Unveiling Initial Commitment: How Emotional Commitment Precedes and Determines Action

The Role of Emotional Commitment in Consumer Innovation Projects

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Abstract

In most firms, innovation projects take up huge amounts of resources. Managing these projects often proofs to be difficult. Innovation projects are characterized by high uncertainty. It requires decision-makers to make the most rational decisions given the circumstances. Such decisions start with the search for, and usage of the right information. Assessing the risks that matter and allocating the right amount of resources are important follow-up steps. These attributes of rational decision-making are not always implemented in a rational way. Particularly, escalation of commitment is such a phenomenon in which decision-makers make sub-optimal or even irrational follow-up decisions. The question then arises as to what this commitment to less rational actions is before it escalates. Specifically, the creation and build-up of initial commitment to actions remains unclear.

Two studies were performed. The objective of the studies was to investigate the creation and build-up of initial emotional commitment in situations of high uncertainty. Antecedents of emotional commitment and its effects on decision-making effectiveness (information usage, risk perception, and resource allocation) were examined. Several theories were used; among them were escalation of commitment theory, expectancy theory, and prospect theory. In the decision-making experiment, antecedents of emotional commitment were manipulated to create different levels of emotional commitment between groups. Differences in decision-making effectiveness were observed, while all respondents received the same information packages to base their decisions on. Analyses of Variance and Paired Samples t-Tests were used to compare means between and within groups. Partial Least Squares Structural Equation Modeling was used to estimate model parameters.

Emotional Involvement was found to be an antecedent of Emotional Commitment, Project Impact was not. No interaction effect was found between Emotional Involvement and Project Impact on Emotional Commitment. Both results indicated that Emotional Commitment had a substantial and significant effect on Resource Allocation. A significant effect was found on Risk Perception. A negative, but non-significant effect was found on Information Usage. The results of both studies are discussed. Limitations as well as implications for future research and managerial practice are given.

Acknowledgements

I would like to acknowledge the people that helped me throughout the whole research process and without whom this thesis would not be possible. My thesis supervisor, prof. dr. Van Riel, introduced me to the topic and shared his substantial knowledge. Thank you for always making time to meet with me. You gave excellent guidance when progress was tough and went beyond that of a thesis supervisor. I would also like to thank my second examiner dr. … for taking the time to examine my thesis and giving valuable feedback. Lastly, I would like to thank my parents, Marcel and Anne-Marie, and my partner in crime, Jill. Their support and encouragement gave me the strength to persist with my research.

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Introduction

Introduction

The topic of decision-making has received interest from many academic fields over the years. This comes as no surprise, because every human makes decisions, almost non-stop throughout the day. In a business context, it is the firm that depends on, and benefits from rational (i.e., effective) decision-making by management. Unfortunately, management does not always take the most rational course of action (Pinto & Mantel, 1990; Staw, 1976; Staw & Ross, 1987a; Brockner, Rubin, & Lang, 1981; Van der Panne, Van Beers & Kleinknecht, 2003). An area that has great importance, but often suffers from decision-making failures is that of innovation project management (Van der Panne et al., 2003; Cozijnsen, Vrakking, & Van IJzerloo, 2000; Drummond, 1994; Staw, 1976). There is general consensus that innovation is very important for firms, and therefore must be managed properly (e.g., Gunday, Ulusoy, Kilic, & Alpkan, 2011; Michie, 2001). A frequently used type of innovation is consumer product innovation. The development of consumer products is often structured by the implementation of a stage-gate model (Cooper, Edgett, & Kleinschmidt, 2002). The stages end with a decision gate at which the future of the innovation project is decided (Cooper, 1990, 1992; Van der Panne et al., 2003). The decision to continue the project is an important one, because continuation means more resources are being burned for what may end up being a failed project (Drummond, 1994; Staw, 1976; Staw & Ross, 1987b; Brockner, 1992). Innovation project managers must use their knowledge, expertise, and all available relevant information to come up with the most rational decision. In this decision-making process, problems can arise. Sometimes relevant information states that an innovation project should be canceled, but the manager is committed to choose the irrational course of action (Brockner, 1992; Drummond, 1994; Keil, Mixon, Saarinen & Tuunainen, 1995). Discontinuing a course of action in the face of negative consequences seems the most logical choice, but research shows that managers behave opposite on many occasions (e.g., Brockner, 1992; He & Mittal, 2007; Mahring & Keil, 2008). The project continues and sunk costs increase in that case. Current literature fails to fully explain the creation and build-up of commitment to less rational courses of action.

A frequently used theory for the explanation of irrational follow-up decision-making is that of Staw (1976). In 1976, Staw described the phenomenon of escalation of commitment. In short, there is a situation that involves costs. The manager receives negative feedback. There is an opportunity to withdraw at each decision-gate, but the manager persists without taking the actual consequences of his or her decision into account (Staw & Ross, 1978). The manager is

committed to a situation which is rather expending more resources than meeting expectations. The rational decision would be to pull the plug, but the manager only sees the potential rewards and keeps allocating resources in the hope that future rewards may be attained. Escalation of commitment is not only a problem in innovation projects, but also for other important decision moments (e.g., takeovers). A prominent practical example is the bankruptcy of Campeau in the eighties. Campeau overpaid 600 million dollars in buying Bloomingdale's (Bazerman & Neale, 1992). Campeau was overly committed in taking over Bloomingdale's, which resulted in its own bankruptcy. Overcoming escalation of commitment is an important practical endeavor, which starts with the understanding of commitment itself.

Escalation of commitment theory partially explains the decisions of the project manager when he or she chooses to increase the sunk cost jar (Keil & Montealegre, 2000; Staw, 1981). Unfortunately, a full understanding remains elusive. Continuously choosing the irrational course of action in a doomed scenario seems to be related to initial decisions (Mintzberg, Raisinghani, & Théorêt, 1976). A manager can become committed towards an irrational course of action without escalation. This is the point where light transitions into shadows. What exactly is commitment and how does it form? Positive commitment, known as engagement (Kahn, 1990) can be described as the willingness of the manager to spend more effort in the *future* to obtain the objectives of a decision. Negative commitment is described as the ''unwillingness to change one's mind *after* the decision is made'' (Van Riel, Henseler & Semeijn, 2012, p. 9; Bazerman, 2001). The term 'escalation' (also persistence and entrapment) is commonly used to describe commitment towards a *previously* selected course of action (Bazerman & Moore, 2008). Positive commitment seems to be directed at future decisions. This paper investigates the existence of undesirable commitment towards *future* decisions. Langley, Mintzberg, Pitcher, Posada, and Saint-Macary (1995) describe decision-making as the development of commitment to action. In this paper, commitment is the dedication, or the 'build up' towards the *next* action being taken. Commitment that makes managers follow less rational courses of action is framed as undesirable commitment.

A heavily researched concept that is an integral part of decision-making (Perez-Alvarez & Timoneda, 2007) is emotion (e.g., Simon, 1987; Loewenstein & Lerner, 2003; Peters, Västfjäll, Gärling, & Slovic, 2006; Heilman, Crisan, Houser, Miclea & Miu, 2010). Emotion that affects positive commitment is called 'emotional engagement'. The effect of emotions on initial (undesirable) commitment has not received any attention. This paper focuses on the aforementioned phenomenon, by describing undesirable commitment affected by emotion as emotional commitment. The following definition is made: *emotional commitment is the latent*

force in the mind of the decision-maker in which emotions create and build-up an (undesirable) form of commitment to a course of action.

Managers are creating and building up commitment towards emotionally satisficing choices (Simon, 1959), rather than choosing the most rational course of action. Portraying emotional commitment as only undesirable, is a bridge too far. The general status of specific commitment depends on the judgment of men, who themselves are rationally bounded. Initial commitment can in fact precede escalation as well as engagement. A clearer picture on whether commitment was truly undesirable can only be seen in hindsight. For reasons of simplicity, emotional commitment is viewed as undesirable because it is irrational or non-rational. Understanding this emotional build-up for inferior choices is an important step for answering questions like why particular courses of actions are taken. What the antecedents of emotional commitment are exactly, is not known. Two predictors are used to investigate the creation and build-up of emotional commitment. The first predictor is Emotional Involvement. The second predictor is Project Impact. To further prove the existence and undesirability of emotional commitment, three components of decision-making effectiveness are added to the model: 1) information usage, 2) risk perception, and 3) resource allocation. Data is gathered through a questionnaire in which respondents assumed the role of an innovation project manager. In two studies, data is analyzed by making use of Analyses of Variance (Study 1), Partial Least Squares Structural Equation Modeling, and Paired Samples t-Tests (Study 2). Study 1 focuses on the creation of emotional commitment and its initial effects on decision-making effectiveness. Study 2 focuses on the build-up of emotional commitment, as well as corroborating on the findings of Study 1. Before the dive into emotional commitment is made, a short summary of decision-making literature is provided to better understand the context of the problem.

Historical Perspective

In the last one hundred years, progress in decision-making theory has been made by authors like Barnard, Simon, March, Cyert, Mintzberg, and many more. The journey of modern decision-making in business management started in the beginning of the twentieth century. In 1921, Borel re-introduced the theory of games in several papers after its initial birth in the eighteenth century (Dimand & Dimand, 2002). It was Barnard who put decision-making center stage in 1938 and laid the foundation for decision-making research in organizational management (Buchanan & O'Connell, 2006). Von Neumann and Morgenstern published the book 'Theory of games and economic behavior' in 1944, which had a huge influence in the field of economics, and social sciences later on (Leonard, 1995). In the book, assumptions are

made that decision-makers have a substantial knowledge base and that they are aware of all available possibilities. It is assumed that the human mind has complete knowledge and is capable of perfect rational thinking. Early thoughts about managerial decision-making derived from the figment of 'Homo Economicus' (Simon, 1955; Persky, 1995; Leibenstein, 1976; Bensunan-Butt, 1978), and resembled the axioms of expected utility theorem (Dimand & Dimand, 2002). The assumption was made that when managers know decision options and outcomes of those decisions, they will choose the decision that results in the greatest utility (which should be achieving economic goals). In other words, innovation managers would behave and decide rationally in economic sense (Simon, 1976).

Simon introduced concepts like bounded rationality and satisficing in his 1947 book 'Administrative behavior' (Simon, 1997). Simon's work (1955, 1959) goes against the notion of the economic man and tries to sketch a more realistic picture of human thinking in a business context (see also Simon & March, 1958; Lindblom, 1959). Because of Simon, the cognitive imperfections of the human mind became more apparent. Simon (1955, 1979) proposed that decision-makers should be considered as rationally bounded and made a model in which the maximization of utility was replaced by satisficing. By challenging the notion of the 'economic man', the model of Simon (1960) about decision-making processes became dominant in organizational theory (Langley et al., 1995). Simon's basic model views the decision-making process in three stages, which can be referred to as a sequential model (Langley et al., 1995). The model was far from complete. Cohen, March, and Olsen (1972) came up with a different model, which was more anarchical. The model is called the garbage can and describes decision-making as a chaotic process. A few years later, Mintzberg et al. (1976) brought in a third model that resembles both previous models, describing decision-making as a more iterative process. The work of Langley et al. (1995) summarizes these models and adds three new models. They even hint that all models could be applicable, thus making the topic of decision-making interdimensional and highly complex. A full understanding of decision-making requires lots of additional research and insights. A good step in the right direction has been taken by the psychologists Kahneman and Tversky (e.g., 1972, 1979). Both authors focused on limitations of the human mind, known as biases. Biases are cognitive and behavioral errors within the brain that result in deviations from rational judgment. Many biases have been identified in research. Some well-known sources of biases include prejudice, heuristics, mental limitations, and lack of information. Escalation of commitment is also a form of bias.

There is a general consensus that the human mind has many flaws, prohibiting innovation managers from making full rational decisions. Still, lots of progress has been made

over the last decades. Decision models have been expanded, and more limitations have been discovered. Unfortunately, current decision-making theory still cannot fully explain why certain decisions are being made the way they are. Taking a look at the core of a decision, the vital part 'commitment' is still not understood. Mintzberg et al. (1976) and Langley et al. (1995) shortly wrote on the matter. They both mentioned that a decision encompasses *commitment towards action*. Langley et al. (1995) elaborates on commitment, saying that commitment is hard to measure. Commitment before action can be vague and confusing. Action can occur without commitment. Is there a true beginning and ending of a decision? ''Critical evidence on the true timing and nature of commitment may be beyond the protocols of researchers'' (Langley et al., 1995, p. 266). That is where the initial stages of commitment have been laid to rest.

Antecedents of Emotional Commitment

Emotional commitment is a latent construct, meaning that it cannot be observed directly. Emotional commitment is hard to trace retrospectively. To prove the existence of emotional commitment ''requires clear definitions of the temporal and substantive boundaries of the phenomenon'' (Langley et al., 1995 p. 266). Most obvious in both studies is the focus on emotions that affect the creation and build-up of undesirable commitment. Emotion is an integral part of decision-making (e.g., Perez-Alvarez & Timoneda, 2007), therefore making the combination with commitment to action straightforward. Langley et al. (1995) discovered that commitment has an affective component, making it highly plausible that emotions affect the creation and build-up of undesirable commitment (to action). Even the outcome of the decision-making process results in an affective attitude towards the course of action that has been taken (Mintzberg, 1979). This 'affective attitude' is essentially emotional commitment towards the same course of action. The concept of emotional engagement has already seen the light of day. This paper directs its attention on the undesirable form: emotional commitment.

