Rutledge, 1995b).

framing effects. They find that while risky-choice and attribute frames produce reliable and robust results, goal frames fail to produce significant differences.

### *2.2.2 Typology of Framing Effects & Accounting Research*

The Levin et al. (1998) categorization of framing effects has proven beneficial in clarifying the framing literature. The value of their review can be seen in the recognized need to clarify differing types of framing manipulations (van Schie and van der Pligt, 1995; Kuhberger, 1998), and empirical analysis that supports their conclusions (Levin et al., 2002). In addition, the widespread adoption of their framework in the framing literature also verifies the value of their work (Chang, Yen, and Duh, 2002; Hasseldine and Hite, 2003). Framing effects have been considered extensively in the accounting domain. Researchers have considered the impact of frames in managerial accounting, taxation, and auditing. However, these studies have been diverse in terms of manipulations and findings. While my review of the framing literature in the accounting domain is based primarily on the findings in each primary field, the tripartite categorization of risky-choice framing, attribute framing, and goal framing will be adopted throughout.

Framing effects in the field of managerial accounting includes all framing types (risky-choice, attribute, and goal framing). However, Chang, Yen, and Duh (2002)<sup>4</sup> correctly conclude that the majority of this research considers risky-choice framing effects. The risky-choice framing research in accounting has focused on understanding and mitigating escalation of commitment (see Capital Budgeting review above). Sharp and Salter (1997) find that gain and loss frames based on prospect theory better explain the international generalizability of escalation of commitment than does agency theory, and Chow et al. (1997) provide some support for the Sharp and Salter (1997) findings with moderately significant differences between gain and loss frames when considering another international subject pool's tendency to escalate on commitment. Rutledge, along with Harrell, (Rutledge and Harrell, 1993; Rutledge and Harrell, 1994; Rutledge, 1995a) find frames can be used to moderate the effect investment responsibility has on escalation. They conclude that responsibility and negative frames cause increased

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<sup>4</sup> Chang, Yen, and Duh (2002) also analyze risky-choice framing effects. They seek to better understand the theoretical reason for these effects by considering alternative psychological explanations. Specifically, they consider prospect theory, probabilistic mental models, and fuzzy-trace theory. By varying the strength of the frames attached to the risky and certain choice options, they conclude that fuzzy-trace theory best explains the occurrence of risky-choice framing effects.

escalation, but that positive frames can reduce the impact of responsibility on escalating behaviors<sup>5</sup>. While Rutledge focuses on escalation of commitment with risky-choice framing, he also considers the impact attribute frames have on recency effects in operational budgeting decisions (Rutledge, 1995b). Rutledge analyzes participants' beliefs about satisfying sales budget expectations, and he manipulates information order and information attribute frames. Information order is manipulated by either presenting the two positive information items first or last, and information frames are either consistent or inconsistent with the information order. In the consistent form, positive information is presented first and all information items are framed positively. In the inconsistent form, positive information is presented first and all information is framed negatively. This pattern is reversed for the presentation of negative information. His results show that information frames presented in an inconsistent manner completely moderate recency effects due to information order. Finally, Luft (1994) considers goal framing in employee incentive contract adoption. She finds that incentive contracts emphasizing bonuses rather than penalties result in increased willingness to adopt, and in addition, when past performance is considered based on memory, she finds that the preference for the bonus language (positive goal frame) increases with experience.

Auditing research primarily considers attribute framing. Kida (1984) was the first to analyze attribute frames in the auditing domain, and he did so by analyzing auditors' hypothesis frame. Kida's research shows that manipulating the question frame in a going concern decision directly impacts memory recall and evidence ratings. Subjects were asked to assess either the company's chance of remaining viable or failing (starting bankruptcy proceedings). While he finds no decision differences between the groups, the auditors in the 'viability' frame recalled more positive information cues than those with the failure frame. Trotman and Sng (1989) also consider the hypothesis frame in a going concern decision, but only consider evidence recall and

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<sup>5</sup> The Management/Organizational Psychology literature expands this consideration by analyzing attribute framing in a continuing investment task. Dunegan and colleagues (Dunegan, 1993; Dunegan et al., 1995) show that attribute frames attached to past manager performance and past group performance impact the level of continued investment in predicted directions. Positive frames cause larger continued investment and negative frames cause smaller continued investments. However, this research focuses primarily on students (one of three studies use managers), and no traditional accounting information is provided or framed. Hence, this research is considered relevant for the current study for its consistent findings with the vast body of prior attribute framing research (see Levin et al. (1998) for a review), however, it is not considered conclusive with regards to the impact attribute frames have on accounting data in capital budgeting decisions.

ratings. They find differences in information ratings only when the financial indicators are positive<sup>6</sup>. O'Clock and Devine (1995) also analyze the going concern decision with attribute frames; however, they analyze the impact of framing potential decision outcomes. They frame two potential outcomes of including an explanatory paragraph and two potential outcome of excluding an explanatory paragraph. Specifically, they frame the chance of winning or losing a lawsuit initiated by shareholders when the explanatory paragraph is excluded, and winning or losing a lawsuit initiated by the client when the explanatory paragraph is included. They also frame the chance of keeping or losing the client with the explanatory paragraph excluded and included. They find that auditors at regional and national firms modify their explanatory paragraph decisions based on decision outcome attribute frames, but there were no differences for Big Six auditors. Emby (1994) analyzes auditor internal control decisions by asking auditors to assess internal controls and determine the appropriate amount of substantive testing. The auditors were specifically asked to assess either internal control risk or internal control strength. He finds that auditors in the negative 'internal control risk' frame rated internal controls lower and assigned a higher amount of substantive tests, while those in the positive 'internal control strength' frame assessed controls as less risky and decreased the amount of substantive tests. These results include small and medium-sized CPA firms, and Emby and Finley (1997) find that framing effects are also observed for Big Six auditors. The above research suggests that decision question framing affects the information used in making decisions, consistent with confirmation bias (Kida, 1984). When the decision question is framed positively, subjects focus on evidence that confirms the hypothesis and this results in more positive decisions. Mueller and Anderson (2002) provide additional support for this conclusion. They analyze auditors' analysis of analytical procedures with the use of a decision aid. The decision aid provided potential explanations for account fluctuations, and the auditors were asked to either eliminate irrelevant decision aid cues or include relevant decision aid cues. They predicted and found that the auditors used different decision aid information sets based on the decision question frame.

Framing effects have also been analyzed extensively with regards to taxpayer compliance. The taxation researchers have also considered all the frame types (risky-choice,

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<sup>6</sup> Kida (1984) and Trotman and Sng (1989) also include framing manipulations in task instructions to induce a 'hypothesis frame' throughout the entire task. However, the work of Mueller and Anderson (2002) suggest that framing decision questions only also results in biased information sets.

attribute, and goal framing), but the primary focus has been on risky-choice framing effects. This research has concluded that withholding position (refund or payment) results in gain (refund) or loss (payment) frames, and taxpayers and preparers are more risk seeking (more likely to recognize questionable deductions/income) in loss domains (Schepanski and Shearer, 1995; Kirchler and Maciejovsky, 2001; Schmidt, 2001). However, interesting findings have also emerged from goal framing (Newberry et al., 1993; Hasseldine and Hite, 2003). Newberry et al. (1993) analyze the willingness of tax preparers to recognize questionable deductions based on their history with the taxpayer. Consistent with the endowment effect, they find that taxpayers are more willing to recognize the deduction for a past client than for a potential client. Hence, they are more willing to sacrifice a gain than sustain a loss. Hasseldine and Hite (2003) consider the ability of persuasive messages to encourage tax compliance. They frame the consequences of complying with IRS demands and the consequences of not complying. While they find no main effect for goal framing effects, they do find a significant gender by frame interaction. Their results suggest that men have greater tax compliance with negative consequences and females have greater tax compliance with positive consequences. Finally, Christensen and Hite (1997) consider attribute framing, but find no attribute framing effect. They frame the likelihood of winning or losing in a IRS audit challenge, and find it has no effect on taxpayers decisions about recognizing ambiguous deductions or income.

This review clearly shows the importance of framing effects in the various specialties of accounting. While much research has been done, many questions remain unanswered. The current study analyzes the effects attribute frames have on accounting information in capital budgeting decisions. In the next section I further analyze attribute frames and attempt to distinguish between various accounting studies that have considered attribute frames.

### *2.2.3 Attribute Framing & Accounting Decisions*

Levin et al. (1998) define attribute framing as the presentation of an equivalent decision characteristic (attribute) either positively or negatively. They further suggest that this is the simplest form of framing, and advantageous for developing a theoretical understanding of how descriptive valence impacts decisions (158). Based on their review, Levin et al. conclude that attribute framing effects are robust and the most consistently predictable of all framing effects. They find that positive attribute frames result in more favorable evaluations or choices, while

negative frames result in less favorable evaluations and choices. While this explanation and the results of attribute frames seem straight forward, the relatively broad definition allows for various framing manipulations within the category of attribute framing effects. Accounting research has analyzed three types of attribute framing effects, and these effects are largely unrelated theoretically.

Accounting research has analyzed the impact of attribute frames on decision questions, decision information, and decision outcomes. To better understand the distinction between these types of attribute frames, an example of each is provided below (see Example 3). Note that the example displays decision question frames (1a & 1b), decision information frames (2a & 2b), and decision outcome frames (3a & 3b).

Decision questions determine how the decision maker approaches the decision task. When considering 1a and 1b from Example 3, it is clear that the decision maker either considers the likelihood that a project will succeed or the likelihood that a project will fail. Note that these frames are developed or given before any decision relevant information is considered. Decision information includes the individual information items the decision maker assesses in coming to an overall evaluation or choice. Example 3, 2a and 2b give framed examples of one piece of decision information (obviously, the decision maker will generally consider more than one item in coming to an overall decision). When framed, decision information focuses the decision maker on either the positive or negative aspects of the decision information item. When making a decision, the decision maker is generally confronted with consequences of his/her decision, or decision outcomes. Decision outcomes include the consequences of a decision choice. It is important to note that while decision outcomes are consequences of a decision, they are not directly relevant to the decision maker's evaluation or choice. So, while the decision outcome may affect the decision maker, normatively speaking it should not change the decision maker's judgment concerning the decision task in question. Consider 3a and 3b in Example 3, a possible promotion should not increase the decision maker's assessment of the project's likelihood of succeeding, though project success may be beneficial for the decision maker. When a decision outcome is framed it increases the decision maker's awareness of either the positive or negative aspects of the possible decision consequence(s). Table 3 summarizes each of these focal studies below, along with the frame manipulation used and the most likely theoretical justification.

In addition to framing different aspects of the decision, studies analyzing these decision attribute frames suggest different theoretical explanations for observed results (see Table 3, p. 32). Kida (1984) is a good example of attribute frames attached to decision questions. He frames a going concern decision by asking auditors whether a company will remain viable or fail within two years. Kida (1984) finds limited support for confirmation strategies, as auditors in the viability question frame recall more positive firm information, but there was no difference in the amount of negative information considered by the two groups. This research suggests that decision question frames manipulate the type of information the decision maker considers. In other words, the viability frame generally causes the auditor to focus more on viability cues/ less on failure cues, and the failure frame generally causes the auditor to focus more on failure cues/ less on viability cues. Mueller and Anderson (2002) provide additional support for this conclusion, as they find that auditors develop different information sets based on the question frame. Auditors asked to eliminate unnecessary decision aid information developed a different list than auditors asked to include necessary decision aid information. Therefore, it seems reasonable to conclude that when question frames have their usual impact, they result in different information sets. The information set with the positive question frame includes more positive information cues and fewer negative information cues, and the information set with the negative question frame includes more negative information cues and fewer positive information cues.

Rutledge (1995b) is the only study in the accounting literature that analyzes decision information attribute framing effects. This study analyzes operational budgeting decisions, and shows that framing these information cues can serve to mitigate recency effects. This study presented budget relevant information items, including a 10% reduction in operating costs, 8% increase in sales, a possible labor strike, and a necessary 3 – 5% reduction in sales price due to competitive pressures. These information items were then framed based on the likelihood that they would occur. While the focus of Rutledge (1995b) is not on the biasing potential or theoretical reasoning for attribute framing effects on decision information, this manipulation is equivalent to the work done by Levin and colleagues. Therefore, Levin et al.'s (1998) Associative Model appears to be the most reasonable theoretical explanation.

O'Clock and Devine (1995) consider attribute framing when dealing with decision outcomes. They frame the chance of winning or losing a lawsuit initiated by either the client or investors, both these potential outcomes were included in each task by contrasting the potential

outcomes of including an explanatory paragraph with the potential consequences of excluding an explanatory paragraph. They also framed the chance they would keep or lose the client in both scenarios. They find that regional and national firm auditors adjust their opinion modification decision; however, Big Six auditors did not. In explaining this difference, O’Clock and Devine (1995) note the competitive nature of the accounting environment and suggest that this environment may force all but the largest firms to be less conservative with their audit opinions. If their suggestion is correct, then decision outcome frames impact decision makers by causing an adjustment in their decision thresholds. That is, if a costly consequence is framed either positively or negatively, the auditor may modify the amount of evidence necessary before allowing the potentially damaging decision. So, if the possibility of losing a client is considered, the auditor may require more evidence of financial failure before choosing to include a going concern modification, whereas the possibility of keeping a client may decrease the amount of failure information necessary. Based on this theoretical explanation, the reverse should be true for situations where an auditor is faced with the possibility of losing versus winning a civil case against investors<sup>7</sup>. While a threshold adjustment seems possible, there is no research in this area that analyzes the theoretical antecedents of decision outcomes attached to attribute frames, and therefore, other theoretical explanations must be considered. For instance, decision outcome frames may impact decision makers in a way consistent with question frames. Consistent with confirmation bias, differently framed consequences may cause the auditor to focus on different information sets. If the threat of losing an investor civil case is considered, the auditor may consider more company failure cues and fewer company viability cues. Clearly, these theoretical options do not exhaust the possible theoretical reasons for decision outcome attribute framing effects; however, each seems feasible and choosing between them allows for contrasting the three types of attribute framing effects: decision questions, decision information, and decision outcomes.

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<sup>7</sup> It is interesting to note that these two scenarios were rated as the most influential outcomes based on auditor opinions. Specifically, if an explanatory paragraph is included and the client remains viable, the most influential (damaging) consequence is the loss of the client. Conversely, if the explanatory paragraph is excluded and the client fails, the most influential (damaging) consequence is a lawsuit by investors.

Based on this review of the attribute framing research in accounting, the current study will analyze decision information attribute frames. The choice to analyze this particular framing effect is based on important differences between decision information attribute frames and either decision question or decision outcome attribute frames. First, there are generally more decision information items in a single decision than there are decision questions or decision outcomes. This could result in greater biasing potential, so it is important to understand how these frames effect accounting decisions. In addition, while there may be more than one decision outcome for any accounting decision, often these outcomes are not salient and they are generally not relevant to the decision. Second, the theoretical framework for framing decision information items is different than those proposed for decision questions and decision outcomes. Levin et al.'s (1998) Associative Model predicts that framed decision information is an encoding bias. That is, the meaning and interpretation of the information is manipulated, not the information set used. Decision information attributes will be individually evaluated, and while these evaluations can vary in complexity, generally the items will be assessed on a scale ranging from good to bad (Fiske and Taylor, 1991). Levin et al. (1998) propose that the evaluation of these information items will be consistent with their descriptive valence. This results in positively framed information items being evaluated favorably and negatively framed information items being evaluated unfavorably. Third, Rutledge (1995b) is the only study to specifically analyze the impact this encoding bias has on accounting information. Rutledge shows that information item frames can be used to moderate recency effects in a managerial accounting setting, however, no attempt is made to measure the biasing effect of information item frames. Therefore, the biasing potential of decision information attribute frames is still unexplored in the accounting domain. Finally, past research has made important predictions about the interpretation and use of accounting information (Kida and Smith, 1995), these predictions can be utilized to develop a greater understanding of the interpretation of accounting data and framing effects, and most importantly for the current study, for the interpretation of interactions between accounting data and attribute frames.

### 2.3 Affect & Accounting

This category analyzes the definition and general findings concerning affect in the psychology and organizational literatures. In addition, I consider the importance of evaluative

reactions in the accounting domain, and how evaluative reactions have been used to understand framing effects.

### *2.3.1 Affect*

Affect has received substantial attention in recent judgment and decision making research (Mitchell and Beach, 1990; Keren, 1996; Mellers, 2000). Many researchers have commented on the need to incorporate affect into models of judgment (Keren, 1996; Loewenstein, 1996; Strack and Neumann, 1996; Finucane et al., 2000; Mellers, 2000), and theoretical models like affect-as-information (Schwarz, 1990), the affect infusion model (Forgas, 1995), and values, attitudes, and moods (George and Jones, 1997) have been proposed to better define how affect impacts the overall decision process. Affect is a term used to refer to a wide range of moods, emotions, and evaluations (Fiske and Taylor, 1991). Moods are relatively enduring general affective states that are not attached to any specific target or object. Emotions are complex, intense, and short-lived affective reactions to a specific target or object. Examples of these feelings include anger, fear, joy, and excitement (Fiske and Taylor, 1991). Finally, evaluations are defined as simple positive or negative reactions to a specific target.

### *2.3.2 Affect & Organizations*

The presence and influence of affect in an organizational setting has been verified in many ways (Forgas, 1995; Forgas and George, 2001; Brief and Weiss, 2002). Research has shown that affect can impact outcomes at both the individual and organizational levels. When considering organizational outcomes, research has shown that affect can influence organizational spontaneity, worker motivation, and worker performance. Katz (1964) defines organizational spontaneity, or voluntary extra-role behavior (George and Jones, 1997), as helping co-workers, protecting the organization, making constructive suggestions, developing oneself, and spreading goodwill. While these behaviors are not generally defined or required by organizational roles, the willingness of employees to partake in these behaviors greatly benefits an organization in attaining its goals. George and Brief (1992) propose a model that incorporates affect and organizational spontaneity, and they suggest that positive affect is likely to be positively related to organizational spontaneity. Empirical research has broadly supported this proposal, as multiple studies show that workers in positive moods tend to show higher levels of helping

(prosocial) behavior and coordination (Isen and Baron, 1991), both individually (George, 1991) and in groups (George, 1990). In addition, good moods promote greater generosity, openness, and flexibility in cognitive style (Fogas, 1999a, 1999b; Fiedler, 2000).

George and Brief (1996) propose that positive affect also plays an important and facilitating role in both distal and proximal motivation, and research on affect and worker performance have broadly supported their beliefs. Staw and associates (Staw and Barsade, 1993; Staw, Sutton, and Pelled, 1994; Wright and Staw, 1999) broadly find that good moods lead to higher levels of performance (Brief and Weiss, 2002). Staw et al. (1994) and George (1991) find that positive moods lead to higher performance ratings by superiors in hospital, manufacturing, and service settings. In addition, Oldham, Cummings, Mischel, Schmidtke, and Zhou (1995) find that reducing negative affect also predicts higher levels of performance. Taken together, this research suggests that affect influences worker behavior in the organization by impacting prosocial behaviors (i.e., organizational spontaneity), motivation, and performance.

Research has shown a complex relationship between affect and individual outcomes; this research has analyzed the role of affect in negotiation, creativity, and judgment. Negotiations have been found to improve when negotiators are in positive moods. Specifically, researchers find that positive affect results in more ambitious expectations and goals, more cooperative and integrative action plans, a greater breadth of creative solutions, greater confidence in negotiation outcomes, and greater benefits in final negotiation outcomes (Baron, 1990; Pruitt and Carnevale, 1993; Forgas, 1998a). Positive affect has also broadly resulted in more creative problem solving. This conclusion has been justified in the laboratory (Isen, 1999) and in the field (Estrada, Isen, and Young, 1997). However, the impact of affect on creativity has been shown to be context-specific, as George and Zhou (2001) find that negative moods can facilitate creativity when feedback is lacking. They propose that this contrary finding is due to the impact affect has on the interpretation of job performance. In the absence of feedback, negative moods result in less security in job performance and therefore, greater motivation to improve, whereas positive moods result in greater security in job performance and less motivation to improve.

Research on affect and judgment further highlights the complexity and sensitivity of positive and negative feelings in the workplace. As was previously stated, positive affect generally leads to higher supervisor rating of employee performance, however, research on affect and judgment suggests that this may partially be due to inferior supervisor evaluations. Sinclair

(1988) finds that subjects in positive moods rate performance higher due to mood congruence. Positive moods cause increased memory associations with positive information, and these positive memory associations result in higher performance ratings. Sinclair's (1988) results also show that people in negative moods provide more accurate performance ratings, and this result is consistent with research suggesting that individuals in negative moods are less susceptible than individuals in positive moods to judgment bias (Forgas, 1998b).

Research on affect is also complex when considering subordinate response to performance feedback. Hammer and Stone-Romero (1996) find that mood congruence is an important determinant in understanding employee responses to performance feedback. They find that those with negative moods better receive negative feedback, and those in positive moods better receive positive feedback. Mood congruence has also been shown with task characteristics and job/task satisfaction. Employees in positive moods are more satisfied with their responsibilities, while those in negative moods are less satisfied (Kraiger, Billings, and Isen, 1989; Brief, Butcher, and Roberson, 1995). However, Trope, Ferguson, and Ragunathan (2001) find that positive affect acts as an emotional buffer when confronted with negative feedback. This allows employees to better adjust to the negative feedback and use it constructively. The counterintuitive findings of affect congruence and differential affective effects on judgments have resulted in more integrated theories of cognition and affect like the Affect Infusion Model (AIM, Forgas, 1995) and Values, Attitudes, and Moods (VAM, George and Jones, 1997). These models attempt to explain when and how affect will impact judgments and decisions, and while summaries of the affect literature can be harmonized within these frameworks, specific empirical analysis of the models is limited. However, accounting research has recently recognized the importance of affect and this research helps to understand the impact affect can have on accounting decisions and contexts.

### *2.3.3 Affective Reactions & Accounting Decisions*

Accounting researchers have recently given serious consideration to the impact affect has on decision makers. This research has focused primarily on two forms of affect, emotional reactions (Kida et al., 2001; Battacharjee and Moreno, 2002; Moreno et al., 2002) and evaluative reactions (Kida and Smith, 1995; Kida et al., 1998). Kida et al. (2001) show that emotion plays an important role, along with cognition, in capital budgeting decisions, and they warn that both

emotion and cognition must be considered when analyzing decision effectiveness. They show that interpersonal relationships can elicit emotional reactions and these reactions are considered valuable and useful in the capital budgeting decision process. Moreno et al. (2003) extend this finding by showing that affective information overshadows gain/loss frames in a risky decision scenario. As the traditional finding of economic gains eliciting risk aversion and economic losses eliciting risk seeking reverse due to positive or negative emotional reactions.

Bhattacharjee and Moreno (2002) show that affective information also impacts inexperienced auditors. They analyzed irrelevant emotional reactions and find that while experienced auditors are able to ignore this irrelevant emotional information, inexperienced auditors are unable to do so.

Kida and associates have also considered the impact of evaluative reactions in accounting. Kida and Smith (1995) propose a numerical information-encoding framework based on evaluative reactions. They propose that numerical information is encoded in multiple forms, with evaluative reactions being the most durable and retrievable. Specifically, they argue that accounting data is cognitively considered and encoded as a verbatim numeric item, a quantitative comparison between the accounting item of interest and a relevant reference value, and an evaluative reaction based on this quantitative comparison. In other words, while accounting information is encoded verbatim, it is not generally used this way. Rather, the verbatim information is assigned an evaluative score (ranging from very good to very bad), and this evaluative score (or reaction) is used in making relevant decisions<sup>8</sup>. Kida et al. (1998) show that evaluative reactions – or evaluative scores – are more retrievable than numerical values and comparisons, and they further show that in some situations these evaluative reactions can have a detrimental effect on decisions. This research suggests that affect plays a prominent role in many accounting decisions. Mercer (2005) highlights the importance and generalizability of Kida and Smith's framework. She analyzes management disclosure decisions and the impact these decisions have on investors' perceptions of management's reporting credibility. Mercer proposes and finds that disclosure forthcomingness is recognized and valued by investors in the short-term. However, based on the work of Kida and Smith (1995), she argues that long-term

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<sup>8</sup> Kida and Smith (1995) note that verbatim information may be remembered and used in a decision, but generally this occurs only when the decision maker's goal clearly requires for verbatim recall. In other words, unless the verbatim quantity of an accounting figure or the verbatim comparison of accounting quantities are relevant decisions will be based on the evaluative score assigned to the quantity or quantitative comparison.

memory is based on the information's most pronounced evaluative reaction. Because of this, the evaluative reaction to disclosure forthcomingness is mitigated by the evaluative reaction to the disclosure information's valence (i.e., is the information positive or negative). Her findings suggest that relevant and meaningful information is ignored over the long-term because assessments are based on evaluative reactions, as the evaluative reaction to the forthcomingness of the disclosure is ignored because of the evaluative reaction to the valence of the disclosure information. This work also shows the importance of understanding how interactions between evaluative reactions impact accounting decisions. The current proposal continues this type of analysis by analyzing the integration of multiple evaluative reactions at a single point in time (rather than short-term versus long-term). Specifically, this study analyzes how the evaluative reaction to accounting data, as proposed by Kida and Smith (1995), is impacted by an additional and independent evaluative reaction based on an attribute frame (description), and how this integration impacts accounting decisions and judgments.

#### *2.3.4 Affect & Attribute Framing*

Levin et al. (1998) describe attribute frames and their effects in terms of automatic<sup>9</sup> evaluative reactions. They call their theoretical explanation the Associative Model. Based on this explanation they argue that positive and negative frames cause valence consistent associations in memory, which impacts information encoding in a valence-consistent way. Specifically, they argue that positive frames cause positive associations in memory (i.e., describing an item in terms of success causes memory associations with other past events that were successful), and this associative effect results in more positive evaluative reactions and encoding. This explanation is consistent with evaluative priming effects, and Levin et al. (1998) specifically argue that attribute frames are like primes that are attached to, rather than peripheral to, the target stimuli (166). Several studies by Levin and colleagues indirectly support this conclusion (Levin, Johnson, Russo, and Deldin, 1985; Levin and Gaeth, 1988), but Levin et al. (1998) specifically test their Associative Model. They ask subjects to rate positive and negative words presented in alphabetical order after reading each of four scenarios with attribute framing

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<sup>9</sup> Automatic is used in this paper to describe a reaction that is not purposeful or intentional. When presented with an attribute frame, decision makers do not knowingly focus on positive memory associations. The strong link Levin et al. (1998) make between priming and attribute framing further clarifies this assumption, as priming mechanisms are generally peripheral and often suboptimal, and therefore, their impact on the decision maker is automatic.

manipulations. They then sum the ratings for positive words and subtract the amounts for negative words to develop what they call an Associative Valence Index (AVI). They find that the AVI is significantly higher for individuals receiving the positive attribute frame, and take this as direct evidence for their Associative Model. This is taken as additional support that attribute frames are similar to evaluative primes. They state, “the prime sets up an ‘evaluative tone,’ which determines whether positively or negatively valenced knowledge is accessed during the impression formation process (Wyer and Srull, 1989)” (166,167). Levin et al.’s (1998) Associative model and the connection between attribute frames and priming strongly suggests that attribute frames result in evaluative reactions (or evaluative tones) that impact the interpretation and encoding of information. Taken together with the research of Kida et al. (1998), this research suggests that accounting information described with attribute frames results in two evaluative reactions, one to the information description (attribute frame) and one to the information content (accounting data).

#### 2.4 Framing Effects, Accounting Decisions, & Ambiguity

The current study seeks to analyze the ability of accounting data to moderate the effects of attribute frames. While framing effects have been researched extensively, relatively little research has specifically analyzed the moderation of attribute framing. The current study develops a rationale for moderating these effects by considering the literatures on risky-choice framing effects, priming and other related mechanisms, and accounting decisions. Based on a review of these literatures, it is predicted that attribute framing effects will be dependent upon the valence (e.g., positive, neutral, negative) of the evaluative reaction to accounting data. Specifically, attribute framing effects are only expected when accounting data is ambiguous, creating a neutral or moderate evaluative reaction.

##### *2.4.1 Risky-Choice Framing & Ambiguity*

Research has shown that risky-choice framing effects have many mitigating factors (Fagley and Miller, 1990; Miller and Fagley, 1991; Fagley and Miller, 1997). Many researchers have suggested that one of these mitigating factors is the level of ambiguity related to a risky-choice. Schoorman, Mayer, Douglas, and Hetrick (1994) find that framing effects only occur when information is limited. In other words, if there is ambiguity (uncertainty) relating to the

decision choice, framing effects are more likely to occur, and if there is more information and less ambiguity, framing effects are less likely to occur. Reyna and Brainerd (1991) provide similar results. They vary the specificity of information provided concerning a risky-choice. Specifically, they systematically replace percentage information with more general labels, such as 'some' or 'many'. They find that framing effects are strongest when information is the most subjective or ambiguous. In other words, framing effects are largest when all percentage information is replaced with qualitative modifiers. Frisch (1993) indicates a general agreement with the suggestion that ambiguity can play an important role in framing effects. She notes that if decision makers are indifferent about the choices presented, minor modifications in wording are likely to impact their choices. This research suggests that as ambiguity relating to a decision increases – or certainty/clarity decreases – framing effects become larger.