The chosen predictors for this research are: 1) emotional involvement and 2) project impact. The purpose of these predictors is to give insight into the antecedents of emotional commitment and to increase the level of emotional commitment for respondents. Respondents that are emotionally involved in the project are more likely to develop an undesirable commitment to the project. The general consensus is that emotion makes decision-makers deviate from rational action (Stickney, 2009), although anger does not seem to override the ability to be rational (Moons & Mackie, 2007). Emotional involvement is evoked by manipulating two project elements: type of project and end-users of the innovation. These

project elements create an emotional response in the decision-maker. For example, a project involving a cancer medicine is likely to generate a higher emotional response than a project involving a toothbrush. Having children instead of prisoners as end-users likely creates a higher emotional response in the manager.

There are several related concepts used to describe the emotional 'influence' in decision-making. For example, positive affect (e.g., Isen & Means, 1983), negative affect (e.g., Ortega, Ramirez, Colmenero & Garcia-Viedma, 2017), cognitive reappraisal (e.g., Heilman et al., 2010), and valence. Emotional response is vague, therefore the concept of valence is used. Valence is the emotional value that someone associates with a stimulus (Frijda, 1986). The two project elements are the stimuli that evoke a certain level of emotional value. A high emotional value is synonymous with a high emotional involvement. In other words: the more valence towards the type of project and/or the end-users, the more emotional involvement is to be expected. The more emotional involvement, the more emotional commitment is to be expected. The second predictor 'project impact' relates to the size, complexity, and costs of the project. A bigger project that involves more resources can result in different decision-making choices compared to smaller projects (e.g., breakthrough versus incremental innovation). It is very interesting to investigate the possible differences in undesirable commitment due to project impact, because it would greatly affect practical managerial decision-making. Three components of decision-making effectiveness are added to the model to show the undesirable practical impact of emotional commitment on decision-making.

Decision-making Effectiveness

One of the aims of this paper is to discover phenomena that let supposedly rational actors deviate from rational action. This paper finds itself equal to many other papers that want to explain the effectiveness of decision-making. Effectiveness is the degree to which the decision is successful in producing the desired result. Emotional commitment is such a phenomenon that is presumed to decrease decision-making effectiveness. Three components of decision-making effectiveness are added to measure the impact of emotional commitment on decision-making. The components are: 1) information usage, 2) risk perception, and 3) resource allocation. Emotional commitment is associated with a tendency towards a particular decision-option, making the search and use of information less relevant. Emotional commitment is expected to have a negative effect on information usage. Emotional commitment is also expected to have a negative effect on risk perception. A manager who is emotionally committed to choose the option to continue the innovation project, is less perceptive of signs that indicate

project failure. The manager perceives risks at a lower level. A manager who is emotionally committed to continue the innovation project is likely to allocate more resources than a manager who is not affected by emotional commitment. Emotional commitment is expected to have a positive effect on the height of resources to be allocated. The following framework presents the relationships under investigation between the two predictors, emotional commitment, and the three components of decision-making effectiveness:

Figure 1 - Framework of the Introduced Variables.
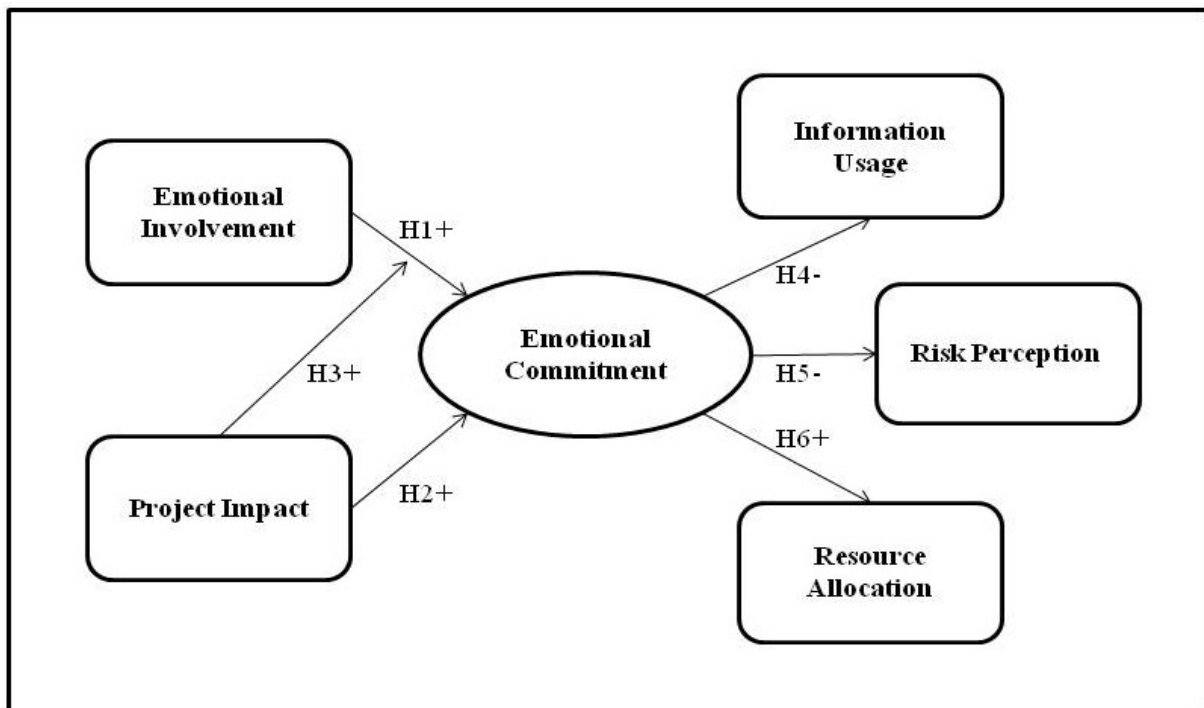
Research Questions

Emotional commitment is expected to play a role in decision-making, especially in situations of high uncertainty. The precise role of emotional commitment remains unclear. The aim of both studies is to start opening up emotional commitment. By focusing on the antecedents: emotional involvement and project impact, a better understanding of the effects of emotional commitment on decision-making can be measured. Higher levels of valence towards the project and the end-users are expected to affect emotional involvement. Emotional involvement and project impact are expected to affect emotional commitment. In turn, emotional commitment is expected to have an effect on decision-making effectiveness. In order to research the above, the following research question is formulated: What is the role of emotional involvement and project impact on the creation and development of emotional

commitment towards action (i.e., the decision) and how does it affect decision-making effectiveness? In order to answer the main research question, sub questions are formulated:

- How does emotional involvement influence the creation and development of emotional commitment in situations of high uncertainty?

- How does project impact influence the creation and development of emotional commitment in situations of high uncertainty?

- How does emotional commitment influence decision-making effectiveness?

  o How does emotional commitment influence the usage of information in situations of high uncertainty?

  o How does emotional commitment influence risk perception in situations of high uncertainty?

  o How does emotional commitment influence the allocation of resources in situations of high uncertainty?

Academic and Practical Contribution

Theoretical contributions are made by stepping into the undiscovered area of emotional commitment within decision-making theory. This research shows that emotional commitment is indeed a real force that needs to be accounted for. Emotional commitment is also an indicator of decision-making effectiveness. The research showed that emotional involvement has a high influence on the creation and build-up of emotional commitment. Even project impact seems to have a very small effect on undesirable commitment towards less rational courses of action. Both studies give insights into antecedents of emotional commitment as well as the effects on decision-making effectiveness. Lastly, the overall paper is meant to spark interest in other researchers to investigate this dark stretch of decision-making theory. More antecedents of emotional commitment must be identified in order to fully understand decision-making in settings that are characterized by high uncertainty.

Managerial contributions are made by making suggestions that can help managers to improve their decision-making process. Improvements are possible due to managers being more aware of their emotional involvement that affects the creation and build-up of emotional commitment. Managers are also more aware of the effects of emotional commitment on resource allocation, risk perception, and information usage. Lastly, the firm can make better choices on assigning managers to certain projects. If a firm knows that a specific manager is likely to develop emotional commitment, that manager can be pulled from the innovation project before less rational decisions are being made.

The Setup

Two studies are performed. The methodology and results are presented separately. A general questionnaire has been developed. The questionnaire was sent to 185 respondents of eighteen years and above. The final sample consisted of 100 respondents ($N = 100$). The questionnaire consists of an Initial Phase and a Second Phase. Analyses of variance are used to analyze data from the initial phase (Study 1). Partial least squares structural equation modeling and paired samples *t*-tests are used to analyze data from the initial phase and second phase (Study 2). The findings will be discussed simultaneously. Lastly, managerial implications, limitations, and suggestions for further research are provided.

In the theory chapter, a deeper dive into emotional commitment is made and hypotheses are given. There is a focus on the effects of emotional involvement and project impact on emotional commitment. Secondly, the effect of emotional commitment on three components of decision-making effectiveness is theorized. Lastly, the overall conceptual model is presented.

Theory

Emotional Commitment in Innovation Projects

The introduction described emotional commitment as a new and under-researched concept. Emotional commitment is the latent force in the mind of the decision-maker in which emotions create and build-up an undesirable form of commitment to a course of action. The

rationale of this paper is discovering the existence of early stage emotional commitment, and the effects of this commitment on managerial decision-making effectiveness in situations of high uncertainty. Before the hypotheses are derived from theory, it is important to theorize and visualize the workings of emotional commitment. Emotional involvement and project impact are added to the theory. After these theorizations, the addition of three components of decision-making effectiveness conclude the conceptualization.

The first step is to look at commitment in innovation projects. Mintzberg et al. (1976), referred to a decision as commitment to action. Commitment is more or less the predilection and tendency for a decision-option. The more commitment towards an action, the more likely it is that the manager chooses that action. In other words, there is a build-up (i.e., commitment) towards a choice for a particular course of action (i.e., the decision). Mintzberg et al., (1976) also mentioned that commitment is a byproduct of initial decisions. That means that commitment is not only formed in the beginning stages of a project, but also remains present during follow-up decision-making. Note that commitment to action differs from the more general concept of commitment. For example, commitment to an organization is a different kind of commitment, while both affect the decision-maker in his or her decisions.

The choice that the manager makes is defined by the expected utility of the outcome for that option. The manager chooses an option that either maximizes expected utility (Schoemaker, 1982) or satisfies expected utility of the outcome (Simon, 1972, 1997). Maximizing expected utility refers to a decision that results in the best outcome for the decision-maker. A decision-option that satisfies expected utility refers to an option that reaches a minimum level of satisfaction. This option does not have to maximize expected utility, but must have enough expected utility to satisfice the decision-maker. It is a clash of economic decision theory versus the theory of bounded rationality. The firm likely expects decisions that maximize utility for the firm. A manager who is rationally bound chooses a course of action that likely satisfices expected utility and with it, hopefully satisfies the firm (Simon, 1997).

The project manager has to make decisions in situations of high uncertainty. Innovation projects are clouded in high uncertainty, simply because the future of the project is unclear. It is unknown what events and problems will occur in the future. A manager does not know for certain if made investments will pay off. Managers cannot even accurately predict their own future feelings and actions (Gilbert & Wilson, 2000; Ku, 2008). This uncertainty is in conflict with expected utility theorem. The axioms of expected utility theorem cannot be met, because a manager does not have perfect rationality and full knowledge of all possible choices and outcomes. This makes it highly implausible for the manager to choose the option that results in

maximum utility. Choosing decision-options that satisfies expected utility becomes more realistic in innovation projects. To make good decisions in innovation projects, the manager must try to diminish uncertainty and increase utility by searching and using relevant information. Asserting the level of risk for each option and determining the height of resources needed is also important for higher levels of effectiveness. In other words: to achieve high levels of expected utility, there must be a high decision-making effectiveness. To increase decision-making effectiveness in innovation projects, firms adopt some form of the stage-gate model (Cooper, 1990, 1992; Cooper et al., 2002). The model (conceptual and operational) is a blueprint for managing New Product Development processes by improving efficiency and effectiveness (Cooper, 1990). The project is divided in different stages with corresponding decision-gates. Such stages and gates give the manager a better overview of the situation at hand, which can reduce overall project uncertainty.

After each stage, there is a gate at which the manager must decide the future of the project. The decision to kill a project is not easy to make. A lot of time, effort, and money have already been invested in the project (Ku, 2008). Accepting the invested resources as a loss seems to be difficult. The tendency to escalate commitment towards the project increases (Keil, Truex & Mixon, 1995; Staw, 1976). Killing a project while it was on the brink of success or continuing a project that seems likely to fail, are indicators of undesirable commitment towards unwanted courses of action. Undesirable commitment is linked to emotion. Emotion has been described as an irrational affector of decision-making (Stickney, 2009). Emotion makes the manager behave and decide less rational. Emotional commitment in the early stages seems to be a determinant for the same (and even less rational) courses of action. Figure 2 demonstrates the basic conceptualization of emotional commitment within innovation project decision-making.

Figure 2 - Visualization of Emotional Commitment in Innovation Projects.

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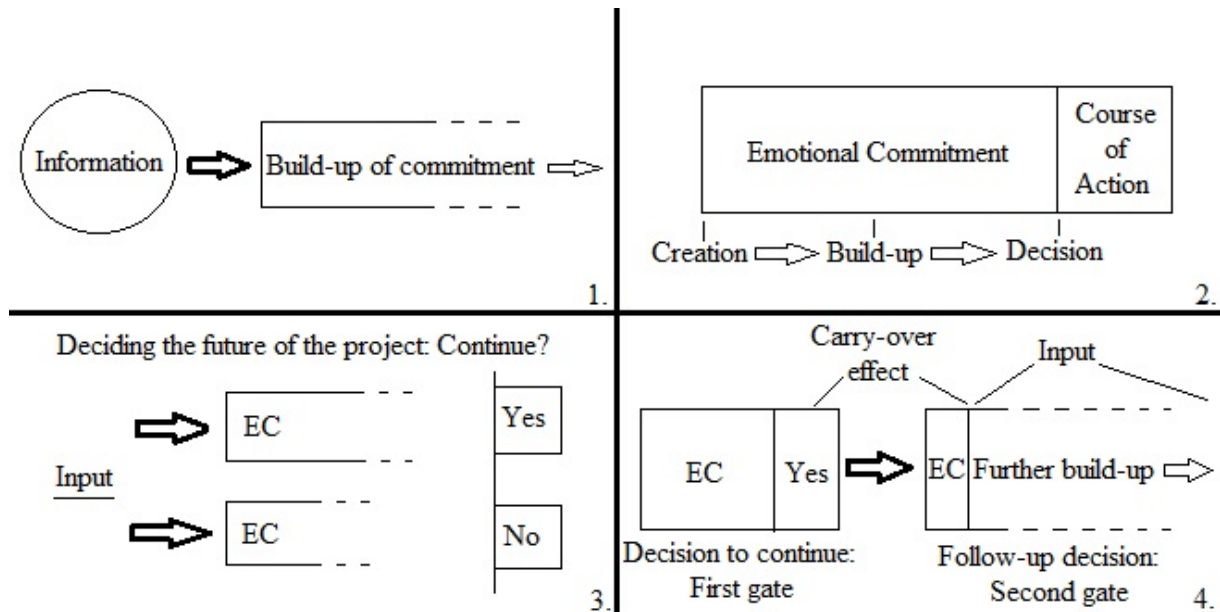
In innovation projects, the assumption is that decisions are not made spontaneously. The first step is the search and analysis of information. Information can include among other things: documentation, people, and experience. The gathered information is analyzed so that the manager can make a decision. During the weighing of one's decision-options, the manager is building up towards a particular course of action (Part one of Figure 2). The course of action that the manager decides on has the highest level of commitment (when talking about set decision-times). Reaching a certain level of commitment can also prompt the manager to decide to take the related course of action (when decision-times are not set). When exactly commitment transposes into the decision to a course of action is hard to measure (Langley et al., 1995) and lies beyond the scope of this paper.

Part two of Figure 2 shows the basic concept of emotional commitment to action. The more emotional commitment there is for a course of action, the more the manager thinks that this course of action is (emotionally) the best one. All the information and emotions that affect the creation and build-up emotional commitment, is called 'input'. When deciding the future of a project, the manager has the option to continue or to kill the project (Part three of Figure 2). More emotional commitment towards the project increases the likelihood that continuation is the eventual course of action. When the project continues, emotional commitment from the previous decision has a carry-over effect (Mintzberg, 1979) towards the next decision (Part four of Figure 2). The carry-over effect makes the manager slightly steer towards project continuation (at the following decision-gate). Too much build-up of emotional commitment,

paired with a high carry-over effect, can easily result in escalation of commitment (Staw, 1976; Staw & Ross, 1987a).

The Addition of Valence

Managers who start an innovation project have a stronger build-up of commitment (in new product development) than managers who are assigned to the project in a later stage (Schmidt & Calantone, 2002). When managers are personally responsible for the project, the chance of escalation increases (Schmidt & Calantone, 2002). Being personally responsible seems to create a stronger undesirable commitment. The emotions associated with responsibility push the manager towards project completion (i.e., goal attainment). These managers are more likely to continue the project when failure seems to be imminent. Escalation of commitment focuses on the *later stages* of decision-making, where project failure is imminent but the manager does not recognize/accept signs of failure and continues to invest in a doomed project (Drummond, 1994, 1998). The paper of Schmidt and Calantone (2002) gives the insight that the foundation for a strong build-up of emotional commitment is formed in the early stages of an innovation project. There must be some antecedents that create and affect the build-up of emotional commitment in early stage decision-making. The first antecedent under investigation is emotional involvement.

Emotional involvement is the experience of emotions that takes someone in the process of being part of something, and is part of something. For example, a nurse that is emotionally involved with patients so that he or she can truly care for them. Students that must be emotionally involved in school, otherwise dropout rates and absenteeism would be much higher. The experience of positive and negative emotions should activate the decision-maker to strive for positive outcomes (e.g., the attainment of goals). Emotional involvement would then evolve into emotional engagement. Unfortunately, emotional involvement can make decision-makers involved in less rational courses of action. For example, a manager that keeps spending valuable resources on a project while it is highly uncertain whether that project would ever succeed. It raises the question: when does Emotional Involvement transform into undesirable (emotional) commitment? To be emotionally involved, the manager must experience emotions about something. To measure emotional involvement in the beginning stages of an innovation project, there must be an affective state or attitude affecting the manager at the start. That affective state is valence.

Valence is the emotional value that a manager experiences with a certain stimulus, specifically the attractiveness or aversiveness of the stimulus (Frijda, 1986). If there is a

stimulus in the project (i.e., emotional attractiveness or emotional aversiveness), valence is assumed to be high if that stimulus is met. When a stimulus is met, the manager experiences the emotions that are attached to the stimulus. The emotions that a manager can experience differ from happiness and confidence to anger and disappointment. How strong these emotions are and how strong they are experienced, depends on the manager's emotional value. In many cases, the manager will overestimate the intensity of future affective states (Buehler & McFarland, 2001; Ku, 2008).

To stay close to the manager and the innovation project, a specific dimension of valence must be chosen that can affect managers in the earliest stages of an innovation project. In this paper, two project elements are used that affect the emotional state of a decision-maker. The first project element is the type of project. The second project element is the end-user of the innovation. The main valence-stimulus is the importance of project continuation and completion. The more important project continuation and completion is, the more a manager is moved to continue and complete the project (Ryan & Deci, 2000). Commitment to a goal is what makes managers continue with the same course of action while negative feedback says otherwise (Lee, Keil & Wong, 2015). It can be seen as emotional (irrational) goal attainment.

The first project element is the *Type of Project,* for which the manager has a level of subjective importance. In short, the manager has an emotional value associated with the type of project (e.g., a medicine against cancer) which in turn leads to emotional attractiveness or aversiveness to the project. A manager that has a higher emotional attractiveness to the project is more emotionally involved, and cares more about the continuation and completion of the project. The motivation to pursue project completion lies in the expectation that the manager will receive first and second order outcomes (expectancy theory) (Vroom, 1964). The outcomes are related to the perceived gratification of needs of the manager.

The second project element is the *Type of End-user* of the innovation. Different types of end-users hold different emotional values for the manager. The emotional attractiveness of project completion increases as the end-users become more important to the manager. The emotional stimuli for the second project element are the first and second order outcomes that the manager thinks he or she will receive if the innovation is helpful for the end-users, and is perceived as helpful by these end-users. Figure 3 helps to visualize the connection between the project elements, valence, and emotional commitment in innovation projects.

Figure 3 - Visualization of the Effect of Valence on Emotional Commitment.
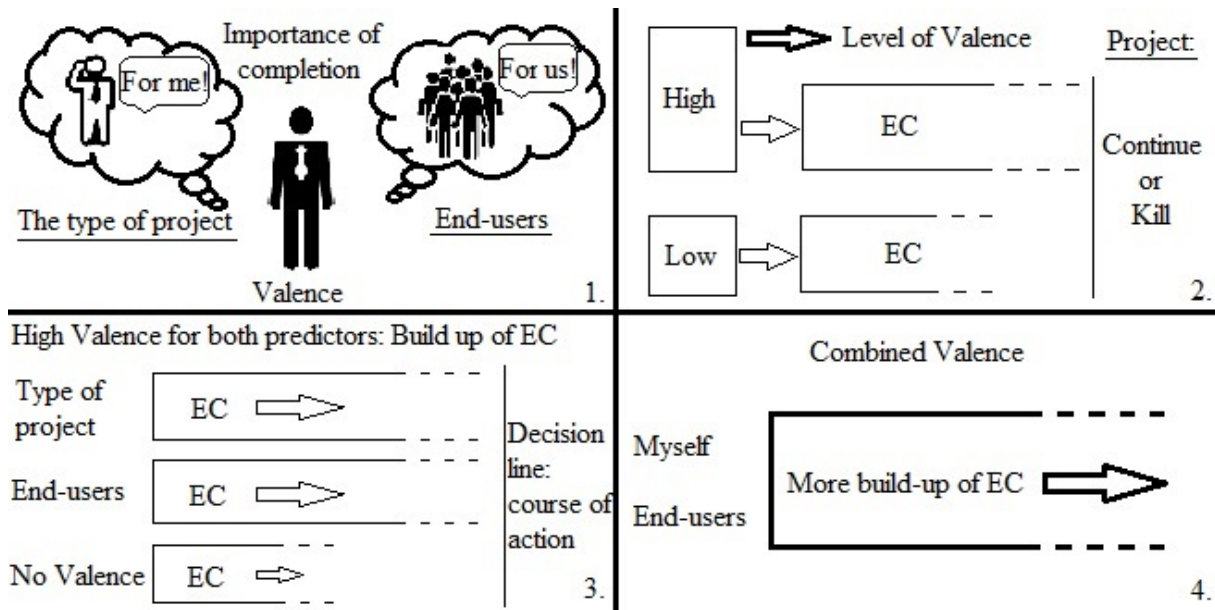
At the start of an innovation project, the manager has a mental picture of what is going to be developed and who it is for. The manager himself chooses the project or gets a project assigned by others. Either way, the manager holds an emotional value towards the project and the end-users (Part one of Figure 3). Innovation projects are governed by high uncertainty. The future of the project is not known. This means that the manager has to decide if project continuation is worth the investment. A manager that is emotionally involved, is more likely to see the project as worthy of pursuing. How important the type of project and the type of end-users are to a manager is expressed in levels of valence. More valence equals a higher emotional involvement which results in a higher creation and build-up of emotional commitment (Part two of Figure 3). Once emotional commitment reaches the decision line, the decision to continue the project is made (Part three of Figure 3). The decision line is the point in time where the manager decides the next course of action. In innovation projects, decision-gates are time frames in which the decision line resides. Once the decision line is crossed, the manager follows the course of action that has the most emotional commitment. That course of action would be to continue the project if the manager is affected by valence (assuming all other factors are zero). The level of valence increases if both project elements are applicable. (Part four of Figure 3).

An explanation is given *why* higher levels of valence towards the project and the end-users increases emotional involvement, which in turn stimulates the creation and build-up of emotional commitment. The next step is to explain *how* higher levels of valence affect the creation and build-up of emotional commitment. The following two paragraphs explain how

the two project elements can increase emotional involvement. After these two paragraphs, decision-making effectiveness is added to show the latent force of emotional commitment to related decisions.

Predictor 1: Emotional Involvement

Involvement is a theoretical component of affective commitment (Riketta & Van Dick, 2009). Emotional involvement is a highly likely antecedent of emotional commitment. Two elements of an innovation project have been chosen that affect the emotional involvement of the manager on a personal level. The elements are the type of project and the type of end-users. These project elements are present in every innovation project and can hold different levels of emotional value for managers. It is important to note that these paragraphs explain how the elements can affect a manager on the individual level. The elements do not intrinsically increase or decrease valence, but can affect personal valence. It is the perception of the manager that determines the subjective importance of the elements.

Project Element: Type of Project

The first project element is the type of project. Specifically the emotional value that a manager has associated with the type of project. There are many different types of projects. One project can be simple, short, and relatively cheap. For example, a toothbrush made from plastic (e.g., incremental innovation). Another project can be difficult, long, and expensive. For example, a newly developed medicine (e.g., breakthrough innovation). Given these differences between projects, it is expected that different managers have different emotional values for different projects. Higher levels of valence constitute a bigger impact of emotions on decision-making. Why is a higher build-up of emotional commitment expected when emotional involvement is high? When something evokes emotion, that thing apparently has emotional meaning for the decision-maker. In general, higher levels of valence indicate the presence of an affective state towards a stimulus (Frijda, 1986). The affective state towards the project (i.e., the stimulus) makes managers emotionally involved in the project. Changing the project does not mean that involvement is automatically increased or decreased. A short and cheap project may be personally important to the manager (high valence), and a big and (objectively) important project may actually not affect the manager personally. Which emotions affect the manager and at what level, find their roots in underlying mechanisms. The underlying mechanisms that guide individual decision-making lie within intrinsic and extrinsic motivations

(Vroom, 1964). Intrinsic and extrinsic motivations are a derivative of Vroom's Expectancy theory. This theory is one of the most accepted theories of why decision-makers make the decisions they make.