Wang (1996) extends this line of research by focusing on the decision maker's risk preference. He suggests that risky-choice framing effects only occur when there is an ambiguous risk preference. In other words, if the decision maker has a high or low preference for taking risks, framing effects will not occur. However, if there is neither a high or low preference for risk taking, framing effects will be large. Wang (1996) defines variations in risk preferences based on aspiration levels. A decision maker's aspiration level is the minimum requirement or return in a specific decision. He notes that different decision contexts result in different aspiration levels, and therefore, more or less ambiguous risk preferences. He finds that life – death framing choices show a greater risk seeking tendency than asset-based choices and that risk preference generally augments framing effects, but he does not directly test the impact risk preference has on the existence of risky-choice framing effects. Zickar and Highhouse (1998) continue this line of research by analyzing risky-choice framing effects via item response analysis. They specifically consider the impact risk preference has on the size of risky-choice framing effects, and support Wang's (1996) contention that framing effects will only occur when risk preference is ambiguous. They find no framing effects when risk preference is either high or low, but find strong framing effects when risk preference is moderate or ambiguous. Taken together this research suggests that risky-choice framing effects are dependent on decision ambiguity. In general, risky-choice framing effects are larger when the decision context involves ambiguity, and specifically, risky-choice framing effects only occur when risk preference is moderate or ambiguous.

#### *2.4.2 Priming Mechanisms & Ambiguity*

While the conditionality of risky-choice framing effects on ambiguity provides some basis for predicting ambiguity as a moderator of attribute frames, more support can be found in priming research. Levin et al. (1998) specifically relate attribute frames to priming mechanisms; therefore, moderating effects for priming mechanisms are likely to moderate attribute framing effects. Fiske and Talyor (1991) review the priming literature and conclude that ambiguous information is well suited for assimilation to a priming mechanism, while unambiguous information is not. Prime assimilation is the process of a stimulus or target adopting the valence of the priming mechanism. Fiske and Taylor (1991) note that while ambiguous information is consistently and predictably impacted by primes, unambiguous information often prevents or reverses priming effects. Basic research on linguistic priming also infers this relationship. Ashcraft (1994) reviews this research and finds that linguistic primes are very powerful when the target is an ambiguous word (i.e., words with dual meaning: bank); however, the impact of a linguistic prime is heavily influenced by the dominance of available word meanings. In other words, if one meaning is clearly more prevalent (i.e., dominant or unambiguous), linguistic primes will generally not activate alternative meanings.<sup>10</sup> This research suggests that priming mechanisms are heavily influenced by the ambiguity of the target information.

While the priming research broadly supports an important role for ambiguity, specific studies also strongly support this relationship. Bettman and Sujan (1987) consider the ability of primes to impact expert decision makers when making product comparison decisions between either compatible products (same type: camera) or incompatible products (different types: camera versus computer). They predict and find that priming mechanisms only affect decision makers when the comparison is incompatible. That is, when the comparison is unambiguous (compatible) the priming mechanism had no impact on the decision process; however, when the comparison was ambiguous (incompatible) the priming mechanism had the predicted effect. Hoch and Ha (1986) come to a similar conclusion when dealing with product advertisements (acting as a prime) and product quality. They find that when a decision maker is given

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<sup>10</sup> Simpson (1984) notes that the activation level of the linguistic prime is dependent on two factors: the dominance of the available meanings and the strength of the priming context. If word usage is such that one meaning is dominant, then primes will not be as effective in activating other meanings. However, contexts that clearly and thoroughly bias the listener to the alternative meaning will still result in activation.

unambiguous evidence relating to product quality, advertisements have no impact on the decision maker. However, when the evidence provided is ambiguous, product advertisements powerfully influence the decision maker's assessment of product quality. This research again suggests that information ambiguity is likely to act as a moderator for attribute framing effects. Specifically, when ambiguity is high attribute frames will be powerful; however, when ambiguity is low attribute frames will be weak.

#### *2.4.3 Accounting Decisions & Ambiguity*

The current study seeks to clarify the impact attribute frames have on accounting information and decisions. It is therefore important to analyze the impact ambiguity has on these decisions. It has been shown that information ambiguity is an important moderator for both risky-choice framing effects and priming mechanisms, and research in accounting continues to support a moderating role for information ambiguity. Information ambiguity research in accounting has focused on the auditing context, and overall this research suggests that ambiguity serves to accentuate decision bias. Johnstone et al. (2001) review past auditing literature while proposing a framework for independence risk and suggest that independence risk is only a concern when dealing with ambiguous decisions. They specifically note that when dealing with unambiguous information and decisions, auditors are largely shielded from independence risk. Individual research findings also support an important role for information ambiguity. Trompeter (1994) considers auditor decisions when Generally Accepted Accounting Principles (GAAP) allows a small, moderate, or large number of reporting alternatives, and finds that auditors are less likely to require a downward adjustment in the moderate and large alternative cases when compared to the low alternative case. Salterio and Koonce (1996) consider auditor decisions when authoritative pronouncements do not exist. Specifically, they analyze the impact of consistent versus inconsistent prior precedents on auditors' agreement with client's positions. They find that if precedents are consistently supportive or unsupportive of the client's position, auditors base their decision on the prior precedents and not on the client's position. However, when prior precedents are inconsistent (i.e., mixed) auditors tend to favor the clients position. Hackenbrack and Nelson (1996) show that auditors actually use ambiguity based on the level of engagement or litigation risk. Specifically, they find that if engagement risk is high, auditors require conservative reporting in the face of an ambiguous standard, however, if engagement risk

is only moderate, auditors allow aggressive reporting and justify this reporting based on an aggressive interpretation of the standard's ambiguity. Finally, Braun (2001) finds that auditors confronted with proposed adjusting journal entries (PAJE's) that are subjective or ambiguous in nature cause a greater number of decisions that are inconsistent with Generally Accepted Auditing Standards (GAAS). Specifically, they consider auditor decisions to book or waive PAJE's and manipulate the subjectivity of the auditor's task. They find that in more subjective tasks (allowance for doubtful accounts and inventory obsolescence reserves) auditors waive more material PAJE's than in less subjective tasks. The impact of ambiguity in accounting decisions is largely consistent with the implications made based on the risky-choice framing literature and the priming effects literature, namely, when there is ambiguity decision bias will occur, however, if there is little or no ambiguity, no decision bias will occur. This research again suggests that the impact of attribute frames will be dependent on whether the accounting information is ambiguous or unambiguous. If the information is ambiguous, attribute frames will bias decisions, but if the information is unambiguous, attribute frames will not bias decisions.

## 2.5 Literature Synthesis & Hypotheses

This review of the literature has shown that capital budgeting decisions are very important for an organization's long-term competitive advantage and overall success (Page, 1993; Merchant, 1997). These decisions span the entire organization and involve input from various departments and levels of management (Clancy et al., 1979; Harris and Raviv, 1998; Lynch, 2002). Research on the political paradigm of strategic decisions and manager reputation suggests that these decisions often involve political tactics such as the undermining of competition, information manipulation and distortion, and information channel disruption (Sapolsky, 1972; Pettigrew, 1973; Pfeffer, 1992; Sridhar, 1994). In addition, accounting research suggests that affective reactions can strongly impact these decisions, and that framing effects can influence managerial decisions, including the tendency to escalate on capital budgeting projects. However, no study has analyzed the impact information attribute frames have on the interpretation and use of accounting information in capital budgeting decisions.

In developing hypotheses relating to information frames and accounting data, one first must analyze the theoretical underpinnings of framing effects. Levin et al. (1998) suggest that

attribute frames impact information interpretation by manipulating the decision maker's evaluative reaction towards the information description. That is, positive attribute frames cause the decision maker to focus on the positive (or successful) aspects of the information, resulting in higher, or more positive evaluations, and negative frames cause the decision maker to focus on the negative (or failure) aspects of the information, resulting in lower, or more negative evaluations. Levin et al. (1998) further note that this evaluative reaction based on the attribute frame is similar to a priming mechanism, which immediately transfers its evaluative sign (positive or negative) to the item of interest. Based on this theoretical understanding of framing effects, and the extensive literature showing attribute framing effects in applied contexts, I expect attribute frames to impact capital budgeting decisions.

***H<sub>1</sub>**: Positive and negative attribute frames will impact capital budgeting decisions, such that capital budgeting proposals that are positively framed will receive greater support than those that are negatively framed.*

To further understand the impact attribute framing effects have on capital budgeting decisions a thorough understanding of the interpretation and use of accounting data is necessary. Kida and Smith (1995) theorize that accounting data is generally interpreted and used based on an evaluative reaction derived from a cognitive appraisal of its information content. This suggests that when the accounting data indicates a high, moderate, or low chance of success, the data will be assigned a positive, neutral, or negative evaluative reaction, respectively. Kida et al. (1998) provide empirical evidence for this claim in a memory-based investment decision by showing that managers choose investments based on the assigned evaluative score, rather than verbatim financial outcomes. Synthesizing the work of Kida et al. (1998) and Levin et al. (1998) suggests that the overall interpretation of framed accounting data results in two separate evaluative reactions, one to the information description (attribute frame) and one to the information content (accounting data).

While no research has considered the ability of evaluative reactions to accounting data to moderate attribute framing effects, research on risky-choice framing, priming mechanisms, and accounting decisions suggest that attribute framing effects may be dependent on information ambiguity. Reyna and Brainerd (1991) and Schoorman et al. (1994) show that information ambiguity serves to accentuate risky-choice framing effects. Reyna and Brainerd (1991) show that as the information included in a risky-choice decision becomes more subjective, framing effects become larger, and Schoorman et al. (1994) show that as a decision maker receives more

information regarding a decision and its context, framing effects become smaller. In addition, Wang (1996), along with others, contends that if a decision maker has an ambiguous risk preference, framing effects are likely; however, if the decision maker's risk preference is high or low, framing effects are unlikely (Schneider, 1992; Frisch, 1993). Zickar and Highhouse (1998) provide direct empirical support for this contention, and find that, indeed, framing effects only occur for those with moderate risk preferences. This research suggests that risky-choice framing effects are heavily dependent on ambiguity. Specifically, if there is ambiguity relating to the decision context, decision information, or decision maker risk preferences framing effects are likely to occur, but if there is no ambiguity, framing effects are unlikely to occur.

In addition to the risky-choice literature, priming research also emphasizes the importance of information ambiguity. Fiske and Taylor (1991) along with Ashcraft (1994) conclude that priming mechanisms have their greatest impact on ambiguous information. They note that when information can be interpreted in multiple ways, the priming mechanism is especially likely to impact the decision maker because of an increased dependence on context to define or interpret the information. They also note, however, that when primes are used with unambiguous information individuals are more conscious of the prime and better able to distinguish between the prime and the target. In these situations, priming mechanisms are often ignored and sometimes result in contrast effects (Herr, Sherman, and Fazio, 1983). Hoch and Ha (1986) further support this conclusion. They show that advertisements, acting as primes, have powerful and predictable effects on product quality assessments when evidence regarding quality is ambiguous, however, advertisements have no effect on product quality assessments when evidence is unambiguous. Considering Levin et al.'s (1998) contention that attribute frames function like priming mechanisms, this research strongly suggests that attribute framing effects will be dependent on ambiguity; such that, if the framed information is ambiguous (unambiguous) the attribute frame will have a strong (weak) effect on the information's interpretation and use.

Finally, accounting research also emphasizes a general relationship between decision ambiguity and bias. Trompeter (1994) and Salterio and Koonce (1997) find that auditors are more likely to endorse client-preferred positions when accounting pronouncements or precedents are ambiguous (i.e., mixed), however, they find the opposite result when accounting pronouncements or precedents are unambiguous. Specifically, if accounting pronouncements or

precedents are unambiguous (i.e., consistent), auditors ignore client preferences and base their decisions solely on the authoritative literature. Braun (2001) comes to a similar conclusion. She analyzes book or waive decisions for auditing tasks with varying levels of subjectivity, and finds that subjective tasks result in a greater number of waive decisions when compared to objective tasks. In developing a framework for auditor independence risk, Johnstone et al. (2001) agree with these studies and note that auditor incentives and client pressures are likely to have a greater impact on auditor decisions when accounting issues are ambiguous. They further note that in the case of unambiguous accounting issues, incentives and pressures represent a minimal threat to auditor independence. Like the research from risky-choice framing effects and priming mechanisms, auditing research suggests that decision makers' use of information is most (least) susceptible to bias when the information is ambiguous (unambiguous).

Considering the impact of ambiguous information on these diverse fields of research, ambiguous (unambiguous) accounting data is expected to be sensitive (insensitive) to attribute framing effects. When considered with the work of Kida and Smith (1995), this suggests that if the accounting data elicits a neutral evaluative reaction attribute frames will bias the interpretation and use of accounting information, but if the accounting data elicits a positive or negative evaluative reaction attribute frames will not bias the interpretation and use of accounting information. Based on the political paradigm and the persuasive tactics often involved in capital budgeting decisions, this further suggests that positive or negative descriptions of accounting information will have the greatest effect when the investment is ambiguous with regards to success or failure. However, decision makers will not be manipulated by these descriptions when the accounting information suggests a high likelihood or low likelihood of success. Overall this research implies that the impact of the information description (attribute frame) will be conditional on the evaluative reaction resulting from the information content (accounting data).

*The valence (e.g., positive, neutral, or negative) of accounting data will impact the effect of attribute frames on capital budgeting judgments and decisions such that,*

***H<sub>2a</sub>***: *Attribute frames will impact capital budgeting judgments and decisions when the investment proposal has a moderate chance of success.*

***H<sub>2b</sub>***: *Attribute frames will not impact capital budgeting judgments and decisions when the investment proposal has a high chance of success.*

*H<sub>2c</sub>: Attribute frames will not impact capital budgeting judgments and decisions when the investment has a low chance of success.*

These hypotheses were analyzed by developing an experimental task that considered both positive and negative attribute frames and positive, negative, and ambiguous investment projects. The study utilized a two (Information Frame) by three (Accounting Data) between subjects design. The next chapter, Research Methodology, delineates the research process, along with other relevant issues pertaining to the current study.