In light of expectancy theory, one must see valence as the emotional orientation that the manager holds towards outcomes. In other words, the emotional value that the manager attaches to an outcome. Outcomes can be divided in first and second order outcomes (Vroom, 1964). The manager puts in effort because he or she expects first order outcomes (i.e., expectancy). First order outcomes are among other things: performance, creativity, and tardiness. The manager has a perception about how first order outcomes can lead to second order outcomes (i.e., instrumentality). Second order outcomes are among other things: praise/acceptance from the boss/co-workers, salary increase, promotion/demotion, and job security. These outcomes are what the manager actually desires. The second order outcomes translate into intrinsic and extrinsic motivations. Intrinsic motivations are about the things that are inherently interesting or enjoyable for the manager (i.e., internal rewards) (Ryan & Deci, 2000). Extrinsic motivations are about doing something because they are leading to a separable outcome (e.g., a salary increase or promotion) (Ryan & Deci, 2000). Taking cognitive evaluation theory into account, it is important to note that the experience of different external rewards lead to different effects of intrinsic motivation (Desi, 1971, 1972; Deci, Koestner & Ryan, 2001). A manager with high valence towards his or her current project has intrinsic motivations, extrinsic motivations, or a combination of both to continue the innovation project (Motivational Force = Expectancy x $\sum$(Valences x Instrumentalities)). These intrinsic and extrinsic motivations are likely used as justification for the continuation of the project. Justification seems to be important for the build-up of (emotional) commitment, because it is an antecedent of escalation of commitment (Bobocel & Meyer, 1994). Motivation makes the manager move to do something, rather than to do nothing (unmotivated) (Ryan & Deci, 2000). The more emotions a stimulus evokes, the higher the motivational force to achieve the outcome. In other words: the more important a project is, the more the experienced emotions make managers emotionally involved. Emotional involvement can lead to an undesirable commitment towards a less rational course of action.

Emotions can be categorized into different dimensions. Two important dimensions are immediate and future (expected) emotions. Immediate emotions affect the decision at hand. Loewenstein and Lerner (2003) made the distinction between a direct and an indirect impact of immediate emotions. An indirect impact of immediate emotions is when a manager has a preexisting mood that can influence a decision. A direct impact of immediate emotions is when a manager directly experiences emotions at the prospect of continuing or killing an innovation

project. A manager with high valence towards his or her current project is emotionally caring about a successful completion. The course of action to continue the project likely results in a direct impact of pleasant emotions. Killing the project on the other hand likely results in the experience of negative emotions. Pleasant emotions steer the manager towards a decision while negative emotions deter the manager from making a particular decision (Schwarz, 2000). If the project is important, the manager will experience emotions that support the decision to continue the project (e.g., happiness to continue, sad when to kill). Emotional involvement is expected to affect the creation and build-up of emotional commitment, because managers would rather experience positive emotions than negative emotions.

Future expected emotions can also affect decision-making (Loewenstein & Lerner, 2003). Decision-makers ask themselves how the decision makes them feel (Schwarz & Clore, 1983). Feelings (e.g., towards the expected affective state) are used as information that influences the next series of decisions. It is known as the affect-as-information hypothesis (Clore, Gasper, & Garvin, 2001). Especially the experience of negative feelings (i.e., mood) leads to a more deliberate information processing, because the decision-maker wants to 'fix' the negative affective state (Schwarz & Clore, 1983). It should be noted that judgment is not always affected by feelings, and that information is more experiential than it is conceptual (Clore et al., 2001). In case of goal attainment, higher levels of positive anticipatory emotions increase the tendency to escalate commitment (Harvey & Victoravich, 2009). If a pleasant emotion is expected, the decision-maker will steer in the direction of the pleasant emotion. An option that makes the decision-maker feel good, increases the incentive to choose that particular option. Does the decision-maker anticipate negative emotions, then inaction is favored over action (Schwarz, 2000). If the intensity of an emotion increases, the influence of the emotion on behavior increases (Loewenstein & Lerner, 2003). Highly intense emotions can disrupt cognitive processes, thus making full rational decision-making highly implausible. A manager that is emotionally involved to his or her project expects pleasant emotions when the project continues (current emotions) and is completed (future expected emotions). The higher the valence, the more intense the emotions can be when managers think about the expected emotions. A manager that is directly and indirectly impacted by current and future emotions has a much harder time to be a rational actor. A manager that is emotionally involved in his or her project experiences these emotions and therefore has more intrinsic and extrinsic motivations to continue the project. A higher emotional involvement is thus expected.

Project Element: Type of End-users

The project element 'type of end-users' is very similar to the previous project element. Just like the type of project, decision-makers experience different levels of valence towards the end-users of the project. For example, a manager likely experiences a different emotional value if the innovation for disabled children rather than for prisoners. It does not mean that this element intrinsically increases or decreases valence, but it can affect personal valence. A difference in emotional value for end-users results in the experience of different emotions and different levels of emotions. The experienced emotions motivate the manager to actively pursue project completion if the end-users are important to the manager. Immediate and future expected emotions govern the intensity of the motivations (Loewenstein & Lerner, 2003). The emotions are derived from underlying intrinsic and extrinsic motivations (Vroom, 1964). Strong intrinsic and extrinsic motivations make the manager emotionally involved. It is important to remember that valence is the emotional orientation of the manager towards outcomes. Outcomes can be divided in first and second order outcomes. Why project continuation is important differs for both elements. The emotions and motivations related to each type of subjective importance have different roots and can be experienced differently. However, the way intrinsic and extrinsic motivations work remains the same. Intrinsic motivations are about inherently interesting or enjoyable things, and extrinsic motivations are about doing something because they lead to a separable outcome (Ryan & Deci, 2000). Higher levels of valence towards the end-users of the project likely result in a higher build-up of emotional commitment towards continuation and completion of the project. The manager who finds the end-users of his or her project important has the emotions (current and future expected) and motivations to put more energy in the continuation and completion of the project.

The paragraphs above are about the effect of two project elements on emotional involvement. Emotional involvement is expected to affect the creation and build-up of emotional commitment. The following hypothesis is therefore formulated:

H1: Emotional involvement has a positive effect on the creation and build-up of emotional commitment in situations of high uncertainty.

Predictor 2: Project Impact

Modern firms actively pursue product innovation, because it is has become a vital task (Schilling & Hill, 1998). Many firms are working on a multitude of projects. Several factors

determine the impact of a project on the firm and management (and every other stakeholder). For example, there can be a difference in size, resources used and needed, and duration. The time, energy, and resources spend on a project can range from a little to a huge amount. A good portfolio management therefore has become the norm rather than exception. The fine line between success and failure often lies in how well resources are distributed between projects. Cooper (2000) gave four goals for a successful portfolio management. The first goal is maximizing portfolio value. The total worth of the projects being developed must yield maximum value for the corporation. The second goal is the achievement of the right balance of projects. There must be a fine balance between low-risk and high-risk, short-term and long-term, new products and product improvements, and so on. The third goal is the achievement of a strategically aligned portfolio. The projects must be on strategy and the investments in the projects have to mirror the strategic priorities of the firm. The last goal is the balancing of resources. Firms are prone to having too much projects in their portfolio while resources are limited. Some projects might need more resources, others are mimicking sunk cost garbage cans. Some projects take too long to get to market, while others get their corners cut. Spending resources on a project does not only affect the project itself, but also the firm's total amount of limited resources (and with it other projects as well). It is very important that the allocated resources get managed properly, especially if a project needs a lot of it due to its big impact. It is highly undesirable that a manager would create and build up some undesirable commitment towards the project which could negatively affect decision-making effectiveness. Such ineffective decisions can result in the drainage of additional resources to a lost cause. The entire portfolio of the firm can be negatively affected.

Projects that have a big impact are usually accompanied by higher amounts of pressure. There are many stakeholders that rely on the proper management (and even success) of the project. Being responsible for an efficient and effective allocation of scarce resources can be daunting. It is not a farfetched idea that managers of such projects are going the extra mile to prevent failure. Failure is associated with negative emotions. Such emotions are unpleasant and are likely to be avoided. Inaction is then favored over action (Schwarz, 2000). In general, there is a lot more at stake when a project with a big impact fails. It is expected that the emotions for such a project can be more intense by average. Intense emotions increase the effects of emotions on behavior (Loewenstein & Lerner, 2003). Emotions experienced by managers trigger intrinsic and extrinsic motivations (Vroom, 1964) to continue the project, rather than acknowledging its failure. If a successful project affects a lot of stakeholders, its impact can serve as a motivational tool. Projects with a big impact usually cost a large amount of resources. Such projects have a

larger amount of sunk costs. When investments are high, it is much harder to let the project go (Staw & Ross, 1987a). The manager is then likely to create and build-up undesirable emotional commitment to the project. The following hypothesis is therefore formulated:

H2: Project impact has a positive effect on the creation and build-up of emotional commitment in situations of high uncertainty.

It is possible that the joint effect of emotional involvement and project impact is significantly greater than the sum of their parts. A manager can perceive a higher impact if he or she is emotionally involved in the project. It is also possible that a higher impact can make a manager more emotionally involved in the project. The following hypothesis is therefore formulated:

H3: As project impact increases, the emotional involvement-emotional commitment association becomes stronger.

Measuring the existence of emotional commitment is important for a deeper understanding of decision-making theorem. To measure the effects of emotional commitment on decision-making effectiveness, three components of decision-making effectiveness are added: information usage, risk perception, and resource allocation.

Information Usage

The first component of decision-making effectiveness is the search and usage of information. In situations of high uncertainty, the acquisition and usage of information becomes very important (Fahey & Narayanan, 1986). Decision-makers in an innovational context have to deal with an abundance of information (overload) rather than with information scarcity (Meyer, 1998; Bucklin, Lehmann, & Little, 1998). The gathered information consists of relevant and irrelevant information. The process of sensemaking must make the manager aware of the information that is usable (Weick, 1995). Information is used to reduce or even remove uncertainty (Frishammar, 2003), although other researchers found that information is not often used to resolve uncertainty (Mishra, Allen & Pearman, 2015). One way to define uncertainty is that processed information is lower than the information needed to complete the task (Kaye, 1995). Another definition is that the manager has an inability to accurately predict the outcomes

of a decision (Duncan, 1972). In case of continuation or kill decisions, uncertainty is very high. Many factors influence the fate of the innovation project. At one time the project may be flourishing, but at another time the project is doomed to fail. In order to make good decisions, the manager must search and use enough information to be as accurate as possible in his or her judgments.

In an ideal setting, the manager uses all available rational information to determine the best course of action. This view is based upon rational decision theory (Berryman, 2008). Information research based on this theory ''assumes that effective decision-making is preceded by and inextricably linked to the seeking and use of information to make reflective, evidence-based decisions'' (Mishra et al., 2015, p. 663). In order to decide effectively in innovation projects, the manager has to search and use relevant information when it comes to project continuation. Unfortunately, there are some figurative roadblocks regarding rational decision theory. Simon (1997) introduced the concept of bounded rationality almost seventy years ago. Humans are only capable of grasping a certain understanding of the problem (tractability). The limited decision-time in innovation projects is not contributing to rational decision-making. Mental limitations prohibit a full understanding of the problem and its decision-options (Mullainathan & Thaler, 2000). Kahneman and Tversky developed an important perspective on the theory of bounded rationality (Gilovich, Griffin & Kahneman, 2002). Within the operating mind of the decision-maker, biases were identified by Kahneman and Tversky (e.g., 1972) that interfere with the decision-making process. Cognitive biases specifically refer to biases that are present in the decision-maker's mind. There are also behavioral biases, who find their roots in emotion. Managers are prone to biases when they judge in an uncertain context (Peón, Antelo, & Calvo-Silvosa, 2017).

In rational decision theory, the standard model of rational choice says that decision-makers choose the options that maximize expected utility. Biases however make the manager reason in less rational ways, which lead to systematic deviations from a standard of rationality (Shefrin, 2006). Biases are an inclination or prejudice that the decision-maker has against or for someone, or against something. Biases can be seen as filters that affect information processing, and the information that the eventual decision is being based upon. Kahneman, Slovic and Tversky (1982) talk about several forms of systematic bias that involves choice in the decision-making process. A very important concept in the domain of biases is heuristics (Kahneman & Tversky, 1972, 1992; Plous, 1993). Heuristics are an approach to decision-making, in which experience is used to make judgments and decisions. The decision-maker uses mental shortcuts that help the decision-maker to make quick decisions or focus on one aspect. The approach of

most researchers towards heuristics and biases is the consideration of heuristics first, and then the biases the heuristics lead to (Peón et al., 2017). Simplified heuristics are a coping mechanism to handle the complexity of decision-making. Experience is necessary for a somewhat effective implementation of heuristics. Experience however negatively affects the search for relevant information (Mishra et al., 2015). Heuristics can be seen as shortcuts for information processing, or refer to rules that ignore information (Marewski, Gaissmaier & Gigerenzer, 2010). Information, in a domain of judgment under uncertainty, is extensive, scattered, and subject to change. Managers make their own rules of thumb to process information and to come to a decision. This often leads to errors in the manager's judgment (Shefrin, 2000).

Different types of heuristics and biases have been identified over the years (Kahneman, Slovic, & Tversky, 1982; Plous, 1993; Rabin, 1998; Peón et al., 2017), although not all biases have been scientifically proven. Emotional commitment can be seen as a bias that affects the search and usage of information. In case of escalation of commitment, a manager is irrationally stuck in the same decision-pattern (Brockner, 1992; Staw 1976; Staw & Ross, 1987b). The search and usage of relevant information is almost absent. Build-up of emotional commitment in the early stages of an innovation project is expected to have a negative influence on the search and usage of information. Affect can influence the analytic processing of the manager (Stickney, 2009). Mood can influence the way managers think and evaluate situations (Forgas & George, 2001). Emotional commitment is the tendency to choose a particular course of action, due to emotions. This tendency can be created without the use of much information, especially if the decision-maker is emotionally involved. The tendency for one particular course of action makes other courses of action less interesting. Managers that seek and process new information, often find that new information biases in favor of the managers' beliefs, expectations, or desired conclusions (Jonas, Schulz-Hardt, Frey & Thelen, 2001). Emotional commitment is likely to bias analytical processes in the early stages of innovation projects. A huge bias that comes to mind is confirmation bias (Griffin & Tversky, 1992). If a manager has a higher emotional commitment towards the continuation of the innovation project, than that course of action becomes central. The manager unconsciously search and selects information that supports the decision to continue the project (confirmation). The value of information that supports project continuation is perceived as more valuable than the same amount of information that indicates project abandonment is the best course of action (Nickerson, 1998). Recalling information also happens in a way that favors the continuation of the innovation project. A small case can be made for the anchoring of initial positive information that confirms

the importance of the project. Anchoring effects occur when a manager evaluates the project through previous evaluation or information that serves as an anchor for future reference (Tversky & Kahneman, 1974). The information does not have to be correct, but can still be a part of the basis of the decision. Future information that does not resemble the anchor information can be tossed aside. Such a thing negatively affects the search and usage of relevant information.

A certain level of information is needed to evaluate the available courses of action. If a manager has a high amount of emotional commitment, acknowledgement of contradictory information becomes harder. There is less incentive to look for additional information if one particular course of action is already preferred. Emotional commitment can be seen as an irrational tendency for a particular course of action of which rational information has a hard time persuading the manager to take another course of action. Information that disagrees with the preferred course of action is likely to be dealt with in a manner that is related to dissonance theory (Festinger, 1957). The manager who has emotional commitment to a course of action prefers consonant information that supports that course of action. Dissonant information might bring the manager in disharmony which has to be avoided by the inner drive of the manager. Dissonant information is less likely to be searched. Even if this type of information is found, the manager can create cognitive illusions to rationalize the information to fit the preferred course of action. The manager tries to consciously justify his or her decisions to himself (Eysenck, 2009) and to others (Simonson & Staw, 1992). Information is sought and used to justify the decision after the decision is made (Mishra et al., 2015).

Emotional commitment is theorized to have a negative effect on the usage of information. The following hypothesis is therefore formulated:

H4: Emotional commitment has a negative effect on the usage of information in situations of high uncertainty.

Risk Perception

Looking back at 'Homo Economicus', economic actors that behave and decide rationally should have equal perceptions about risk. The reality is that managers use heuristics in uncertain situations to reduce complexity and assert probabilities. The negative consequence of using heuristics is that the decision-maker can be affected by systematic errors (i.e., biases). Biases affect the information behavior of decision-makers which in turn can affect the

perception of risk in innovation projects. How managers perceive risk is important for the effectiveness of their decision-making.

The best known descriptive and normative theory for decision-making under risk or uncertainty, is prospect theory (Kahneman & Tversky, 1979). The theory assumes that decision-makers use the value function to evaluate outcomes of risky prospects. Unlike expected utility theory, where risk aversion and risk seeking are only determined by the utility function, prospect theory determines the value of risk aversion and risk seeking by the value function and weighting functions (Kahneman & Tversky, 1992). In the modified version of prospect theory (Kahneman & Tversky, 1992), four risk attitudes are confirmed by experimental evidence (Peón et al., 2017; Barberis, 2013). The four elements are: reference dependence, loss aversion, diminishing sensitivity, and probability weighting. One can argue that some elements favor managers who have a higher emotional commitment due to higher levels of valence. Managers who are emotionally committed to the project likely perceive a higher value of the change from one decision-gate to another, because the project is one step closer to completion. The perceived value of previous investments is likely to be higher, because project continuation and completion is important. The thought of losing the investment and also the project (which is important) can increase the loss aversion effect on the manager. A manager that finds the completion of a project important and thus has more emotional commitment towards the project, is expected to overweight the probability that the project can successfully be completed (Vallone, Griffin, Lin, & Ross, 1990). Overestimating the probability that the project can be completed is a result of the overconfidence that individuals tend to have in their forecasts (Dunning, Griffin, Milojkovic, & Ross, 1990; Griffin, Dunning, & Ross, 1990). There is a positive relationship between commitment and the illusion of control (Keil, Depledge, & Rai, 2007). In the beginning stages of an innovation project, the total amount of investments is lower than in the later stages. This gives managers the perception that more can be invested, because sunk costs are still on the lower side.

Kahneman and Tversky (1992) mentioned that risk aversion is generally assumed to be leading in decision-making under uncertainty. However, when decision-makers are confronted with a sure loss versus the substantial probability of a bigger loss, the decision-makers prefer the probability of a substantial bigger loss. It is expected that managers who are emotionally committed to the project, are more risk seeking than managers who are not influenced by emotional commitment. Keil et al., (2000) discovered a negative relationship between risk perception and escalation of commitment. Managers not only tend to be overconfident when they forecast the future (Griffin et al., 1990). Managers also tend to overestimate their ability

to control these forecasts, or at least the outcomes of their decisions (Kahneman & Riepe, 1998). The above gives rise to the expectation that managers, who are emotionally committed to the continuation of the project, perceive risk at lower levels than normal. A lower risk perception is a result of the overconfidence their own abilities and the project, and the overweighting of probabilities. The following hypothesis is therefore formulated:

H5: Emotional commitment has a negative effect on risk perception in situations of high uncertainty.

Resource Allocation

The last hypothesis relates to the effect of emotional commitment on resource allocation. During innovation projects, a lot of resources are spent on the development of a new innovation. A product innovation is a product that is perceived as new by stakeholders (Rogers, 2003). Innovation can be seen as creative destruction (Schumpeter, 1976), because the innovation replaces the old with the new. To create a successful innovation from start to finish is not an easy accomplishment. Within the multiple dimensions of value, it is found that the new product must offer a dramatic technical improvement or be compatible with an existing installed base either by replacing or complementing (Schilling, 2016). Only one in three thousand innovation ideas is successful. No wonder that pursuing innovation is an expensive endeavor. The amount of resources (e.g., time, energy, and finances) that it costs to make a project successful can be enormous. The type of the project (e.g., incremental or breakthrough) and its impact influence the height of allocation (Cooper, 2000). An important task of the project manager is to decide if the innovation is worth pursuing or if it is best to pull the plug. When a manager decides to continue the innovation project, the next step is determining the height of the resources to be allocated.

In situations of high uncertainty, determining the amount of resources needed can be very difficult. Innovation projects have a high degree of uncertainty, which means that managers do not know if the made investments will return as profit. If it were up to the Homo Economicus, the height of the allocated resources would be pinpointed with rational precision. The expected utility for each decision-option is weighted by trading off risks and expected benefits. Managers do not have this rational foresight. After the decision is made to continue the project, managers must select and process relevant information to determine the most effective allocation. This is done by an ongoing sense making process (Weick, 1995). In most

cases, firms run several innovation projects simultaneously. A scarcity of resources demands an effective and efficient allocation for each project (Cooper, 2000). Unfortunately, emotional commitment seems to be a latent force that affects decisions related to project continuation. Emotional commitment towards related decisions shows the ubiquity of commitment (Staw, 1997). After the decision to continue the project, decision-makers show an undesirable decision commitment to resource allocation (McNamara, Moon, & Bromiley, 2002). As theorized in a previous paragraph, managers that are emotionally committed to project continuation and completion, have their information search and usage distorted. The project is likely to be portrayed as more important than it actually is, which results in an unbalanced (or even unjustifiable) allocation of resources. An unjustifiable allocation is seen when escalation of commitment dictates financial decision-making (Drummond, 1994, 1998; Staw, 1981). When a large sum has already been invested, it is even harder to let the investment go (Staw & Ross, 1987a). Three important allocation irrationalities can be identified in escalation theory: the reluctance of managers to accept previously made investments as a loss (because they are too concerned with the unrecoverable sunk costs). Too much focus on what it costs to kill the current project rather than focusing on the costs of missing other possible opportunities. Lastly, the unwillingness to acknowledge that previous investments in the project were a mistake (Molden & Hui, 2011; Brockner, 1992; Arkes & Blumer, 1985; Staw, 1981). The result is that managers are investing additional resources in the hope that a finished (and successful) innovation will pay off and erase the managers' losses and vindicate their actions (Molden & Hui, 2011).

If the escalation of commitment significantly affects the allocation of resources, it is expected that lower levels of emotional commitment also have a noticeable effect on the allocation of resources. After all, emotional commitment is decreasing the decision-maker's rationale. Decision-makers want to avoid negative emotions and strive for positive emotions (Loewenstein & Lerner, 2003). If project completion gives positive emotions and failing a project gives negative emotions, the manager has a stronger motivation to actively pursue project completion, which likely results in the allocation of more resources. If resources are already been spend on a project, the effects of sunk costs (Keil et al., 1995b) influence the manager to continue with allocating even more resources (Arkes & Blumer, 1985). Decision-makers are more willing to invest the same amount of resources in ongoing projects than those at the start of a project (Arkes & Blumer, 1985). Even a linear relationship between the willingness to continue a project and the amount of sunk costs exists (Garland, 1990). The refusal of acknowledging a deteriorating project is stronger if that acknowledgement results in
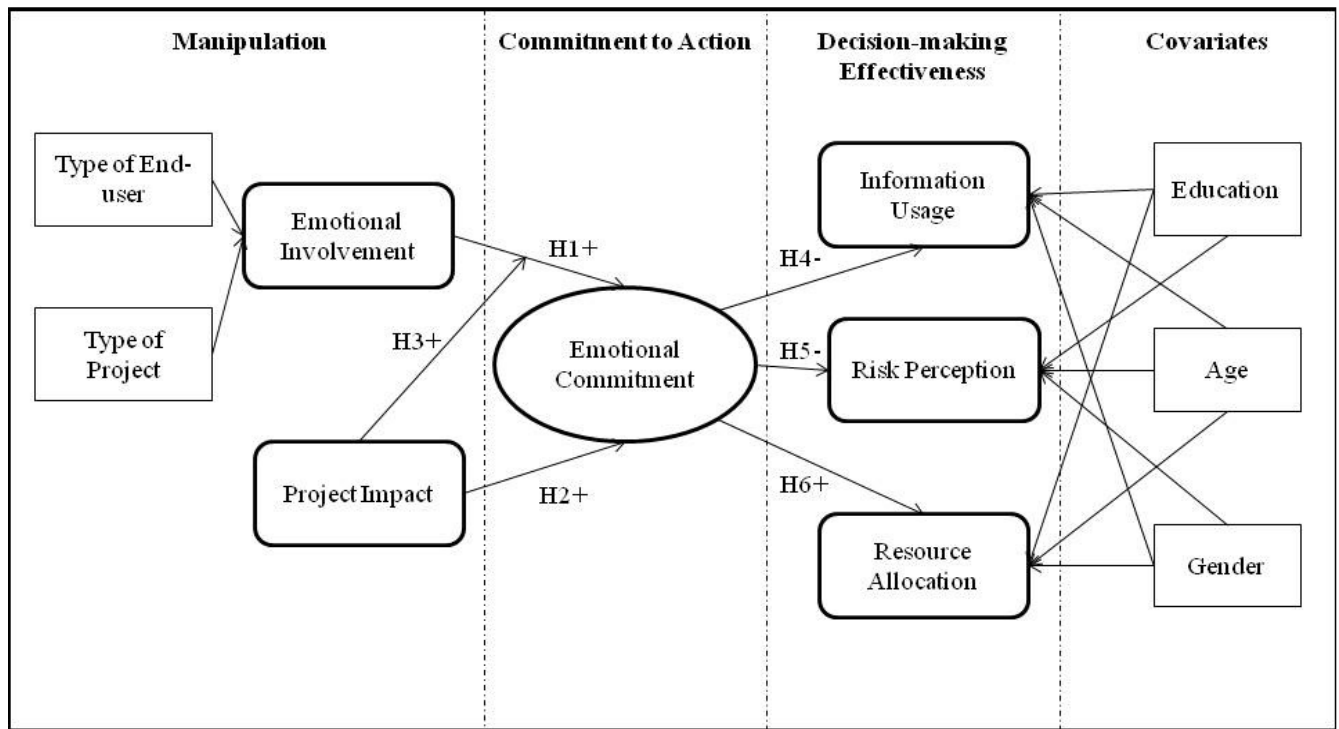
undesirable outcomes for the decision-maker (McNamara et al., 2002). Managers that are emotionally committed to the project, are expected to have a higher willingness to allocate more resources after the first decision-gate. The subjective importance of continuing the project, combined with the after effects of primary investments, increase the emotional commitment to the project even further.

Another argument that can be made for a positive effect on resource allocation lies in prospect theory (Kahneman & Tversky, 1979). Prospect theory states that decision-makers avoid risk when choosing between certain gains and the risk of larger gains or losing it all. Decision-makers are seeking risk when choosing between certain losses and the risk of larger losses or no losses at all. Project continuation options (continue or kill) are straightforward in terms of how gains and losses are framed (Northcraft & Neale, 1986). Project abandonment gives certain losses which have to be avoided. Clear losses are the sunk costs and the expected benefits that are derived from intrinsic and extrinsic motivations. Continuing a project might recover lost resources and keep the expectancy alive that first and second order outcomes can be attained at project completion. Managers that are affected by emotional commitment are more likely to be risk seeking than risk aversive. Risk seeking translates itself in the allocation of more resources. What must be said is that project continuation also results in a certain loss of opportunity costs. These costs resemble the costs that could have been spent on other and even better opportunities. If managers are made aware of opportunity costs, the incentive to invest in the current project decreases (Harvey & Victoravich, 2009; Northcraft & Neale, 1986). Opportunity costs however do not seem to be an important aspect of a manager's deliberations (Becker, Ronen, & Sorter, 1974; Hoskin, 1983). Based on the aforementioned theorization, the following hypothesis is formulated:

H6: Emotional commitment has a positive effect on the allocation of resources in situations of high uncertainty.