## **CHAPTER 3**

### **RESEARCH METHODOLOGY**

#### 3.1 Overview

The primary purpose of this research was to analyze the impact attribute frames have on capital budgeting decisions when investment proposals have varying likelihoods of success. To consider this issue, an experimental business task was developed. The task required participants to make funding decisions regarding a capital investment proposal. Participants were asked to read a company introduction and background and familiarize themselves with the information relevant for the capital investment decision. Participants were then told to assume the role of the investment decision maker and were informed as to the nature and purpose of the proposed investment. Then participants analyzed the accounting information provided concerning the investment proposal. These information items were presented with either positive or negative attribute frames, and the accounting data suggested that the investment was either very likely to succeed, not very likely to succeed, or neutral concerning success. Participants were then asked to make a dichotomous accept or reject decision. Following this decision, a joint-investment decision was considered. This decision required participants to consider taking on an investment partner, and assuming the acceptance of a partner, determining the portion of the investment they would fund. Finally, participants completed a memory recall task, which analyzed their recollection of the accounting information relating to the investment opportunity.

#### 3.2 Experimental Task

In developing the experimental case, the determinants of new product success were carefully considered. Researchers and writers have suggested multiple measures relevant to capital project success, and these factors can broadly be described as financial-based, production-based, and product-based indicators<sup>11</sup>. Financial-based indicators for capital budgeting success

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<sup>11</sup> Market-based factors were also considered; however, they were excluded for two reasons. First, research suggests that these factors are of less importance than one may assume. Cooper and Kleinschmidt (1987 and 1993) find that market factors have little impact on product success when compared to product pre-planning and product advantages. Second, past experience with differing market conditions could serve to indirectly drive results. In other words, market condition factors could vary significantly from subjects' reference points concerning appropriate market conditions, and therefore, be an overly powerful determinant of decisions.

generally include Net Present Value, Internal Rate of Return, and the Payback Method (Horngren et al., 2003). In addition to these general cash flow measures, other measures of investment performance are available based on accounting income; these include return on investment and residual income (Ferrara, Boer, Jeter, Steedle, and Dougherty, 1996). Production-based factors analyze the quality and efficiency of the product's production. Quality issues relating to input materials and final products are particularly important when dealing with the acceptability of new products (Brandon and Drtina, 1997). Finally, product-based factors consider the specific aspects of the product that enhance its desirability and usability for customers. These items may include product uniqueness, quality, and cost (Brown and Eisenhardt, 1995). In addition to individual indicators, more general factors like support from top management, cross-functional team consideration, and emphasizing firm competencies were also considered. All these factors were carefully considered and incorporated into the experimental case.

### *3.2.1 Background*

The experimental task first described Stevens Electronics, Inc., an electronics product producer and seller. The background included information on the company's mission, recent expansion, and the amount of total assets and annual revenues. The company introduction and background were used to emphasize the company goal of expansion and investment. All background information enforced the importance and overall corporate focus on this goal. In addition, effective product development decisions were emphasized by describing a careful and deliberate process of assessing new product opportunities by a cross-functional group of experts. Participants were told that these experts worked together to develop new product proposals that included both financial and non-financial information, and that the information in the proposals was accurate and objective. As a whole, the background provided information on the company goal of investment and diversification, as well as, the care taken by the company to assure good capital budgeting decisions.

In addition to the company background, other descriptions in the task included the participants' responsibility as an investment decision maker. Participants were also told that the capital proposal was a revenue-enhancing project focusing on new product development. The new product was described as an electronics product marketable to consumers.

### *3.2.2 Investment Cues*

The experimental task explained that multiple information items were considered for investment decisions. These information items were identified and fully described. The information items were categorized as financial information, production information, and market research information. Financial information included measures of the expected net cash flows and net income for the investment. These financial information items included Net Present Value, Payback Period, Accounting Rate of Return, and Residual Income. These items were presented in the form of likelihood assessments to account for outcome risk and information uncertainty. These information cues were selected due to the general agreement about their use in quantitatively analyzing capital proposals (Horngren et al., 2003; Ferrara et al., 1996). Production information analyzed the efficiency and effectiveness of the company's product manufacturing process, and how this manufacturing process would improve with experience (Brandon and Drtina, 1997). Specifically, participants were given information concerning the percentage of abnormal raw material waste, the rate of defective production, the percentage of employees trained in new product production, and the percentage of new product raw materials purchased from familiar suppliers. These cues were chosen because they address two key factors in product production, product quality (defective rate, employee training) and raw material quality and use (supplier relationships and abnormal waste) (Brandon and Drtina, 1997; Horngren et al., 2003). Market research information included items relating to consumer opinions and preferences concerning the product. These information items included customer opinions on product performance, uniqueness, and price, as well as, the number of consumers expected to make multiple product purchases. These cues were chosen because they are often relevant for new product development decisions (Brown and Eisenhardt, 1995) and included in new product development cases (Swayne and Ginter, 1993). All information items were described in terms of probability estimates.

### *3.2.3 Independent Variables*

The experimental task manipulated two independent variables: Information Frame and Accounting Data. Manipulating the information frame involved changing the way the information was described. When dealing with probabilistic estimates, information must be

described in terms of its likelihood to have a positive or negative outcome. The current design manipulated the information frame by describing the relevant accounting information items in terms of their likelihood of success (meeting target) versus their likelihood of failure (not meeting target). Manipulating the accounting data related to adjusting the message about the investment's likelihood of success. Accounting data concerning an investment proposal could suggest that an investment is almost certain to succeed or fail, and the data could suggest anything between these extremes. The current design manipulated the accounting data by suggesting the investment was either very likely to succeed, not very likely to succeed, or neutral with regards to success.

The information frame manipulation can be seen in Table 4 for all experimental information cues. The information in Table 4 comes directly from the ambiguous/neutral accounting data scenario. Note that all information items in Table 4 are economically equivalent across both positive and negative frames, and that positive and negative frames are consistently given for all information items. In other words, all information cues are framed (either positively or negatively), and they are all framed consistently (either all positive or all negative).

To manipulate the accounting data, three versions of the new product decision were developed: a positive, neutral, and negative scenario. In the positive accounting data scenario, all information was given a higher than 70% chance of succeeding, with an overall average of 83% success. In the neutral case most information items were between a 75% and 50% chance of succeeding, with an overall average of 65% success. And, for the negative case most information was given lower than a 30% chance of succeeding, with an overall average of 30% success. Two exceptions to this categorization should be noted, the rate of defective production and the change in abnormal waste. These items were considered important information for this capital budgeting decision, however, a defect rate of lower than 50% would likely be too strong an indicator of failure. Therefore, the defective production rate was provided as 5%, 10%, or 25% for the high success, neutral success, and low success scenarios, respectively. Similarly, the amount of remaining abnormal raw material waste did not exceed sixty percent, with 10%, 40%, and 60% of the products abnormal waste remaining for the high success, neutral success, and low success scenarios, respectively.

The development of the accounting information items for the different scenarios included many pretesting phases. First, multiple information items important for new product decisions

were identified, initially sixteen information items were considered for inclusion on the instrument. These items were analyzed with regards to their decision usefulness, clarity, and naturalness of frame manipulation. Ultimately, twelve items were chosen based on past research and capital budgeting/new product development cases. The items chosen were easily categorized into financial, production, and product characteristics, they could be briefly and clearly explained, they were relevant and useful in the decision process, and they allowed for natural and unobtrusive information frames.

Second, likelihood information concerning product success was developed to distinguish between positive, neutral, and negative data. Initially, the overall probabilities of success were determined by moving away from the extreme points of probabilistic expression (i.e., 1.0 and 0). Positive and negative items were moved approximately 30 percentage points from these extreme points, respectively, resulting in positive information items suggesting approximately a 70% chance of success and negative information items suggesting a 30% chance of success. The neutral information was given an approximate average of 50%, the mid-point between the positive and negative scenarios. To determine whether this accounting data distinguished between a positive, neutral, and negative investment, individual evaluations of the information items were collected from undergraduate accounting students. Results showed that the accounting data successfully came through as positive, neutral, or negative, respectively, with means and standard deviations of 7.44 [1.44], 5.56 [1.45], and 3.73 [1.50].

Finally, it was necessary to determine whether composite or overall judgments based on the neutral information agreed with the individual evaluations of the neutral information cues. To analyze this issue Intermediate Accounting students were asked to make overall judgments based on the neutral accounting information scenario. The results of the pretest suggested that the neutral case was judged far more negatively as an overall or composite decision than as individual item evaluations. Based on these results, the likelihood of success for the accounting information in the neutral scenario was increased, and to maintain a clear distinction between the neutral and positive case, the likelihood of success in the positive case was also increased. After the adjustments to the neutral case, overall judgments were pretested again with senior-level accounting students. The pretest results showed an increase in the overall acceptance of the neutral decision case, and this level of acceptance was deemed to be appropriate. After this pretest, three individuals with extensive managerial accounting experience were asked to

complete and critique the instrument. All three individuals were satisfied with the relevance and reliability of the information included in the scenarios. Minor modifications were suggested, and each of these suggestions was considered, and they were incorporated as was determined by the researcher.

### *3.2.4 Dependent Variables*

Two dependent variables were analyzed in the experiment, an accept/reject decision and a strategic alliance/investment sharing judgment. These dependent variables allowed for an increased understanding of the interaction between the accounting information content and description. These variables included a decision choice and an investment judgment.

Accept/Reject Decision: Participants were first asked whether they would accept or reject the proposed investment. This question was considered after subjects had reviewed the case background, task and role responsibilities, and the relevant accounting information. The accept/reject decision was considered important for the current study because capital budgeting decisions are generally dichotomous in nature (Horngren et al., 2003). This type of decision also provides greater insight into the practical concern of framing effects in applied decision contexts. While most research on attribute frames analyzes continuous evaluations (Emby, 1994; Emby and Finley, 1997), many applied decisions are dichotomous in nature, and it is therefore important to analyze the impact attribute frames have on these choices. Participants were asked to circle either “Accept” or “Reject” to indicate their choice.

Strategic Alliance Judgment: In addition to an accept/reject decision, a growing number of investments over the last two decades have been undertaken through strategic alliances (Bierly and Coombs, 2004). Strategic alliances have been defined as “partnerships between firms whereby their resources, capabilities, and core competencies are combined to pursue mutual interests in developing, manufacturing, or distributing goods or services” (Hitt, Ireland, Hoskisson, 1997: 314). Interfirm cooperation has been shown to greatly enhance competitive advantage and company adaptability in dynamic business environments by providing greater strategic flexibility via smaller resource commitments and risk reductions (Hagedoorn, 1993; Rothaermel, 2001; Bierly and Coombs, 2004). Based on the increased importance of strategic alliances, an investment sharing decision was developed. Participants were asked to consider jointly investing in the new product proposal with an investment partner. Specifically,

participants were told that a raw material supplier might be willing to provide partial funding for the project. Based on this information, participants were asked whether they would accept an investment partner, and if they were willing to jointly invest, the level of funding they would provide for the investment. Participants were reminded that the investment required six million dollars, and they were told that the investment partner might be willing to invest as much as 97.5% or as little as 2.5%. They were also asked if they would be willing to invest in the proposal if these investment partner restrictions were lifted. This variable allows for the analysis of attribute framing effects on a continuous investment decision that is relevant for real-world investment decisions.

### *3.2.5 Additional Information*

Subjects were also asked about their job title, work experience, understanding of the capital budgeting information, familiarity with resource allocation decisions, and gender. All measures with the exception of gender were used to assess the quality of the sample. Gender has been shown to moderate framing effects in psychology and accounting contexts (Fagley and Miller, 1990; Hasseldine and Hite, 2003), and this information was collected to determine whether any moderating effect occurred, assuming a relatively even distribution between gender types.

The instrument background, descriptions, information items, and all manipulations can be seen in the Appendix. The Appendix includes one example of the background, descriptions, and dependent (decision) variables, and six variations in the information items. These variations account for all configurations of the previously mentioned independent variables. The various information items are all included in the information item section of the example instrument, and they are all labeled in the following manner: Accounting Data Type\_\_Information Frame Type.

### 3.3 Participants

This study used professionals and managers familiar with resource allocation decisions and the indicators relevant for these decisions. Participants included professionals from both industry positions and full-time professional degree programs. Participants in industry positions included employees from two Fortune 500 companies, as well as, smaller domestic corporations. Participants from professional degree programs included masters-level business students from

two universities in the eastern United States. A total of 156 surveys were collected and analyzed; Table 5 shows the demographic characteristics of the sample.

These participants individually completed the experimental task, and their responses serve as the basis for testing the hypotheses proposed in Chapter 2. The Results section (Chapter 4) considers these responses and analyzes them statistically to determine the level of support provided by both dependent variables: accept/reject decisions and strategic alliance/investment sharing judgments.

## CHAPTER 4

### RESULTS

The study's proposed hypotheses were considered via statistical analysis, and this chapter presents the results of this analysis. Two dependent variables were analyzed: accept/reject decisions and strategic alliance judgments. Accept/reject decisions were considered first. These decisions were considered important because this is the most common type of capital budgeting judgment; in addition, this variable provided the greatest insight into the biasing strength of attribute frames. The variable was measured by asking participants to circle either "Accept" or "Reject" after considering the investment information. Strategic alliance judgments were analyzed second, and these judgments were considered important because of their intrinsic advantages and popularity in the business world. Participants were presented with the possibility of a joint investment and asked to specify the amount of funding they would be willing to invest in the project. In addition to these primary dependent variables, supplemental analyses were performed to consider memory recall scores, gender, and information objectivity. Taken together, these variables provided an opportunity to analyze the theoretical relationship between accounting data and attribute frames, and provided insight regarding the generalizability of attribute framing effects across various judgment/decision contexts.

The statistical analysis was conducted in five phases. First, preliminary analyses were performed to assure consistent sample characteristics across experimental conditions. Second, the two dependent variables were considered to determine the level of support provided for the proposed hypotheses. Finally, additional analyses were conducted to further clarify the primary analyses.

#### 4.1 Preliminary Analysis

The first step in the analyses included analyzing the sample to determine whether any demographic or experience/knowledge based variables varied across experimental groups. Specifically, the amount of professional experience, level of task knowledge, level of task understanding, and gender were analyzed across experimental conditions to provide assurance that these variables would not impact the experimental results. To analyze this issue each of the first three variables was used as a dependent variable in an analysis of variance with Accounting

Data and Attribute Frame representing the independent variables. These three analyses showed no differences across the six experimental groups for the experience, task knowledge, and task understanding variables. These results suggest that these factors did not vary across experimental conditions. Logistic regression was utilized to consider gender. Specifically, gender was used as the dependent variable and Accounting Data and Attribute Frame were again independent variables. No differences were found across the six experimental groups, and it was therefore concluded that gender did not vary across experimental groups.