All of the hypotheses are given. The conceptual model is presented in Figure 4. The next two chapters cover the methodology of both studies. Study 1 covers the manipulation, commitment to action, and decision-making effectiveness sections (see Figure 4). Study 2 covers the commitment to action, decision-making effectiveness, and the covariates sections (see Figure 4).

Figure 4 – The Overall Conceptual Model

Manipulation	Commitment to Action	Decision-making Effectiveness	Covariates

Type of End-user

Emotional Involvement

H1+

Information Usage

Education

H4-

Type of Project

H3+

Emotional Commitment

H5-

Risk Perception

Age

Project Impact

H2+

H6+

Resource Allocation

Gender

Methodology Study 1

A total of three questionnaires were made and distributed (two preliminary and one final questionnaire). In the final decision-making experiment, the psychometric variable emotional commitment and three components of decision-making effectiveness have been investigated. Respondents were asked to assume the role of a project manager in a simulated innovation project. The respondents had to make investment decisions at two phases after they received a packet of information for each phase. The final sample consisted of 100 respondents ($N = 100$).

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Preliminary Questionnaires

The first preliminary questionnaire was made to test the manipulation and all the items of the constructs. This questionnaire gave valuable insights into the duration of responding to the questionnaire, the strength of the manipulation, and the loadings of the indicators for each construct. The second preliminary questionnaire focused solely on the manipulation variables: emotional involvement and project impact.

Creating Levels of Emotional Involvement and Project Impact

Four different scenarios were created to investigate the effect of emotional involvement and project impact in emotional commitment. The four scenarios allowed for a two-times-two model. Scenario 1 was written to create a high emotional involvement and a high project impact. Scenario 4 was written to create a low emotional involvement and a low project impact. Scenarios 2 and 3 were control scenarios: emotional involvement was high but project impact low (2) and vice versa (3) (see Table 1).

Emotional involvement was created by manipulating the two project elements mentioned in the theory chapter. Two scenarios were written where the type of project and type of end-user were combined. One scenario was about managing the creation of a handheld device that housed a cancer medicine for children. The other scenario was about managing the creation of a handheld device that made toothbrushes for prisoners. The first scenario was expected to generate higher levels of emotional involvement than the second scenario. Two project impact scenarios were also written. One scenario told of the grandeur of the project. It involved a large sum of a firm's resources and forty employees. The project would help many end-users and was expected to increase the firm's revenue by a large margin. The other scenario told of the small scale of the project that involved little firm resources and only eight employees. The project would help only a few end-users and was expected to increase the firm's revenue by only a small margin. Table 1 shows each scenario. The scenario texts can be found in Appendix 1.

Table 1 - Two-Times-Two Model of the Scenarios

	High Emotional Involvement	Low Emotional Involvement
High Project Impact	Scenario 1	Scenario 2
Low Project Impact	Scenario 3	Scenario 4

Measurement of Preliminary Predictor Variables

The first predictor variable was emotional involvement. Emotional involvement was created by manipulating the project elements 'type of project' and 'type of end-user'. A bipolar 5-point Likert scale was created that housed ten emotions (see Appendix 2). The scale resembles the I-PANAS-SF measurement instrument. The somewhat negative emotions were put on the left and the more positive emotions on the right side of the scale. For example: ashamed to proud. Conscious assessment of emotions can distort what the respondent reports. Emotions are also time related so the assessment must take place as soon as possible. Waiting too long with the assessment can lead to an unreliable and misleading evaluation which distorts the measurement. Respondents had to answer emotion related questions right after the information packages were read.

The second predictor variable was project impact. There are currently no scales that measure the general perceived impact of a project before the project is completed. A scale was made that consisted of four general questions about the perceived impact of the project (See Appendix 2). Perceived project impact was measured using a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*).

Predictor Manipulation Check

Two preliminary questionnaires were distributed. The first contained all the items of every construct ($N = 28$). The second only contained items of emotional involvement and project impact ($N = 29$). Regarding the first questionnaire: respondents had to give ratings using a bipolar scale and several unipolar 5-point Likert scales. The respondents were also asked for improvements to the questionnaire. Many respondents struggled with the English language. Some did not fully understand what was expected of them. This resulted in fourteen respondents aborting the questionnaire. Others were close to aborting due to the length of the questionnaire. The following adjustments were made after the sample check for the final questionnaire:

- Translation of scenario texts to Dutch
- A closer elaboration on what was expected
- Deleting the lowest loading items (with a minimum of three items per construct)
- Easier access to information reports

The second preliminary questionnaire was made to check the manipulation. Only the indicators of emotional involvement and project impact were used. The items can be found in Appendix 2. There were 36 respondents, but 29 valid cases. A principal component analysis

with varimax rotation was conducted to analyze emotional involvement. The rotated component matrix indicated that one item of emotional involvement did not load with the other items (loading of .091). A new variable of emotional involvement was created with the four remaining items. An independent sample t-test showed a large difference in means between the groups, but just not enough significance. There was no significant difference in scores for high emotional involvement ($M = 16.36$, $SD = 2.06$) and low emotional involvement ($M = 14.67$, $SD = 3.54$) scenarios; $t(22.78) = 1.58$, $p = .13$. This was due to both means having a large standard deviation. The standard deviation was high due to the small sample size. The t-test would – with a probability verging on certainty – be significant if the sample size was larger. Although the manipulation would work with a prevailing probability on a larger sample, a few words were added to the scenarios to create a stronger manipulation of emotional involvement.

Project impact was measured using four items. Data showed that one of the items did not fit with the construct. After deleting the item, a new variable was computed with the remaining items. An independent sample t-test indicated that impact manipulation succeeded. There was a significant difference in scores for high project impact ($M = 11.44$, $SD = 2.45$) and low project impact ($M = 9.46$, $SD = 1.81$) scenarios; $t(27) = 2.42$, $p = .02$.

The length and the degree of difficulty of the questionnaire were still a problem. To reduce the number of questions and thus the length of the questionnaire, the indicators of emotional involvement and project impact were left out of the final questionnaire. More energy could now be spend on getting into character and directly focusing on the indicators of emotional commitment. Another important aspect was trying to reduce the aborting rate of the questionnaire. The manipulation was made stronger by adding more loaded wordings.

Final Procedure

A final questionnaire was used to collect data for statistical analysis. The questionnaire can be found in Appendix 3. At the start of the questionnaire, respondents were thanked in advance for their participation. This was done to create a better overall mindset to do the questionnaire more seriously rather than quickly. Respondents were told that the maximum time spend was ten to fifteen minutes. Respondents were also told that they do not have to provide personal information, assuring anonymity. During the questionnaire, respondents had the freedom to withdraw from the questionnaire.

Two stages of an innovation project were used in the questionnaire. The two stages were the shaping of the innovation idea and the building of a prototype. Respondents were not told

that there were only two stages in the questionnaire, because that might have influenced their decision behavior. The first stage is referred to as the *Initial Phase*, the second stage is referred to as the *Second Phase*.

After a short introduction, respondents were asked to adopt the role of an innovation project manager at a large innovative firm. All respondents received some general information about the firm, some information about the stage gate model, and personal role-playing information. After that, respondents randomly received one of the four scenarios (see Table 1). Questions about emotional commitment had to be answered right after the scenario was given. All respondents then received the first information package and had to answer the initial phase questions.

The respondents were shortly introduced to the second phase. The scenario texts were repeated. The second information package and the second phase questions were given. The questions were identical to the first phase questions, albeit in a different order. In both phases, respondents had to make resource allocation decisions. Respondents were also asked how much information they used to base their decisions on. Lastly they had to answer questions about risk perception. The questionnaire ended with some socio-demographic questions. The socio-demographic questions were done last, because it would otherwise take precious time away from the limited attention span of the respondents. There was no time pressure. Although time pressure sometimes simulates real project decision-making, in this case it was important to measure decisions based solely on emotional commitment, rather than decisions based on time pressure.

Internal Justification of Made Decisions

For measuring commitment to action (especially escalation of commitment) it is necessary that justification takes place in addition to choice itself (Bobocel & Meyer, 1994). This study made use of an internal justification process rather than an external justification process. The questionnaire did not stipulate that managers must be held accountable to an external party and did not ask respondents to provide justification of their decisions to others. The emotional attitude towards the project and the end-users, as well as the creation and build-up of emotional commitment itself, is an internal process. No additions to the current hypotheses would be made by manipulating processes of external justification.

Respondents

The final questionnaire had a total of 185 respondents. 81 of those respondents had more than ten percent missing data. Four respondents finished the questionnaire in less than six minutes which was deemed too short. These 85 respondents were deleted from the final sample (*N* = 100). A substantial knowledge of decision-making theory or decision-making experience was not required. The thought was that respondents with a substantial knowledge of decision-making theory or decision-making experience would heavily rely on their intuition, making the data less usable for generalization. Respondents had a variety of jobs and were living all across the Netherlands (but mostly from the Nijmegen region). The demographics of the respondents can be found in Table 2.

Table 2 - Frequencies and Percentages of the Demographic Characteristics of Respondents (N = 100)

Covariates	N	%
Gender		
Male	58	58%
Female	42	42%
Age		
18-24	12	12%
25-99	88	88%
Education		
Secondary school	6	6%
Bachelor	37	37%
Master	55	55%
PhD	2	2%

Data Collection

The questionnaire was made as a self-report system, using a 5-point Likert scale. The questionnaire was created online through Qualtrics. Social media, LinkedIn, and several personal social networks have been used for distribution, as well as soliciting on campus grounds. A randomizer was added to the questionnaire that ensured a random distribution of scenarios among all the respondents.

Measurement of Variables

Predictor Variable

The psychometric predictor variable is emotional commitment (EC_1 and EC_2). Emotional commitment is a latent construct which does not have its own measurement instrument. Allen and Meyer (1990) developed a scale that measures organizational commitment. The scale has been used in quite a number of studies, but did not fit this study very well. Schoemmel, Jønsson, and Jeppesen (2015) developed the Multitarged Affective Commitment Scale (MACS) that measures affective commitment in a variety of settings. The MACS was used, because it reflects the recent theoretical development of affective commitment and can easily be adapted to fit this study. The MACS uses a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). The four highest loading items from the preliminary questionnaire were used (loadings >.819).

Emotional commitment was also measured by looking at the impact it had on decision-making effectiveness. The four scenarios were designed to create an emotional attitude that affected decision-making effectiveness. The difference in decision-making effectiveness for each project gives an indication of the strength of emotional commitment on effectiveness. The measurement of commitment to certain courses of action was done by adding indicators that measured the willingness to invest of stop the investment in the project. The items are about the attitude to stop investing or the attitude to keep or increase investments. This way, the symmetry or asymmetry of commitment can be included in the analysis.

Response Variables

Decision-making effectiveness consists of three response variables. The first variable is information usage (Info_1 and Info_2). A scale from Raymond and Bergeron (2008) was adopted that measures the usage of Project Management Information Systems (PMISs). The function of a PMIS is to provide managers with ''essential information on the cost-time performance parameters of a project and on the interrelationship of these parameters'' (Raymond & Bergeron, 2008, p. 214). A PMIS can consist of many components, ranging from hardware to software. The component that is of interest is the data component. Managers use data from the PMIS to make better decisions (to attain goals). In the questionnaire, respondents were given three short information reports that served as guidance for decision-making. After each phase, respondents were asked how much information they used from each report. Information usage has a 5-point Likert scale (1 = *none at all* to 5 = *a great deal).*

The second variable risk perception (Risk_1 and Risk_2) was measured by adapting several items from the perceived risk scale used by Liljander, Polsa, and Van Riel (2009).

Current perceived risk scales mostly measure consumers' perceived risk in buying new products. Items have been adapted to fit the current study. Two dimensions of perceived risk are represented in the items: social risk and financial risk. Items were measured by using a 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*).

The third variable is resource allocation (Invest_1 and Invest_2). Three items were made. Respondents had to give ratings about a statement, using a 5-point Likert scale (1 = *none at all* to 5 = *a great deal)*. The intended amounts, as well as the differences among groups, were measured.

Analysis

The total number of valid cases was $N = 100$. $N = 25$ respondents adopted the role of project manager for scenario 1. $N = 26$ respondents adopted the role of project manager for scenario 2. $N = 24$ respondents adopted the role of project manager for Scenario 3 and $N = 25$ respondents adopted the role of project manager for Scenario 4. The questionnaire was split up in an *initial phase* and a *second phase*. Both phases had identical items. In this study, the initial phase data is examined by analyses of variance. The structure of the questionnaire can be found in Appendix 3.

Analytical Technique

Analysis of Variance

Analysis of variance (ANOVA) is a very good analytical technique for this study. ANOVA concerns itself with the differences between groups (do groups differ significantly), which is a fundamental aspect of this research design. One-way ANOVAs and an univariate ANOVA were conducted in this study. The null-hypothesis is that the means of a dependent variable is equal across groups. A significant p-value ($p < .05$) indicates that the null-hypothesis must be rejected, indicating that there is a difference between groups. In this study, emotional commitment is directly manipulated to create differences between groups. It is an experimental design, but ANOVA is a good analytical technique when working with experimental designs (Hair, Black, Babin & Anderson, 2010). ANOVA ''provides the tools necessary to judge the observed effect'' (Hair et al., 2010, p. 343). For an ANOVA to be validly conducted, the following assumptions must be met. The dependent variables must be continuous in nature. There is sample independence and variance equality. The residuals must be normally

distributed. Fortunately, AVONA is really robust against departures from normality (Schmider, Ziegler, Danay, Beyer & Bühner, 2010). IBM SPSS statistics version 25 software was used for the analyses.

Assumptions

The Q-Q normality plots and the skewness and kurtosis values were checked for the assumption of normality. Ideally, the residuals (error terms) follow a normal distribution. The variables Q2.1, Q3.1, Q1.2, and Q19.1 showed a skewness and/or kurtosis bigger than 2.1 (>2.10) or smaller than -2.1 (<2.10). Transformations were tried and tested (LN, LN10, SQR, SQRT, CUBE, and CUBER). Unfortunately, none of the transformations resolved the issue of the non-normal distribution. In the experiment, a bit of non-normality is expected due to the manipulation of (psychometric) variables. The variables above belong to a specific scenario-group, thus only containing measurements for a part of the respondents. When these variables are computed into the overall items of emotional commitment ($N = 100$), the skewness and kurtosis are smaller than 2 (<2) and bigger than -2 (>-2). The normality plots show relatively normal distributions of information usage (Info_1), risk perception (Risk_1), and resource allocation (Invest_1). The plot of emotional commitment (EC_1) still does not produce a normal distribution. The ANOVAs were therefore used under the exception of its robustness against departures of normality. The non-parametric Kruskal-Wallis test is skipped to negate the risk of type 1 errors when the F-value is relatively small.

Levene's test was used to check the assumption of homoscedasticity. The scenario-groups functioned as the independent variable. A one-way ANOVA with the test of homoscedasticity of variances showed no significant p-value ($p > .05$) for Invest_1, Risk_1, and Info_1. The computed variable EC_1 had a significant p-value, $F(3, 96) = 11.25$, $p < .05$. The Welch test is used to assess the usability of the ANOVA results. The variance inflation factors (VIF) were examined for multicollinearity between variables. All VIF-values were between 1 and 5, thus indicating that there was no serious multicollinearity problem (see Table 6).

Principal Component Analysis

A principal component analysis (PCA) was conducted to examine the factorability of the items. The goal was to reduce measured variables to smaller sets of composite components. These components must capture as much information as possible in the least amount of components. Firstly, 16 out of the 16 items correlated with at least .30 with another item. The

Kaiser-Meyer-Olkin measure of sampling adequacy was .76, which is above the recommended value of .60. The Bartlett's test of sphericity was significant (χ^2 (120) = 859.56, $p < .05$). All communalities were above .3, which indicates that the items shared common variance with other items. There are enough indicators to validate factor analysis (see Appendix 5). Item Q13Risk was deleted because it did not correlate with any of the other risk items. A second PCA was conducted. The Kaiser-Meyer-Olkin measure of sampling adequacy was .76. The Bartlett's test of sphericity was significant (χ^2 (105) = 835.27, $p < .05$). Item Q8Risk loaded on three different factors with all loadings >.30. The item was deleted to increase discriminant validity.

A final PCA was conducted with 14 items. The Kaiser-Meyer-Olkin measure of sampling adequacy was .75. The Bartlett's test of sphericity was significant (χ^2 (91) = 795.90, $p < .05$). All but one communality was above .50. Item Q11Risk had a communality of .46. The loading was deemed significant for interpretation purposes, therefore it was retained. The initial eigenvalues showed that the first component explained 35,38% of the variance. The second component explained 16,49% of the variance. The third component explained 13,03% of the variance and the fourth component explained 7,33% of the variance. The final factor loading matrix is presented in Table 3.

Table 3 - Factor Loadings and Communalities Based on Principle Components Analysis with Promax Rotation for 14 items (N = 100)

Items	EC_1	Risk_1	Invest_1	Info_1	Communalities
Q5Invest			,963		,897
Q6Invest			,827		,769
Q7Invest			,795		,783
Q9Risk		,899			,777
Q10Risk		,791			,641
Q11Risk		,597			,459
Q12Risk		,695			,586
Q14Info				,862	,734
Q15Info				,688	,604
Q16Info				,786	,615
Phase1_Inv	,876				,718
Phase1_Inter	,868				,866
Phase1_Care	,944				,875
Phase1_Like	,824				,788
Eigenvalues	4,953	2,309	1,825	1,025	Total variance explained: 72,23%

The factor loading matrix indicates sufficient convergent and discriminant validity. Table 4 gives the descriptive statistics of the derived factors from the factor matrix. Cronbachs' alpha did not improve if an item was deleted. In Study 2, reliability and validity are further examined by assessing the measurement model from PLS-SEM (see Tables 7, 8, and 9).

Table 4 – Descriptive Statistics of the Initial Phase Factors

	No. of items	*M (SD)*	Skewness	Kurtosis	Cr. α
EC_1	4	16.61 (3.97)	-1.53	1.70	.92
Info_1	3	8.98 (2.69)	-.62	.48	.68
Risk_1	4	9.67 (2.94)	.60	-.27	.76
Invest_1	3	9.44 (2.96)	-.13	-.47	.89

Note. Cr. A = Cronbachs' Alpha.

Methodology Study 2

Data was gathered using the final questionnaire, which was elaborated on in the previous methodology chapter. The demographic statistics of the respondents ($N = 100$) can be found in Table 2. The questionnaire consists of two phases, the initial phase and the second phase. PLS-SEM was used to estimate model parameters of the initial phase and the second phase. Paired samples t-tests were conducted to compare means of the same scenario-groups between the initial phase (t1) and the second phase (t2). The measurement of variables has been discussed in the previous methodology chapter. Covariates are added, which are discussed below.

Covariates

Gender is added as a control variable with a male and female category. Age is added as a control variable with an 18-24 and 25-99 category. Education is also added as a control variable with the categories 'None', 'Secondary school', 'Bachelor', 'Master', and 'PhD'. Descriptive statistics can be found in Table 2.

Analytical Techniques

Partial Least Squares Structural Equation Modeling

Partial Least Squares Structural Equation Modeling (PLS-SEM) was found to be a good analytical technique for this study. PLS-SEM used the initial and second phase data. PLS-SEM is good and effective technique for the building of theory. PLS is designed to explain variance (Chin, 1998), which is essential in this study. PLS-SEM estimates a measurement model (for assessing reliability and validity) and a structural model that relates latent variables with observed indicators and with experimental factors (Reinartz, Haenlein, & Henseler, 2009). PLS-SEM allows for several analyses of systems of predictor and response variables simultaneously, while multiple regression does not. PLS is very well usable to assess hierarchical construct models (Wetzels, Odekerken-Schröder, & Van Oppen, 2009), is robust with respect to mediating and moderating effects (Wetzels et al., 2009), and violations of the assumption of normality (Cassel, Hackl, & Westlund, 1999). PLS is also robust when there are concerns about multicollinearity (Cassel, Hackl, & Westlund, 2000) and small sample sizes (Haenlein & Kaplan, 2004). Barclay, Higgins, and Thompson (1995) suggested that the sample size should be ten times the number of indicators of the most complex formative construct or ten times the number of antecedent constructs leading towards the endogenous construct (Barclay et al., 1995). The total sample in this study (*N*=100) satisfied both rules of thumb, thus the sample size was sufficient for PLS-SEM. SmartPLS version 3 software was used for the analyses (Ringle, Wende, & Becker, 2015).

Paired Samples t-Test

The paired samples *t*-tests were used to compare means of the same group between the initial and second phase. This is a so-called repeated measures design. Two related means are compared using a paired samples t-test. The null-hypothesis assumes that the mean difference equals zero. The alternative hypothesis assumes that the mean difference does not equal zero. This hypothesis is two-tailed. The upper-tailed hypothesis assumes that the difference is greater than zero, the lower-tailed hypothesis assumes that the difference is less than zero. There are some assumptions to be met. Firstly, the dependent variable is continuous. Secondly, there is sample independence. There are no outliers. The final assumption is that the sampling distribution of the difference between scores is normal (Field, 2013). If the assumption is not met, the paired samples t-test is fairly robust against departures from normality (Posten, 1978). IBM SPSS statistics version 25 software was used for the analyses.

Assumptions

The assumptions for the initial phase items were checked in the previous study. The Q-Q normality plots and the skewness and kurtosis values were examined for the remaining second phase items. The skewness and kurtosis values are smaller than 2 (<2) and bigger than -2 (>-2) for the remaining items. However, the QQ-plots of the second phase emotional commitment items and Q25 showed a non-normal distribution. The transformations LN, LN10, SQR, SQRT, CUBE, and CUBER were tried and tested. None of the transformations resolved the issue of the non-normal distribution. Since the variables of emotional commitment have been manipulated, a bit of non-normality is expected. When the items are transformed into variables, the normality plots of Info_2, Risk_2, and Invest_2 show relatively normal distributions. The plot of emotional commitment (EC_2) still does not produce a relatively normal distribution. PLS-SEM is used due to its robustness against violations of the assumption of normality. The same goes for the paired samples *t*-test (Posten, 1978).

Levene's test was used to check the assumption of homoscedasticity. The scenario-groups functioned as the independent variable. No significant *p*-value ($p > .05$) for Info_2 and Risk_2 was found. EC_2 and Invest_2 had a significant *p*-value ($F(3, 96) = 19.69, p < .05$ and $F(3, 96) = 9.00, p < .05$). Fortunately, PLS-SEM and the paired samples *t*-test are still appropriate to be conducted due to their robustness against violations of this assumption (Posten, 1982). The variance inflation factors (VIF) were examined for multicollinearity between variables. All VIF-values were between 1 and 7, thus indicating that there was no serious multicollinearity problem (see Table 11), although PLS-SEM and the paired samples *t*-test are not bothered by multicollinearity. Unfortunately, some VIF-values were above 5, which means that in those cases there is little unique variance.

Principal Component Analysis

The factorability of the initial phase items have been examined in Study 1. A principal component analysis (PCA) was used to examine the factorability of the second phase items. The second phase items are identical to the 14 initial phase items. The Kaiser-Meyer-Olkin measure of sampling adequacy was .83, which is above the recommended value of .60. The Bartlett's test of sphericity was significant at the .05 level ($p < .05$). All communalities were above .3, which indicates that the items shared common variance with other items. Unfortunately, some items loaded on the wrong factor. Changing the type of analysis or the rotation method did not seem to fix the issue. A high correlation between antecedents and

consequences is theoretically expected. Therefore, the factor analyses of the emotional commitment items were run separately from the decision-making effectiveness items (see Table 5). The Kaiser-Meyer-Olkin measure of sampling adequacy was .85 and .68 respectively. Both Bartlett's tests of sphericity were significant at the .05 level ($p < .05$).

The first PCA examined the factorability of the second phase emotional commitment (EC_2) items. The initial eigenvalue showed that the only component explained 87.90% of the variance. The second PCA examined the factorability of the second phase decision-making effectiveness items. The initial eigenvalues showed that the first component explained 35,59% of the variance. The second component explained 18,12% of the variance. The third component explained 11,97% of the variance. Two items of Risk_2 loaded negatively on another factor (see Table 5). On closer inspection, it became apparent that the dimensionality of Risk_2 was the reason for the split. Q25Risk and Q28Risk measure social risk, while Q24Risk and Q29Risk measure financial risk. Still, the four items are transformed to one variable. The question wording and item formulation indicated that the Risk_2 items indeed measured perceived risk instead of any other construct. Great value was attached to the comparability between the initial phase and second phase.

Table 5 - Factor Loadings and Communalities Based on two Principle Components Analyses with Promax Rotation for 4 and 10 items (N = 100)

Items	Components EC_2	Invest_2	Info_2	Risk_2	Communalities
Q21Invest		,902			,818
Q22Invest		,941			,853
Q23Invest		,895			,743
Q24Risk		-,485			,349
Q25Risk				,902	,797
Q28Risk				,812	,706
Q29Risk		-,572			,494
Q30Info			,852		,760
Q31Info			,586		,357
Q32Info			,837		,691
Phase2_Inv	,935				,875
Phase2_Inter	,939				,881
Phase2_Care	,953				,908
Phase2_Like	,923				,852
Eigenvalues	3,516	3,559	1,812	1,197	TVE: 87.90% and 65.69%

Note. Factor Loadings <.30 are suppressed. TVE = Total Variance Explained.

The factor loading matrix indicates sufficient convergent validity for EC_2, Invest_2, and Info_2 (Q31Info remains questionable). The matrix indicates sufficient discriminant validity for the items. Three items had a communality smaller than .5. These items were retained for comparability purposes. Therefore, it is important that the validity and reliability are further examined. Table 6 gives the descriptive statistics of the four computed variables. The validity and reliability of all the constructs and their items were further assessed by examining the measurement model from PLS-SEM.