#### 4.2 Accept/Reject Decisions

Accept/reject decisions are extremely important in capital budgeting settings. These decisions can mean large monetary commitments for long periods of time, and making sound accept/reject decisions plays a vital role in long-term organizational success. Considering the importance of these decisions, a thorough understanding of the impact of persuasive information descriptions (i.e., attribute frames) on these decisions is extremely important. This section analyzes the impact attribute frames (information descriptions) had on accept/reject decisions in the current study. First, the appropriate inferential parametric statistical procedure is identified, then the applicable assumptions are tested, and finally, the results of the appropriate statistical procedure is reported.

##### *4.2.1 Test of Assumptions: Accept/Reject Decision*

The accept/reject decision dependent variable was dichotomous in nature, and the independent variables (Accounting Data and Information Frame) were categorical. Based on the characteristics of these variables, logistic regression was deemed to be the appropriate method of analysis (Freeman, 1987). The assumptions of logistic regression are lax when compared to ordinary least square regression, however, two assumptions were considered: (1) orthogonal error terms (i.e., error terms are uncorrelated) and (2) data sparseness (i.e., having a zero cell count for either of the dichotomous dependent options [i.e., either accept or reject] in one or more of the experimental configurations).

Generally, the independence of error terms (assumption one) is considered satisfied when the experimental design is between subject, and experimental conditions are randomized. These criteria were satisfied in the current design. However, the latter assumption was found to be

problematic. The data sparseness assumption is violated if any of the experimental configurations result in zero accept or reject decisions, and one experimental configuration (Negative Accounting Data\_Positive Attribute Frame) resulted in zero accept decisions. In other words, no subject in the negative accounting data\_positive attribute frame group chose to accept the investment. While this violation prevents the interpretation of Wald statistics (analogous to t-tests for beta coefficients in OLS regression), Cohen, Cohen, West, and Aiken (2003) note that likelihood ratio statistics are not impacted by data sparseness, and these statistics were used to analyze accept/reject decisions.

#### *4.2.2 Test of Hypotheses: Accept/Reject Decision*

Frequency data concerning accept and reject decisions can be seen in Table 6. By considering the information in Table 6, it can be determined that for the positive, neutral, and negative accounting data groups there was a 12.2%, 27.4%, and -11.5% difference in accept and reject decisions, respectively. The results of a logistic regression analysis can be seen in Table 7. While Accounting Data<sup>12</sup> was highly significant, Attribute Frame was not ( $p = 0.145$ ), however, there was a significant interaction between Accounting Data and Attribute Frame ( $p = 0.021$ ). Because the current study is primary based on planned comparisons, the hypotheses were considered by analyzing multiple 2 X 2 contingency tables. This analysis allowed for the consideration of attribute frames across the overall data set, as well as the positive, neutral, and negative accounting data types individually. To analyze the data, Pearson's Chi-square with Yate's continuity correction was employed, as well as Fisher's Exact Test. These tests allow for the analysis of the current data set because applicable assumptions are based on expected cell counts, not actual counts. In addition, Fisher's Exact Test allows for dependence on these results even if the expected counts are unsatisfactory (Sheskin, 2000).

Table 8: Section A shows the Chi-square and Exact Test results for hypothesis one. Based on these results, as well as those from the logistic regression analysis, hypothesis one was not supported, as positive and negative frames did not cause a significant difference in accept/reject decisions ( $p = 0.225$  and  $0.224$ , respectively). However, Table 8: Section B shows

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<sup>12</sup> The significance of Accounting Data further confirms the effectiveness of the accounting data manipulation. Further analysis showed that the positive group had a significantly higher rate of investment acceptance than either the neutral or negative groups, and that the neutral group had a significantly higher rate of investment acceptance than the negative group.

that these tests support all levels of hypothesis two. Specifically, attribute frames had no impact on accept/reject decisions for positive (12.2% acceptance difference) and negative (11.5% acceptance difference) accounting data cases [ $p = 0.2815$  and  $0.235$ <sup>13</sup>, respectively], but attribute frames caused a significant difference in accept/reject decisions for the neutral accounting data case (27.4% acceptance difference) [ $p = 0.024$ ]. These results provide no support for hypothesis one, but provide strong support for all levels of hypothesis two.

### 4.3 Strategic Alliance Judgments

While most capital budgeting decisions are accept/reject, joint investment is becoming an important and lucrative option for many companies (Bierly and Coombs, 2004). Considering the increasing popularity of these decisions and the political nature of the capital budgeting process, understanding how positive and negative information descriptions impact these decisions could greatly enhance their effectiveness. In addition, looking at the attribute framing effects in both a decision and judgment context allows for greater insight into the biasing potential of attribute frames.

#### *4.3.1 Test of Assumptions: Strategic Alliance Judgment*

The strategic alliance judgment was continuous in nature, and the independent variables (Accounting Data and Information Frame) were categorical. Based on the characteristics of these variables, an analysis of variance (ANOVA) was chosen as the preferred inferential parametric statistic (Sheskin, 2000). ANOVA makes three primary assumptions about the underlying data: (1) orthogonal error terms (i.e., error terms are uncorrelated), (2) multivariate normality (i.e., normality of the dependent variable in each category of the independent variables), and (3) homogeneity of variance (variance in each category of the independent variables is approximately equal). Consistent with the previous analysis, the experimental design along with randomization satisfied the assumption of orthogonal error terms.

Multivariate normality was analyzed by considering various graphical displays. Based on these graphics, it was determined that multivariate normality was potentially violated. To

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<sup>13</sup> While all other pairwise comparisons are single tailed, this comparison is two-tailed because the results were not consistent with the directional hypothesis. Specifically, negative attribute frames resulted in a greater number of acceptance decisions than did positive attribute frames. Because of this inconsistency, a single tailed test could not be performed, and in such cases non-directional hypotheses are appropriate (Sheskin, 2000).

confirm this conclusion, Shapiro-Wilks tests were run on the experimental conditions and all six configurations significantly different than normal ( $p < 0.01$ ). Keppel (1991) notes that ANOVA is robust to moderate violations of multivariate normality; however, this violation may be considered extreme. The assumption of variance homogeneity was also saliently violated. Levene's test of variance homogeneity was performed, and indicated heterogeneity of variance ( $p < 0.001$ ). Keppel (1991) again suggests that ANOVA is robust to violations of the variance homogeneity assumption, however, he notes that if the largest group variance is more than three times the smallest group variance, ANOVA results can be materially biased. In the current study, the largest group variance was more than eight times the smallest group variance, and based on this assumption violation, as well as the violation of multivariate normality, a nonparametric alternative was considered necessary.<sup>14</sup>

#### 4.3.2 Test of Hypotheses: Strategic Alliance Judgment

Descriptive statistics for strategic alliance judgments across accounting data and attribute frame types are presented in Table 9. When analyzing strategic alliance judgments, analyses are based on nonparametric statistics; specifically, Mann-Whitney and Kruskal-Wallis rank tests. These tests are distribution-free, and the use of ranks greatly reduces the impact of variance heterogeneity<sup>15</sup> (Conover, 1980). Table 10 presents the results of the Mann-Whitney tests that address the specific hypotheses.

Hypothesis one predicted that attribute frames would impact capital budgeting decisions regardless of the accounting data valence. To test this hypothesis, a Mann-Whitney test was performed on the entire data set, with Strategic Alliance Judgment representing the dependent variable, and Attribute Frame (positive and negative) representing the independent variable. Table 10: Section A shows a significant difference between positive and negative frames ( $p = 0.0256$ ).

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<sup>14</sup> Strategic Alliance Judgments were also considered with a square root transformation. While the transformation failed to substantially eliminate variance heterogeneity, parametric procedures on these amounts were consistent with the conclusions based on the nonparametric analysis.

<sup>15</sup> To verify that variance heterogeneity had no impact on the statistical inferences, Welch's weighted average one-way ANOVA was employed for all continuous variables, as well as their respective ranks. In addition, a priori t-tests that did not assume variance homogeneity were employed to consider the specific hypotheses. The results of these tests were quantitatively and qualitatively similar to the nonparametric tests presented, with no change in the inferences derived from the statistical analysis.

To determine if the impact of attribute frames varied across the levels of accounting data, the Kruskal-Wallis statistic was calculated for six samples, and was highly significant ( $p < 0.001$ ). To consider hypothesis two directly, Mann-Whitney tests were used as planned comparisons to analyze the impact of attribute frames across positive, neutral, and negative accounting data. The results can be seen in Table 10: Section B, these results strongly support hypothesis two. Specifically, the impact of attribute framing was not significant for either the positive or negative accounting data cases ( $p = 0.305$  and  $0.1003$ ) supporting hypothesis 2a and 2c; however, attribute frame effects were again strong in the neutral accounting data group ( $p = 0.0239$ ) supporting hypothesis 2b. These findings support the contention that attribute frames are suppressed when the evaluative reaction towards the accounting data is positive or negative, and they further support the prediction that ambiguous accounting data is highly susceptible to attribute framing effects. Based on the performed analysis, all hypotheses (1, 2a, 2b, and 2c) were supported.

#### 4.4 Additional Analysis

In addition to the primary analysis, other variables were considered. First, memory scores were analyzed as a dependent variable. While no specific hypotheses were proposed for this variable, understanding the evaluative reactions associated with the investment decisions previously analyzed provides greater opportunity to understand attribute framing effects. Second, gender was considered as an additional independent variable. Past research has shown interactions between framing and gender, and for the sake of completeness this variable was considered in the current analysis. Finally, information objectivity was considered as a control variable. Participants were asked to assess the objectivity of the provided information after making their decisions and the impact of this variable was considered to clarify the primary analysis.

##### *4.4.1 Memory Recall Scores*

Participants were asked to complete a memory recall task. This task analyzed how favorably or unfavorably the participant recalled each of the individual accounting information items. The analysis of memory recall is consistent with Kida et al.'s (1998) use of a memory-based task to analyze evaluative reactions to accounting data. In addition, memory tasks have

also been analyzed in auditing research (Sprinkle and Tubbs, 1998; Rau and Moser, 1999; Lindberg and Maletta, 2003). Participants were given the titles of all accounting information items and asked to rate them individually in terms of favorability from -4 to 4. These ratings were then summed and averaged over all provided memory scores for each participant.

When analyzing memory recall scores the experimental design was consistent with the analysis above for strategic alliance judgments. Analysis of variance was considered, and the applicable assumptions tested. Results were largely consistent with the work previously performed on strategic alliance judgments. Specifically, Shapiro-Wilks tests showed that three of the six experimental configurations were significantly different than normal ( $p < 0.05$ ). In addition, variances were heterogeneous across groups based on Levene's test of variance homogeneity ( $p < 0.001$ ), and the largest group variance was more than eight times the smallest group variance. Based on this analysis, nonparametric statistical procedures were employed.

Descriptive statistics for memory recall scores across accounting data and attribute frame types are presented in Table 11. Consistent with the procedures followed for the strategic alliance judgments, all analyses on memory recall scores were based on Mann-Whitney rank statistics. Table 12 presents the results of the Mann-Whitney tests.

To determine if the impact of the evaluative reactions to attribute frames varied across the levels of accounting data, Mann-Whitney tests were used as planned comparisons to analyze the impact of attribute frames across positive, neutral, and negative accounting data. The results can be seen in Table 12, the impact of attribute frames was significant for the neutral accounting data group ( $p = 0.0228$ ), moderately significant in the positive accounting data group (0.0655), and non-significant in the negative accounting data group ( $p = 0.4325$ ). These findings are broadly consistent with the primary analysis, although memory scores seem to be more sensitive to attribute framing effects in the positive accounting data group.

#### *4.4.2 Gender*

Gender was considered as a moderating variable because past research has found interactions between gender and framing effects (Fagley and Miller, 1990; Hasseldine and Hite, 2003). To consider the sensitivity of the primary analysis findings to gender, logistic regression was used for the accept/reject decisions and a rank ANOVA was used for the strategic alliance judgments. As was previously stated, Cohen et al. (2003) note that likelihood ratio statistics are

not affected by data sparseness, and can therefore be used to consider the impact of gender on investment decisions. In addition, Conover (1980) suggests the use of parametric procedures on ranked data when experimental designs are complex. He notes that these tests are conditionally distribution-free and robust to assumption violations.

The analysis considered the main effects and interactions between gender and attribute frame. Gender was significant as a main effect only for the strategic alliance judgment dependent variable ( $p = 0.02$ ), and all other terms across the dependent variables were found to be insignificant. To verify that the gender main effect did not materially change the interpretation for strategic alliance judgments in the primary analysis, the estimated marginal means for the Accounting Data by Attribute Frame interaction were compared based on Attribute Frame after controlling for the effects of Gender, and consistent with the results of the primary analysis, attribute frames caused a significant difference in the neutral accounting data case ( $p = 0.0255$ ), but no differences were found for the positive or negative accounting data cases ( $p = 0.420$  and  $p = 0.1515$ , respectively). These findings suggest that gender and attribute frames did not interact in anyway when analyzing professional capital budgeting decisions.

#### *4.4.3. Information Objectivity*

A final control variable was the perceived objectivity of the information; if the decision makers perceived the information to be subjective, they may have concluded that additional information was being communicated via the use of positive and negative attribute frames. To analyze this issue, participants were asked to rate the objectivity of the information and this rating was used as a dependent variable, while using the same experimental independent variables (i.e., Accounting Data and Attribute Frame). If the results were based on the objectivity of the information, there should have been significant differences consistent with the study's results. The analysis revealed a main effect for Accounting Data ( $p = 0.05$ ), and no main effect for Attribute Frame or for the Accounting Data/Attribute Frame interaction. Least significant differences (LSD) comparisons revealed that there was a difference between the positive and neutral accounting data groups ( $p < 0.01$ ), but no other groups were significantly different.

To further analyze the impact information objectivity had on attribute framing and accounting data types, logistic regressions and rank ordinary least squares (OLS) regressions

were run to consider the impact of information objectivity on Attribute Frame at the various levels of Accounting Data. Specifically, to analyze the accept/reject decision two logistic regressions were run, one for the positive accounting data and one for the neutral accounting data.<sup>16</sup> The analyses used accept/reject as the dependent variable and Attribute Frame and Information Objectivity as the independent variables. For the strategic alliance judgments three rank OLS regressions were run in a similar manner. These analyses were completely consistent with the primary analysis, as only the neutral accounting data showed framing effects for the accept/reject decision ( $p = 0.031$ ) and strategic alliance judgment ( $p = 0.033$ ). In addition, none of the analyses provided a significant Attribute Frame by Information Objectivity interaction. This analysis suggested that information objectivity did not explain or account for the results of the primary analysis.<sup>17</sup>

The next chapter discusses the presented results and analyzes the contributions the current study provides to the accounting and psychological literatures. In addition, the study's limitations will be discussed, as well as, the potential for future research.

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<sup>16</sup> Additional analysis of the negative accounting data group was not conducted for the Accept/Reject dependent variable because the break up of decisions in this group. Only 5.77% of the decision makers accepted the investment in this group (3 of 52), while the remaining 94.23% of the decision makers rejected the investment.

<sup>17</sup> Participant experience was also analyzed in this way as a control variable. This analysis was also consistent with the primary findings. See Footnote 16.

## **CHAPTER 5**

### **CONCLUSION**

This chapter concludes the study by discussing the implications of the statistical results, highlighting the limitations of this research, and suggesting future research that may further enhance our understanding of the issues considered in this study. This chapter is composed of four sections. First, the implications of the statistical results will be discussed. Second, the limitations of this research will be considered. Third, future research possibilities based on the current study will be proposed. Finally, the major findings of the study will be summarized.

#### 5.1 Discussion

The previous section detailed the statistical results of the current study based on two dependent variables: accept/reject decisions and strategic alliance judgments. The results were consistent with the theoretical expectations; specifically, attribute framing effects (information descriptions) did bias capital budgeting decisions in the expected directions, however, as expected, this biasing effect was limited by the evaluative reaction elicited by the accounting data (information content). This section will first discuss the results for each dependent variable, and then these results will be considered collectively. In addition, the implications of any of the additional analyses will be considered.

##### *5.1.1 Accept/Reject Decisions*

Accept/reject decisions allow for the consideration of the most practical decision form for capital budgeting expenditures. This dependent variable gives greater insight into the external validity of attribute framing effects by analyzing how powerful the bias is when the decision is dichotomous in nature. The statistical analyses showed that accept/reject decisions partially conformed the hypothesized relationships. While attribute framing was not significant in the overall analysis, the impact of attribute frames in the neutral accounting data group was strong and the impact in the positive and negative accounting data groups was weak.

### *5.1.2 Strategic Alliance Judgments*

Strategic alliance judgments allow for the consideration of information description on investment sharing decisions. These decisions are growing in popularity and importance, and an advantage of this research is the opportunity to analyze the biasing potential of attribute frames across this and other capital budgeting decision scenarios. The statistical results for strategic alliance judgments were completely consistent with the hypothesized relationships. Specifically, attribute frames did appear to bias strategic alliance judgments regardless of accounting data type. However, upon closer inspection, it was shown that these effects were isolated to the neutral accounting data group. No significant differences were found for attribute framing in the positive or negative accounting data groups.

### *5.1.3 Overall Study Implications*

The primary finding of the current study is that capital budgeting judgments and decisions are biased by positive and negative information descriptions when the underlying accounting data is ambiguous; however, these decisions are not biased by these descriptions when the underlying accounting data is either positive or negative. These results are particularly important when considering the political nature of these decisions. Research has shown that strategic decisions often involve manipulation and persuasion, and this research suggests that persuasive information descriptions influence these decisions when the investment opportunity is neutral or ambiguous with regards to success or failure. This suggests that investments with the greatest uncertainty may be decided based on political and persuasive tactics. However, this research also shows that decisions makers are able to overcome these persuasive descriptions when the accounting data provides greater levels of certainty.

The finding that ambiguous accounting data leads to greater decision bias is consistent with a large body of research in accounting. Accounting researchers have consistently shown that auditing decisions are more susceptible to internal and external pressures when the accounting decision or task is ambiguous or subjective, and they have further shown that these decisions are less susceptible to these pressures when the accounting decision or task is unambiguous (Johnstone et al., 2001). The findings of the current study serve to emphasize the

importance of ambiguity at the individual information item level, as well as the decision or task level.

The result of this study also suggest that attribute framing effects are not as robust in capital budgeting decisions as has been previously shown in psychological literature. Specifically, while attribute frames appeared to impact capital budgeting decisions, analysis showed that these effects were almost exclusively relegated to decisions involving neutral accounting data. This finding is consistent with a larger body of research that suggests that accounting decision makers performing a task in which they are appropriately trained are not as susceptible to decision bias as participants in many psychological studies (see Smith and Kida, 1991 for a review). The importance of these findings is further supported when considering the vast body of research that has confirmed framing effects (see Kuhberger, 1998 and Levin et al., 1998 for reviews). Levin et al. (1998) specifically note the consistency and robust nature of attribute framing effects, and they conclude that these effects are only moderated when accompanied by percentage information that is close to 1 or 0 (i.e., extreme). Levin and Gaeth (1988) analyze percentage information (75% lean, 25% fat) that is numerically higher (lower) than many of the items considered in the current study and they find large framing effects. However, decision makers experienced with accounting information were unaffected by attribute frames in the positive and negative accounting information groups despite the inclusion of these percentage values.

These findings also extend our understanding of affect in the accounting domain. Various researchers have shown the importance of emotions and evaluations in accounting decisions over the last ten years. Kida et al. (2001) specifically analyzed capital budgeting and emotional reactions, and showed that emotions are reliably and consistently utilized in making these decisions. In addition, Kida and Smith (1995) propose that decision makers use accounting data by developing evaluative reactions or scores to the numerical representations. These evaluative reactions to the accounting data were hypothesized to mitigate the evaluative reactions resulting from attribute frames in the current study. The support found for this relationship serves to increase our understanding and appreciation for affect in business decisions. It also joins the work of Mercer (2005) in developing a greater understanding of the integration of various affective reactions and the important role this affective integration plays in accounting decisions.

Finally, when considering the additional analysis of memory recall scores, the current research adds to the larger body of judgment and decision making research by analyzing the effect of attribute frames across varying types of judgment. This research analyzed individual item evaluations (memory recall), overall judgments (strategic alliance), and overall dichotomous decisions (accept/reject). Findings suggest that the attribute framing bias has a broader effect on more immediate individual evaluations than for overall judgments and decisions. Specifically, attribute framing effects were shown for both neutral and positive accounting data groups for memory recall scores, however, no bias was observed in the positive accounting data groups for either of the other dependent variables. This finding is consistent with the negativity bias (Taylor, 1991) and other forms of affect research that shows an increased susceptibility to bias for positive over negative data (Forgas, 1998b).

## 5.2 Limitations

The results of the current study are subject to certain limitations. First, as is the case for all experimental research, the current study has limitations in external validity. The experimental setting was limited with respect to the capital budgeting task. Specifically, the task was abstracted from an actual capital budgeting decision, and certain information limitations were required to analyze the study's research hypotheses. In addition, the task was limited with respect to group involvement in the decision making process. Participants were asked to make the decision individually with no outside discussion of the case until the task was completed. These abstractions are generally required for experimental research, and they are generally acceptable because of the experimental control provided by these designs. Second, the current research only analyzes a single decision with no iteration. Future research should continue to analyze the role of persuasive tactics in capital budgeting to determine if iteration with certain tactics eliminate their effects. Finally, participants were required to complete the task in a specific order. The specific order of dependent measurement was accept/reject decision, strategic alliance judgment, and memory recall score.

## 5.3 Future Research

The current study leaves many avenues of academic research open for further investigation. First, the current research suggests that the effectiveness of political tactics may

be limited to ambiguous information and/or situations. Future research should continue to analyze this issue; specifically more potent political tactics may generalize to other types of information. The political paradigm also focuses largely on power. Future research could analyze how political power interacts with the current study's findings. Second, the findings confirm a larger body of accounting research in a new way. Specifically, ambiguity is shown to be an important factor in the biased interpretation and use of accounting information in capital budgeting decisions. A large body of auditing research has shown the susceptibility of ambiguous auditing decisions or tasks to internal and external pressures (Salterio and Koonce, 1997; Braun, 2001). Future research should further analyze information and task ambiguity to better define and understand this increased susceptibility to bias. Third, this research is one of very few studies to specifically analyze moderators for attribute framing effects. Future research should further clarify the sensitivity of this bias to various decision makers and contexts to better understand the threat it poses to applied decisions. Finally, this study makes a statement about the sensitivity of capital budgeting decisions to evaluative reactions. This study analyzes evaluative reactions in the form of attribute frames; however, future research should continue to analyze affect in capital budgeting decisions. Various affective reactions, including moods and emotions, are likely when considering capital expenditures. Kida et al. (2001) show that emotion is an important source of information in these decisions, but future research could analyze the impact of presentation and personality on decision maker moods, as research has suggested that these factors could play an important role in capital budgeting decisions (Steele and Albright, 2004).

#### 5.4 Summary

The current study analyzed the susceptibility of capital budgeting decisions to bias. The experiment analyzed the interaction between accounting data (information content) and attribute frames (information descriptions). Based on past academic research, the study proposed that accounting data and attribute frames elicited separate evaluative reactions, and that the nature of the overall evaluation of the accounting information would be based on the valence (i.e., positive, neutral, and negative) of the accounting data. The study specifically proposed that attribute frames would be ineffective in biasing capital budgeting decisions unless the accounting data was ambiguous. An experiment was conducted that considered the issue across two levels

of judgment: strategic alliance judgments (monetary allocations), and accept/reject decisions (dichotomous decision). Results were consistent with expectations, as information descriptions only impacted capital budgeting judgments and decisions when the information content was ambiguous and not when the information content was unambiguous. These results suggest that decision makers are generally unaffected by positive and negative descriptions of information when the accounting data is unambiguous, however, the affect of these descriptions increases dramatically when accounting data is ambiguous.

<b>EXAMPLE 1: Individual and Overall Evaluative Reactions to Accounting Data and Attribute Frames</b>				
<b>Investment</b>	<b>Information</b>	<b>Evaluative Reaction to the Accounting Data</b>	<b>Evaluative Reaction to the Attribute Frame</b>	<b>Overall Evaluative Reaction</b>
Investment A	80% chance of producing a positive cash flow	Positive	Positive	?
Investment A	20% chance of producing a negative cash flow	Positive	Negative	?
Investment B	15% chance of producing a positive cash flow	Negative	Positive	?
Investment B	85% chance of producing a negative cash flow	Negative	Negative	?

### **EXAMPLE 2: Asian Disease Problem (Tversky and Kahneman, 1981)**

Imagine that the U.S. is preparing for the outbreak of an unusual Asian disease, which is expected to kill 600 people. Two alternative programs to combat the disease have been proposed. Assume that the exact scientific estimate of the consequences of the programs are as follows:

Option Set 1:

If Program A is adopted, 200 people will be saved. [72%]

If Program B is adopted, there is  $1/3$  chance that 600 people will be saved, and  $2/3$  chance that no people will be saved. [28%]

Which of the two programs would you favor?

Option Set 2:

If Program C is adopted 400 people will die. [22%]

If Program D is adopted there is  $1/3$  chance that nobody will die, and  $2/3$  chance that 600 people will die. [78%]

Which of the two programs would you favor?

**EXAMPLE 3: The Framing of Decision Questions, Information, and Outcomes in Capital Budgeting**

**Decision Question:** Consider a manager making a capital budgeting decision. The manager may be asking either of the following questions:

(1a) *Positive Frame:* Is this project likely to succeed?

(1b) *Negative Frame:* Is this project likely to fail?

**Decision Information:** To address this question, the manager may collect the following information cue concerning the investment. This cue can be presented in two ways:

(2a) *Positive Frame:* There is a 70% chance that the investment's internal rate of return will exceed the company's cost of capital.

(2b) *Negative Frame:* There is a 30% chance that the investment's internal rate of return will not exceed the company's cost of capital.

**Decision Outcome:** In coming to a decision, the manager may consider a possible consequence of accepting the investment. Again, this consequence can be presented in two ways:

(3a) *Positive Frame:* If the investment is successful, there is a 90% chance of a promotion.

(3b) *Negative Frame:* If the investment is successful, there is a 10% chance of no promotion.

<b>TABLE 1: Experimental Design – Accounting Data by Attribute Frame</b>				
		Accounting Data		
		Positive	Neutral	Negative
Attribute Frame	Positive	+ Frame + Acctg Data	+ Frame = Acctg Data	+ Frame - Acctg Data
	Negative	- Frame + Acctg Data	- Frame = Acctg Data	- Frame - Acctg Data

**TABLE 2: Summary of Methodological Differences in Risky Choice, Attribute, and Goal Framing**

*(Levin, Schneider, and Gaeth, 1998, p. 151)*

<i>Frame Type</i>	<i>What Is Framed</i>	<i>What Is Affected</i>	<i>How Effect Is Measured</i>
<i>Risky choice</i>	Set of options with different risk levels	Risk preference	Comparison of choices for risky options
<i>Attribute</i>	Object/event attributes or characteristics	Item evaluation	Comparison of attractiveness ratings for the single item
<i>Goal</i>	Consequence or implied goal of a behavior	Impact of persuasion	Comparison of rate of adoption of the behavior

<b>TABLE 3: Summary of Focal Studies in Attribute Framing Relating to Decision Questions, Decision Information, and Decision Outcomes</b>			
<i>Attribute Frame Type</i>	<i>Author</i>	<i>Frame Manipulation</i>	<i>Theoretical Explanation</i>
Decision Question	Kida (1984)	Will this company remain viable for two more years?	<b>Different Information Sets <sup>a</sup>:</b> Auditors focus on different information items based on the hypothesis frame. If the frame is viability the give greater consideration to viability cues.
		Will this company fail within the next two years?	
Decision Information	Rutledge (1995b)	[Operation Cost Reduction]. There is a 70% chance that the cost reduction will occur.	<b>Associative Model <sup>b</sup>:</b> The descriptive frame acts as a prime and creates a positive or negative evaluative tone. This tone competes with the general tone of the information to determine overall interpretation.
		[Operation Cost Reduction]. There is a 30% chance that the cost reduction will not occur.	
Decision Outcome	O'Clock and Devine (1995)	[Going Concern Paragraph]. There is a 20% chance that your CPA firm will keep this client.	<b>Threshold Adjustment <sup>c, d</sup>:</b> The descriptive frame causes the auditor to modify (increase or decrease) the amount of evidence necessary to require the explanatory paragraph.
		[Going Concern Paragraph]. There is an 80% chance that your CPA firm will lose this client.	

- a. Consistent with the larger body of work on Confirmation Bias (Snyder and Swann, 1978; Snyder and Campbell, 1980) and the results of Mueller and Anderson (2002).
- b. Levin et al., 1998.
- c. No studies have analyzed the theoretical reasoning for attribute frames in decision outcomes. Threshold Adjustments is a potential explanation provided by the author of this dissertation.
- d. Different Information Sets is another possible theoretical explanation for decision outcome attribute framing effects. This explanation would suggest that an auditor threatened with the loss of a client focuses more on viability information cues to decrease the likelihood of an explanatory paragraph.

**TABLE 4: Positive and Negative Frames for Ambiguous Capital Budgeting Information Items**

<p><b>Financial Information:</b></p> <p>There is a 60 - 70% chance that the investment's cash inflows will be sufficient to meet the net present value target.</p> <p>There is a 65 - 75% chance that the timing of the project's cash inflows will result in an acceptable payback period.</p> <p>There is a 50 – 60% chance that the income from this investment will bring about an adequate rate of return.</p> <p>There is a 55 - 65% chance that the income generated from this project will be sufficient to meet the residual income goal.</p>	<p><b>Financial Information:</b></p> <p>There is a 30 - 40% chance that the investment's cash inflows will be insufficient to meet the net present value target.</p> <p>There is a 25 - 35% chance that the timing of the project's cash inflows will result in an unacceptable payback period.</p> <p>There is a 40 - 50% chance that the income from this investment will bring about an inadequate rate of return.</p> <p>There is a 35 - 45% chance that the income generated from this project will be insufficient to meet the residual income goal.</p>
<p><b>Production Information:</b></p> <p>The production team believes that 70 - 80% of the new product's abnormal raw material waste will be eliminated after a year of production.</p> <p>The production team estimates a 90% defect free production rate for the new product after a year of production.</p> <p>The manufacturing foreman estimates that 60% of the employees have sufficient training in new product production.</p> <p>The development team estimates that 55% of the necessary materials for the new product can be purchased from tested suppliers.</p>	<p><b>Production Information:</b></p> <p>The production team believes that 20 – 30% of the new product's abnormal raw material waste will not be eliminated after a year of production.</p> <p>The production team estimates a 10% defective production rate for the new product after a year of production.</p> <p>The manufacturing foreman estimates that 40% of the employees have insufficient training in new product production.</p> <p>The development team estimates that 45% of the necessary materials for the new product cannot be purchased from tested suppliers.</p>
<p><b>Market Research Information:</b></p> <p>The focus group data suggests that 65% of consumers who tested the new product were satisfied.</p> <p>The focus group data suggests that 60% of consumers consider the product distinct from other products currently available in the market.</p> <p>Based on questionnaire data, 70% of sampled consumers were happy with the new product's projected price.</p> <p>Based on questionnaire data, 55% of sampled consumers would engage in repeat purchases of the new product.</p>	<p><b>Market Research Information:</b></p> <p>The focus group data suggests that 35% of consumers who tested the new product were unsatisfied.</p> <p>The focus group data suggests that 40% of consumers consider the product similar to other products currently available on the market.</p> <p>Based on questionnaire data, 30% of sampled consumers were unhappy with the new product's projected price.</p> <p>Based on questionnaire data, 45% of sampled consumers would not engage in repeat purchases of the product.</p>

**TABLE 5: Participant Demographic Data**

<b>Section A: Participant Origin</b>					
	N	%			
Fortune 500 Companies	38	24.4%			
National Corporations	24	15.4%			
Professional Programs	94	60.3%			
Total	156	100.0%			
<b>Section B: Measured Variables</b>					
Attribute	N	Minimum	Maximum	Mean	Standard Deviation
Work Experience (years)	155	0	40	9.41	8.77
Information Objectivity (1-7)	155	1	7	4.39	1.34
Task Understanding (1-7)	156	1	7	4.57	1.48
Capital Budgeting Knowledge (1-7)	156	1	7	5.01	1.54
<b>Section C: Gender</b>					
	N	%			
Male	96	61.5%			
Female	60	38.5%			
Total	156	100.0%			

**TABLE 6: Accept/Reject Decisions Across Accounting Data and Attribute Frame**

	Accounting Data					
	Positive		Neutral		Negative	
	Attribute Frame		Attribute Frame		Attribute Frame	
Investment Decision	Positive	Negative	Positive	Negative	Positive	Negative
Accept	15	11	13	6	0	3
Reject	10	12	14	23	26	23
Total	25	23	27	29	26	26
Accept	60.0%	47.8%	48.1%	20.7%	0.0%	11.5%
Reject	40.0%	52.2%	51.9%	79.3%	100.0%	88.5%
Total	100%	100%	100%	100%	100%	100%

<b>TABLE 7: Logistic Regression Results for Accept/Reject Decisions</b>			
<b>Model</b>	<b>Overall Model Chi-Square</b>	<b>Change in Chi-Square</b>	<b>P-Value</b>
Accounting Data <sup>a</sup>	31.689	31.689	< 0.001
Attribute Frame <sup>b</sup>	33.812	2.123	0.145
Interaction <sup>c</sup>	41.529	7.717	0.021

<sup>a</sup> Accept/Reject = Constant + Accounting Data

<sup>b</sup> Accept/Reject = Constant + Accounting Data + Attribute Frame

<sup>c</sup> Accept/Reject = Constant + Accounting Data + Attribute Frame + Accounting Data X Attribute Frame

<b>TABLE 8: Tests of Hypotheses for Accept/Reject Decisions</b>			
<b>Section A: Hypothesis 1</b>			
<b>Accounting Data</b>	<b>Pearson Chi-Square<sup>a</sup></b>	<b>P-Value<sup>b</sup></b>	<b>Fisher's Exact Test<sup>b</sup></b>
Overall	1.475	0.225	0.224
<b>Section B: Hypothesis 2</b>			
<b>Accounting Data</b>	<b>Pearson Chi-Square<sup>a</sup></b>	<b>P-Value<sup>b</sup></b>	<b>Fisher's Exact Test<sup>b</sup></b>
Positive	0.309	0.578	0.563
Neutral	3.558	0.059	0.048
Negative <sup>c</sup>	1.415	0.234	0.235

<sup>a</sup> Continuity Correction Employed

<sup>b</sup> Two-tailed

<sup>c</sup> The Negative Accounting Data group includes two cells with expected frequencies less than 5.

**TABLE 9: Means and Standard Deviations for Strategic Alliance Judgments Across Accounting Data and Attribute Frame**

<b>Accounting Data</b>	<b>Attribute Frame</b>	<b>N</b>	<b>Mean</b>	<b>Standard Deviation</b>
Positive	Negative	23	\$ 2,500,435	2,159,715
	Positive	25	\$ 2,592,000	2,288,817
	Total	48	\$ 2,548,125	2,204,661
Neutral	Negative	29	\$ 1,453,828	1,754,868
	Positive	27	\$ 2,426,852	1,771,719
	Total	56	\$ 1,922,964	1,814,484
Negative	Negative	26	\$ 301,923	954,304
	Positive	25	\$ 650,000	1,105,856
	Total	51	\$ 472,549	1,035,969
Total	Negative	78	\$ 1,378,474	1,875,548
	Positive	77	\$ 1,903,571	1,970,906
	Total	155	\$ 1,639,329	1,935,259

**TABLE 10: Tests of Hypotheses for Strategic Alliance Judgments****Section A: Hypothesis 1**

<b>Accounting Data</b>	<b>Attribute Frame</b>	<b>Mean Rank</b>	<b>MWU-Score<sup>a</sup></b>	<b>Z-Score</b>	<b>P-Value<sup>b</sup></b>
Overall	Positive	84.88	2473	1.955	0.0256
	Negative	71.21			

**Section B: Hypothesis 2**

<b>Accounting Data</b>	<b>Attribute Frame</b>	<b>Mean Rank</b>	<b>MWU-Score<sup>a</sup></b>	<b>Z-Score</b>	<b>P-Value<sup>b</sup></b>
Positive	Positive	25.48	263	0.508	0.305
	Negative	23.43			
Neutral	Positive	32.85	274	1.98	0.0239
	Negative	24.45			
Negative	Positive	28.36	266	1.28	0.1003
	Negative	23.73			

<sup>a</sup> Mann-Whitney U-Score<sup>b</sup> One-sided

<b>TABLE 11: Means and Standard Deviations for Memory Recall Scores Across Accounting Data and Attribute Frame</b>				
<b>Accounting Data</b>	<b>Attribute Frame</b>	<b>N</b>	<b>Mean</b>	<b>Standard Deviation</b>
Positive	Negative	22	1.843	1.622
	Positive	24	2.594	1.056
	Total	46	2.235	1.394
Neutral	Negative	27	-0.102	2.211
	Positive	23	1.142	1.819
	Total	50	0.470	2.114
Negative	Negative	24	0.873	3.050
	Positive	20	1.121	2.318
	Total	44	0.986	2.714
Total	Negative	73	0.805	2.479
	Positive	67	1.656	1.881
	Total	140	1.212	2.246

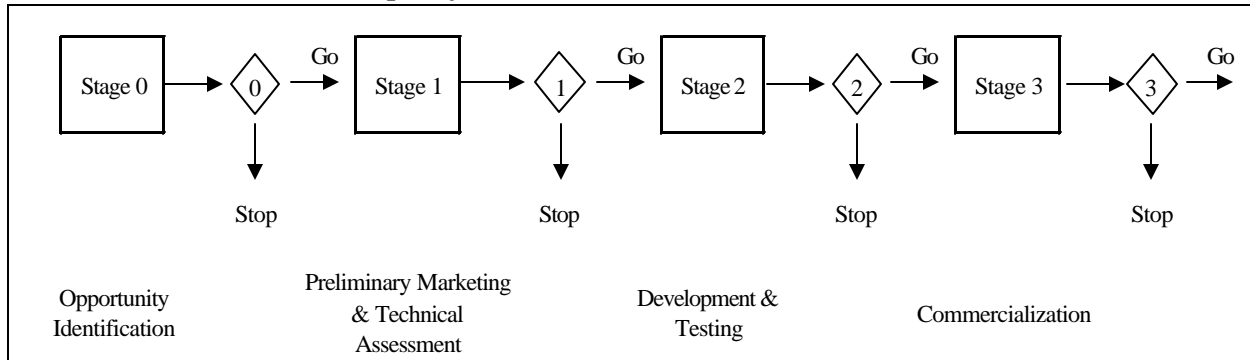
<b>TABLE 12: Analysis of Attribute Frame Effects on Memory Recall Scores Across Accounting Data Groups</b>					
<b>Accounting Data</b>	<b>Attribute Frame</b>	<b>Mean Rank</b>	<b>MWU-Score<sup>a</sup></b>	<b>Z-Score</b>	<b>P-Value<sup>b</sup></b>
Positive	Positive	26.35	195.5	1.51	0.0655
	Negative	20.39			
Neutral	Positive	29.98	207.5	2.01	0.0228
	Negative	21.69			
Negative	Positive	22.85	233	0.17	0.4325
	Negative	22.21			

<sup>a</sup> Mann-Whitney U-Score

<sup>b</sup> One-sided

**FIGURE 1: A Model of The New Product Decision Process**

*(Adapted from Schmidt and Calantone, 2002)*



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## APPENDIX INSTRUMENT

We are interested in your opinion on an investment decision. There are no right or wrong answers. We are only interested in your professional opinion. Please consider the information contained in this packet and answer all questions. This research is aimed at developing a greater understanding of the capital budgeting decision process. After you complete all questions, please return this booklet to the individual who gave it to you.

Thank you for your participation in this study.

Please turn the page and follow the instructions provided in the booklet.

## **Company Information**

John Stevens and Jeff Simpson founded Stevens Electronics, Inc. in 1979 as a manufacturer of creative electronic products. Stevens Electronics is a medium-sized domestic electronics manufacturer. It manufactures a broad range of electronic products for industry and consumer use. In 2003, Stevens Electronics marked its sixth consecutive year of increased earnings. On \$100 million sales, the Charleston, SC-based Company reported 2003 profits of \$20.3 million, with \$120 million in total assets. The company's mission remains the same as it always has been, to create products and introduce product innovations that will maximize consumer convenience and satisfaction. The company has experienced steady sales growth and increased product introductions and innovations since its incorporation. Stevens Electronics has consistently increased the amount of capital invested in product development, with \$27.5 million in 2003. The focus on diversification is seen as the primary catalyst for continued success. The company's goal is to continue to grow sales by introducing new products in new markets.

With this strategy, Stevens Electronics depends heavily on sound product development decisions, and therefore, the company has developed specific procedures for the preparation of capital budgeting proposals. Procedures require all proposals be independently prepared by a cross-discipline group of experts to ensure that the proposals contain objective and accurate information. Proposals include financial and non-financial information items that assess investment profitability, production quality and efficiency, and product marketability. Financial information primarily assesses the short-term profitability estimates for the investment, while non-financial information assesses the long-term brand stability of the investment by analyzing issues such as production quality and customer satisfaction. All information included in the proposal is important, and the information items should be given equal weight when making an investment decision.

**Once you have read the company information, please turn to the next page where you will find a description of each of the relevant information items.**

## DESCRIPTION OF INVESTMENT DECISION INFORMATION

### ***Financial Information:***

This category considers both net cash flows and net income for different investment options. The likelihood assessments address uncertainty concerning projections of future outcomes.

Net Present Value: The present value of cash inflows and outflows for the life of the project.

Payback Period: The number of years before the cash inflows from the investment will equal the amount of the initial cash outflow.

Accounting Rate of Return: The average annual income of the project divided by the initial investment.

Residual Income: The amount by which income exceeds the company's required rate of return.

### ***Production Information:***

This category includes measures that consider the efficiency and effectiveness of product production.

Abnormal Raw Material Waste: The expected change in abnormal raw material waste after twelve months of production.

Production Effectiveness: The estimated rate of defective and defect-free production after twelve months of experience.

Labor Readiness: The number of employees appropriately trained in new product production.

Vendor Relations: The estimated amount of raw materials purchased from tested and untested suppliers.

### ***Market Research Information:***

Consumer questionnaires and focus groups addressing essential characteristics of the new product.

Product Performance: Consumer opinions of product quality.

Product Uniqueness: Consumer opinions on whether the product is different or similar to other available products.

Product Price: Consumer opinions on product price.

Repeat Purchases: Consumer opinions concerning multiple purchases of the new product.

**Once you have reviewed this information, please turn to the next page.**

## **Positive Accounting Data\_\_Positive Attribute Frame**

### **INVESTMENT DECISION**

As a manager, it is your job to determine whether or not an investment should be made. You are currently responsible for deciding whether to invest in an electronic product that will be marketed to consumers. This investment requires \$6 million in capital, which is considered a significant amount. The information necessary to make this decision is found on the following pages. You should assume that all information is reliable, and all information items are equally important.

#### **Financial Information:**

Net Present Value: There is a 70 - 80% chance that the investment's cash inflows will be sufficient to meet the net present value target.

Payback Period: There is a 75 - 85% chance that the timing of the project's cash inflows will result in an acceptable payback period.

Accounting Rate of Return: There is a 70 - 80% chance that the income from this investment will bring about an adequate rate of return.

Residual Income: There is a 75 - 85% chance that the income generated from this project will be sufficient to meet the residual income goal.

#### **Production Information:**

Abnormal Raw Material Waste: The production team believes that 85 - 95% of the new product's abnormal raw material waste will be eliminated after a year of production.

Production Effectiveness: The production team estimates a 95% defect free production rate for the new product after a year of production.

Labor Readiness: The manufacturing foreman estimates that 90% of the employees have sufficient training in new product production.

Vendor Relations: The development team estimates that 80% of the necessary materials for the new product can be purchased from tested suppliers.

**Please turn to the next page to continue reviewing the investment information.**

**Market Research Information:**

Product Performance: The focus group data suggests that 80% of consumers who tested the new product were satisfied.

Product Uniqueness: The focus group data suggests that 85% of consumers consider the product distinct from other products currently available in the market.

Product Price: Based on questionnaire data, 90% of sampled consumers were happy with the new product's projected price.

Repeat Purchases: Based on questionnaire data, 80% of sampled consumers would engage in repeat purchases of the new product.

**We would now like to get your opinion as a manager on this potential product investment.  
Please answer the question below.**

Would you accept or reject this investment opportunity?  
Please circle one of the options below.

Accept

Reject

**Once you have answered this question, please turn the page.**

## **Positive Accounting Data\_\_Negative Attribute Frame**

### **INVESTMENT DECISION**

As a manager, it is your job to determine whether or not an investment should be made. You are currently responsible for deciding whether to invest in an electronic product that will be marketed to consumers. This investment requires \$6 million in capital, which is considered a significant amount. The information necessary to make this decision is found on the following pages. You should assume that all information is reliable, and all information items are equally important.

#### **Financial Information:**

Net Present Value: There is a 20 - 30% chance that the investment's cash inflows will be insufficient to meet the net present value target.

Payback Period: There is a 15 - 25% chance that the timing of the project's cash inflows will result in an unacceptable payback period.

Accounting Rate of Return: There is a 20 - 30% chance that the income from this investment will bring about an inadequate rate of return.

Residual Income: There is a 15 - 25% chance that the income generated from this project will be insufficient to meet the residual income goal.

#### **Production Information:**

Abnormal Raw Material Waste: The production team believes that 5 - 15% of the new product's abnormal raw material waste will not be eliminated after a year of production.

Production Effectiveness: The production team estimates a 5% defective production rate for the new product after a year of production.

Labor Readiness: The manufacturing foreman estimates that 10% of the employees have insufficient training in new product production.

Vendor Relations: The development team estimates that 20% of the necessary materials for the new product cannot be purchased from tested suppliers.

**Please turn to the next page to continue reviewing the investment information.**

**Market Research Information:**

Product Performance: The focus group data suggests that 20% of consumers who tested the new product were unsatisfied.

Product Uniqueness: The focus group data suggests that 15% of consumers consider the product similar to other products currently available on the market.

Product Price: Based on questionnaire data, 10% of sampled consumers were unhappy with the new product's projected price.

Repeat Purchases: Based on questionnaire data, 20% of sampled consumers would not engage in repeat purchases of the product.

We would now like to get your opinion as a manager on this potential product investment. Please answer the question below.

Would you accept or reject this investment opportunity?  
Please circle one of the options below.

Accept

Reject

**Once you have answered this question, please turn the page.**

## Neutral Accounting Data\_\_Positive Attribute Frame

### INVESTMENT DECISION

As a manager, it is your job to determine whether or not an investment should be made. You are currently responsible for deciding whether to invest in an electronic product that will be marketed to consumers. This investment requires \$6 million in capital, which is considered a significant amount. The information necessary to make this decision is found on the following pages. You should assume that all information is reliable, and all information items are equally important.

#### **Financial Information:**

Net Present Value: There is a 60 - 70% chance that the investment's cash inflows will be sufficient to meet the net present value target.

Payback Period: There is a 65 - 75% chance that the timing of the project's cash inflows will result in an acceptable payback period.

Accounting Rate of Return: There is a 50 - 60% chance that the income from this investment will bring about an adequate rate of return.

Residual Income: There is a 55 - 65% chance that the income generated from this project will be sufficient to meet the residual income goal.

#### **Production Information:**

Abnormal Raw Material Waste: The production team believes that 70 - 80% of the new product's abnormal raw material waste will be eliminated after a year of production.

Production Effectiveness: The production team estimates a 90% defect free production rate for the new product after a year of production.

Labor Readiness: The manufacturing foreman estimates that 60% of the employees have sufficient training in new product production.

Vendor Relations: The development team estimates that 55% of the necessary materials for the new product can be purchased from tested suppliers.

**Please turn to the next page to continue reviewing the investment information.**

**Market Research Information:**

Product Performance: The focus group data suggests that 65% of consumers who tested the new product were satisfied.

Product Uniqueness: The focus group data suggests that 60% of consumers consider the product distinct from other products currently available in the market.

Product Price: Based on questionnaire data, 70% of sampled consumers were happy with the new product's projected price.

Repeat Purchases: Based on questionnaire data, 55% of sampled consumers would engage in repeat purchases of the new product.

**We would now like to get your opinion as a manager on this potential product investment.  
Please answer the question below.**

Would you accept or reject this investment opportunity?  
Please circle one of the options below.

Accept

Reject

**Once you have answered this question, please turn the page.**

## **Neutral Accounting Data\_\_Negative Frame**

### **INVESTMENT DECISION**

As a manager, it is your job to determine whether or not an investment should be made. You are currently responsible for deciding whether to invest in an electronic product that will be marketed to consumers. This investment requires \$6 million in capital, which is considered a significant amount. The information necessary to make this decision is found on the following pages. You should assume that all information is reliable, and all information items are equally important.

#### **Financial Information:**

Net Present Value: There is a 30 - 40% chance that the investment's cash inflows will be insufficient to meet the net present value target.

Payback Period: There is a 25 - 35% chance that the timing of the project's cash inflows will result in an unacceptable payback period.

Accounting Rate of Return: There is a 40 - 50% chance that the income from this investment will bring about an inadequate rate of return.

Residual Income: There is a 35 - 45% chance that the income generated from this project will be insufficient to meet the residual income goal.

#### **Production Information:**

Abnormal Raw Material Waste: The production team believes that 20 – 30% of the new product's abnormal raw material waste will not be eliminated after a year of production.

Production Effectiveness: The production team estimates a 10% defective production rate for the new product after a year of production.

Labor Readiness: The manufacturing foreman estimates that 40% of the employees have insufficient training in new product production.

Vendor Relations: The development team estimates that 45% of the necessary materials for the new product cannot be purchased from tested suppliers.

**Please turn to the next page to continue reviewing the investment information.**

**Market Research Information:**

Product Performance: The focus group data suggests that 35% of consumers who tested the new product were unsatisfied.

Product Uniqueness: The focus group data suggests that 40% of consumers consider the product similar to other products currently available on the market.

Product Price: Based on questionnaire data, 30% of sampled consumers were unhappy with the new product's projected price.

Repeat Purchases: Based on questionnaire data, 45% of sampled consumers would not engage in repeat purchases of the product.

**We would now like to get your opinion as a manager on this potential product investment.  
Please answer the question below.**

Would you accept or reject this investment opportunity?  
Please circle one of the options below.

Accept

Reject

**Once you have answered this question, please turn the page.**

## **Negative Accounting Data\_\_Positive Attribute Frame**

### **INVESTMENT DECISION**

As a manager, it is your job to determine whether or not an investment should be made. You are currently responsible for deciding whether to invest in an electronic product that will be marketed to consumers. This investment requires \$6 million in capital, which is considered a significant amount. The information necessary to make this decision is found on the following pages. You should assume that all information is reliable, and all information items are equally important.

#### **Financial Information:**

Net Present Value: There is a 20 - 30% chance that the investment's cash inflows will be sufficient to meet the net present value target.

Payback Period: There is a 15 - 25% chance that the timing of the project's cash inflows will result in an acceptable payback period.

Accounting Rate of Return: There is a 20 - 30% chance that the income from this investment will bring about an adequate rate of return.

Residual Income: There is a 20 - 30% chance that the income generated from this project will be sufficient to meet the residual income goal.

#### **Production Information:**

Abnormal Raw Material Waste: The production team believes that 55 - 65% of the new product's abnormal raw material waste will be eliminated after a year of production.

Production Effectiveness: The production team estimates a 75% defect free production rate for the new product after a year of production.

Labor Readiness: The manufacturing foreman estimates that 15% of the employees have sufficient training in new product production.

Vendor Relations: The development team estimates that 20% of the necessary materials for the new product can be purchased from tested suppliers.

**Please turn to the next page to continue reviewing the investment information.**

**Market Research Information:**

Product Performance: The focus group data suggests that 25% of consumers who tested the new product were satisfied.

Product Uniqueness: The focus group data suggests that 25% of consumers consider the product distinct from other products currently available in the market.

Product Price: Based on questionnaire data, 20% of sampled consumers were happy with the new product's projected price.

Repeat Purchases: Based on questionnaire data, 30% of sampled consumers would engage in repeat purchases of the product.

**We would now like to get your opinion as a manager on this potential product investment.  
Please answer the question below.**

Would you accept or reject this investment opportunity?  
Please circle one of the options below.

Accept

Reject

**Once you have answered this question, please turn the page.**

## **Negative Accounting Data\_\_Negative Attribute Frame**

### **INVESTMENT DECISION**

As a manager, it is your job to determine whether or not an investment should be made. You are currently responsible for deciding whether to invest in an electronic product that will be marketed to consumers. This investment requires \$6 million in capital, which is considered a significant amount. The information necessary to make this decision is found on the following pages. You should assume that all information is reliable, and all information items are equally important.

#### **Financial Information:**

Net Present Value: There is a 70 - 80% chance that the investment's cash inflows will be insufficient to meet the net present value target.

Payback Period: There is a 75 - 85% chance that the timing of the project's cash inflows will result in an unacceptable payback period.

Accounting Rate of Return: There is a 70 - 80% chance that the income from this investment will bring about an inadequate rate of return.

Residual Income: There is a 70 - 80% chance that the income generated from this project will be insufficient to meet the residual income goal.

#### **Production Information:**

Abnormal Raw Material Waste: The production team believes that 35 - 45% of the new product's abnormal raw material waste will not be eliminated after a year of production.

Production Effectiveness: The production team estimates a 25% defective production rate for the new product after a year of production.

Labor Readiness: The manufacturing foreman estimates that 85% of the employees have insufficient training in new product production.

Vendor Relations: The development team estimates that 80% of the necessary materials for the new product cannot be purchased from tested suppliers.

**Please turn to the next page to continue reviewing the investment information.**

**Market Research Information:**

Product Performance: The focus group data suggests that 75% of consumers who tested the new product were unsatisfied.

Product Uniqueness: The focus group data suggests that 75% of consumers consider the product similar to other products currently available on the market.

Product Price: Based on questionnaire data, 80% of sampled consumers were unhappy with the new product's projected price.

Repeat Purchases: Based on questionnaire data, 70% of sampled consumers would not engage in repeat purchases of the product.

**We would now like to get your opinion as a manager on this potential product investment.  
Please answer the question below.**

Would you accept or reject this investment opportunity?  
Please circle one of the options below.

Accept

Reject

**Once you have answered this question, please turn the page.**

While Stevens Electronics, Inc. generally finance new products independently, it sometimes shares the investment capital requirements with the product supplier. The advantage of capital sharing agreements is the reduction of investment risk. The disadvantage is the proportionate loss of rewards that accompany the investment. Historically, investment partners have provided as much as 97.5% or as little as 2.5% of the required investment.

A proposal for investment sharing can be prepared for the current investment. To complete this proposal the alternative capital provider needs to know the portion of the investment that is currently funded. The current investment requires \$6 million, and based on the historical financing information the investment partner will provide between \$150,000 and \$5,850,000 financing for the current investment. There is only one investment partner available for this investment. If you are not willing to invest at least \$150,000, then the project should not be accepted (i.e., your investment should be zero). Similarly, if you are willing to invest more than \$5,850,000, then you should invest the entire amount and no investment partner will be required (i.e., your investment should be six million).

**Once you have completed reading this information, please turn the page.**



**We would now like to get information that will be used for research purposes only. Please answer all of the questions below.**

What is (was) your current (most recent) job title? \_\_\_\_\_

How many years of work experience do you have? \_\_\_\_\_

What is your gender? Please circle one of the answers below.

Male

Female

Are you confident that Stevens Electronics' capital proposal procedures result in objective and accurate information? Please circle a number below.

1	2	3	4	5	6	7
Not Very Confident						Very Confident

Are you confident about your understanding of the capital budgeting information considered in making this decision? Please circle a number below.

1	2	3	4	5	6	7
Not Very Confident						Very Confident

Are you familiar with capital budgeting concepts (e.g., allocating limited resources, such as money, to different projects)? Please circle a number below.

1	2	3	4	5	6	7
Not Very Familiar						Very Familiar

**We appreciate you completing the first section of the capital budgeting case. Please review pages four through seven to make sure you have answered all applicable questions.**

**After reviewing these pages, please *DO NOT TURN BACK* to review any material in the booklet.**

**Please continue to the next page to complete the booklet.**

We would like to get an idea of what you remember about the information presented in the capital budgeting scenario. Please indicate how favorably or unfavorably you recall each piece of information listed below by circling the appropriate number. The closer you circle a number to the right end of the scale, the more favorably you remember the information item. The closer you circle a number to the left end of the scale, the more unfavorably you remember the information item. If you cannot recall your reaction to an information item, please indicate that you do not remember.

-4	-3	-2	-1	0	1	2	3	4
Extremely Unfavorable		Neutral					Extremely Favorable	

										I Don't Remember
<b>Financial Information</b>										
<i>Net Present Value</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Payback Period</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Accounting Rate of Return</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Residual Income</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<b>Production Information</b>										
<i>Abnormal Raw Material Waste</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Production Effectiveness</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Labor Readiness</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Vendor Relations</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<b>Market Research Information</b>										
<i>Product Performance</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Product Uniqueness</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Product Price</i>	-4	-3	-2	-1	0	1	2	3	4	_____
<i>Repeat Sales</i>	-4	-3	-2	-1	0	1	2	3	4	_____

Please return this packet to the individual who gave it to you. Thanks again for your cooperation.