Table 6 - Descriptive Statistics for the Second Phase Factors (N = 100)

	No. of items	*M* (*SD*)	Skewness	Kurtosis	Cr. α
EC_2	4	16.29 (4.27)	-1.27	.64	.95
Info_2	3	9.76 (2.55)	-.80	.75	.66
Risk_2	4	10.72 (2.86)	.25	-.38	.65
Invest_2	3	9.05 (3.23)	-.32	-.62	.90

Measurement Model Assessment of the Initial Phase

The initial phase measurement model was assessed by examining the individual item reliability, internal consistency, convergent validity, and discriminant validity (Barclay et al., 1995). Individual item reliability was assessed by examining the correlations of the measure with their construct. Item loadings of .70 or more were acceptable. Table 7 shows the loadings and cross-loadings of the measures. No items cross-loaded higher on other constructs and the difference between loadings was >.20. Item Q10Risk did not meet the .70 level (.68), but was left intact, as the difference was small. Staying close to the developed scales in past research was deemed more important than increasing reliability by a small amount.

Table 7 - Loadings and Cross-loadings of the Initial Phase Measures in PLS-SEM

Items	EC_1	Invest_1	Risk_1	Info_1
Q5Invest	.541	**.933**	-.313	-.165
Q6Invest	.494	**.883**	-.385	-.128
Q7Invest	.573	**.913**	-.309	-.150
Q9Risk	-.078	-.229	**.793**	-.106
Q10Risk	-.187	-.302	**.676**	-.055
Q11Risk	-.164	-.307	**.788**	.020

Q12Risk	-.055	-.268	**.775**	.030
Q14Info	-.009	-.045	.119	**.760**
Q15Info	-.232	-.230	-.072	**.828**
Q16Info	-.007	-.062	-.076	**.748**
Phase1_Care	**.932**	.572	-.134	-.114
Phase1_Inter	**.936**	.587	-.226	-.193
Phase1_Inv	**.831**	.460	-.088	-.108
Phase1_Like	**.894**	.541	-.116	-.041

Note. Loadings <,30 are suppressed.

Internal consistency reliability (composite reliability) was examined by examining the internal consistency measure, developed by Fornell and Larcker (1981). Cronbach's alpha is also included, which is similar to the measure of Fornell and Larcker (1981), but the former ''presumes, a priori, that each indicator of a construct contributes equally'' (Barclay et al., 1995, p. 297). Still, both measures are similar and were added to Table 8 for comparison. A value of .70 was set as a benchmark for both measures (Nunnally, 1978). One value below .70 was found (.69), but the value was still satisfactory. Table 8 includes the Average Variance Extracted (AVE). Every construct was above the minimum of three items (Ringle, Wende, Will, 2015). All values of the AVE are above .50 (Fornell & Larcker, 1981), which confirms a satisfactory convergent validity.

Table 8 – Initial Phase Measurement Model Output of the Consistent and Convergent Validity Values with the Mean, Standard Deviation, and VIF

Construct	Items	*M*	*SD*	Cr. α	CR	AVE	Rho_A	VIF
Invest_1	Q5Invest	3.25	1.08	.90	.94	.83	.90	3.43
	Q6Invest	2.76	1.16					2.44
	Q7Invest	3.43	1.03					2.77
Risk_1	Q9Risk	1.85	.98	.76	.84	.58	.80	2.27
	Q10Risk	1.85	.91					1.95
	Q11Risk	2.91	.98					1.40
	Q12Risk	3.03	.97					1.54
Info_1	Q14Info	2.68	1.05	.69	.82	.61	.71	1.41
	Q15Info	3.09	1.12					1.27
	Q16Info	3.21	1.26					1.35
EC_1	Phase1_Care	4.26	1.10	.92	.94	.81	.93	4.34
	Phase1_Inter	4.13	1.20					4.33
	Phase1_Inv	4.33	1.01					2.32
	Phase1_Like	3.89	1.11					3.26

Note. SD = Standard Deviation. Cr. A = Cronbachs' Alpha. CR = Composite Reliability. AVE = Average Variance Extracted. VIF = Variance Inflation Factors. Rho_A is a Reliability Coefficient.

Discriminant validity was assessed by examining the average variance shared between a construct and its measures (AVE), as suggested by Fornell and Larcker (1981). The measure AVE has to be greater than the squared correlation between two constructs (Barclay et al., 1995). In Table 9, the diagonal in the correlation of constructs shows the square root of the AVE. The diagonal elements were significantly greater than the other elements in the correlation matrix, thus indicating that discriminant validity was satisfactory. As a bonus, all the values of the Heterotrait-Monotrait ratio (HTMT) were <1.

Table 9 – The Fornell-Larcker Criterion

	EC_1	Info_1	Invest_1	Risk_1
EC_1	**.899**			
Info_1	-.131	**.780**		
Invest_1	.591	-.163	**.910**	
Risk_1	-.162	-.025	-.366	**.759**

Measurement Model Assessment of the Second Phase

The measurement model of the second phase was assessed by examining the individual item reliability, internal consistency, convergent validity, and discriminant validity (Barclay et al., 1995). Item loadings of .70 or more indicated a good individual item reliability. Table 10 shows the loadings and cross-loadings of the measures. No items cross-loaded higher on other constructs and the difference between loadings was >.20. Item Q25Risk, Q28Risk, and Q31Info did not meet the .70 level, but were left intact. Staying close to the developed scales in past research and to the initial phase measures was deemed most important.

Table 10 - Loadings and Cross-loadings of the Second Phase Measures in PLS-SEM

Items	EC_2	Invest_2	Risk_2	Info_2
Q21Invest	.733	**.936**	-.572	-.110
Q22Invest	.728	**.962**	-.533	-.064
Q23Invest	.608	**.836**	-.516	-.184
Q24Risk	-.425	-.405	**.713**	.173
Q25Risk	-.138	-.233	**.641**	-.026
Q28Risk	-.285	-.364	**.570**	-.004
Q29Risk	-.512	-.521	**.804**	.177
Q30Info	-.168	-.158	.126	**.914**
Q31Info	-.065	-.104	.060	**.458**
Q32Info	-.141	-.040	.158	**.850**

Phase2_Care	**.951**	.696	-.480	-.176
Phase2_Inter	**.941**	.727	-.560	-.230
Phase2_Inv	**.936**	.733	-.509	-.153
Phase2_Like	**.922**	.687	-.524	-.087

Note. Loadings <,30 are suppressed.

Internal consistency reliability (composite reliability) was examined by examining the internal consistency measure, developed by Fornell and Larcker (1981). Cronbach's alpha was also included. Both measures are similar and were added to Table 11 for comparison. A value of .70 was set as a benchmark for both measures (Nunnally, 1978). Two alpha-values below .70 were found (.65 and .66), but the values were still acceptable (Hair et al., 2010). Every construct had a minimum of three items (Ringle, Wende, Will, 2015). All but one values of the Average Variance Extracted (AVE) were above .50 (Fornell & Larcker, 1981). Risk_2 had an AVE-value of .47, but the CR was above .60, which confirmed a satisfactory convergent validity (Fornell & Larcker, 1981).

Table 11 – Second Phase Measurement Model Output of the Consistent and Convergent Validity Values with the Mean, Standard Deviation, and VIF

Construct	Items	*M*	*SD*	Cr. α	CR	AVE	Rho_A	VIF
Invest_2	Q21Invest	3.20	1.16	.90	.94	.83	.92	5.17
	Q22Invest	3.14	1.18					6.41
	Q23Invest	2.71	1.21					2.05
Risk_2	Q24Risk	3.25	1.07	.65	.78	.47	.65	1.27
	Q25Risk	1.99	.99					1.60
	Q28Risk	2.08	.98					1.45
	Q29Risk	3.40	1.06					1.29
Info_2	Q30Info	3.29	1.04	.66	.80	.59	.81	1.68
	Q31Info	3.03	1.07					1.16
	Q32Info	3.44	1.19					1.53
EC_2	Phase2_Care	4.18	1.11	.95	.97	.88	.96	6.25
	Phase2_Inter	3.81	1.18					4.82
	Phase2_Inv	4.31	1.02					5.06
	Phase2_Like	3.99	1.24					4.21

Note. SD = Standard Deviation. Cr. A = Cronbachs' Alpha. CR = Composite Reliability. AVE = Average Variance Extracted. VIF = Variance Inflation Factors. Rho_A is a Reliability Coefficient.

Discriminant validity was assessed by examining the average variance shared between a construct and its measures (AVE) (Fornell & Larcker, 1981). The measure AVE has to be greater than the squared correlation between two constructs (Barclay et al., 1995). In Table 12,

the diagonal in the correlation of constructs shows the square root of the AVE. All diagonal elements were greater than the other elements in the correlation matrix. The values of the Heterotrait-Monotrait ratio (HTMT) were <1, indicating that discriminant validity was satisfactory.

Table 12 – The Fornell-Larcker Criterion

	EC_2	Info_2	Invest_2	Risk_2
EC_2	**.938**			
Info_2	-.174	**.768**		
Invest_2	.759	-.126	**.913**	
Risk_2	-.554	.157	-.591	**.687**

Results of Study 1

Results of the ANOVA

Hypothesis 1 (H1)

H1 hypothesized that emotional involvement has a positive effect on the creation and build-up of emotional commitment in situations of high uncertainty. An one-way ANOVA was conducted to measure if there is a statistically significant difference between the high and low emotional involvement group on their emotional commitment means. The first group consisted of respondents from scenarios 1 and 2 (high emotional involvement group; $M = 18.5, SD = 1.7$). The second group consisted of respondents from scenarios 3 and 4 (low emotional involvement group; $M = 14.6, SD = 4.6$). There was a statistically significant difference between groups as determined by one-way ANOVA ($F(1, 98) = 32.81, p = .00$). Since the assumption of homogeneity of variance was not met for this data set (Levene's test $F(1, 98) = 33.16, p = .00$), the obtained Welch's adjusted F ratio (31.84) was used, which was significant at the .05 alpha level, reported as Welch's $F(1, 60.91) = 31.84, p = .00$. It can be concluded that the high emotional involvement group differs statistically significantly from the low emotional involvement group on their emotional commitment. H1 was supported by the data.

Hypothesis 2 (H2)

H2 hypothesized that project impact has a positive effect on the creation and build-up of emotional commitment in situations of high uncertainty. An one-way ANOVA was conducted to measure if there is a statistically significant difference between the high and low project impact group on their emotional commitment means. The first group consisted of respondents from Scenarios 1 and 3 (high project impact group; $M = 17$, $SD = 3.9$). The second group consisted of respondents from Scenarios 2 and 4 (low project impact group; $M = 16.3$, $SD = 4$). There was no statistically significant difference between groups as determined by one-way ANOVA ($F(1, 98) = .83$, $p = .36$). It can be concluded that the high project impact group did not differ statistically significantly from the low project impact group on their emotional commitment. H2 was not supported by the data.

Hypothesis 3 (H3)

H3 hypothesized that as project impact increases, the emotional involvement-emotional commitment association becomes stronger. An univariate ANOVA was run to measure if project impact had a statistically significant positive moderation effect on the relationship between emotional involvement and emotional commitment. The descriptive statistics of the groups can be found in Table 13. There was insufficient evidence to reject the interaction effect null hypothesis $F(1, 96) = .115$, $p = .74$, partial $\eta^2 = .001$, observed power $= .063$. The interaction effect plot can be found in Appendix 7. The effect of emotional involvement on emotional commitment does not depend on project impact. H3 is not supported by the data.

Table 13 - Descriptive Statistics of the Emotional Involvement and Project Impact Scenarios (N = 100)

Emotional Involvement	Project Impact	*M*	*SD*	*N*
High Involvement	High impact	18.80	1.76	25
	Low impact	18.30	1.72	26
	Total	18.55	1.74	51
Low Involvement	High impact	15.08	4.60	24
	Low impact	14.12	4.66	25
	Total	14.59	4.60	49
Total	High impact	16.98	3.90	49
	Low impact	16.25	4.04	51
	Total	16.61	3.97	100

Note. Dependent Variable: Emotional Commitment (EC_1).

Hypothesis 4 (H4)

H4 hypothesized that emotional commitment has a negative effect on the usage of information in situations of high uncertainty. Several ANOVA's were conducted to measure if there is a statistically significant difference between groups on their resource information usage mean. The first one-way ANOVA contained all four scenario-groups. The descriptive statistics can be found in Table 14. There was no statistically significant difference between groups as determined by one-way ANOVA ($F(3, 96) = .62$, $p = .61$). Another one-way ANOVA was run that only contained the first and fourth scenario-group. The control groups (Scenarios 2 and 3) were left out. Again, there was no statistically significant difference between groups as determined by one-way ANOVA ($F(1, 48) = .90$, $p = .35$). Since the assumption of homogeneity of variance was not met for this data (Levene's test $F(1, 48) = 5.49$, $p = .02$), the obtained Welch's adjusted F ratio (.90) was used, which was also not significant at the .05 alpha level, reported as Welch's $F(1, 38.65) = .90$, $p = .35$. Emotional involvement is the only predictor of the two that has a statistically significant effect on the means of emotional commitment. The high emotional involvement group has significantly more emotional commitment than the low emotional involvement group. A final one-way ANOVA is therefore run with the high and low emotional involvement group to test the effect of emotional commitment. Unfortunately, there was no statistically significant difference between groups as determined by one-way ANOVA ($F(1, 98) = 1.80$, $p = .18$). It can be concluded that emotional commitment does not have a statistical significant negative effect on information usage in situations of high uncertainty. H4 is not supported by the data.

Table 14 – Descriptive Statistics of the Emotional Involvement and Scenario-groups (N = 100)

Group	N	M	SD
Scenario 1	25	8.72	3.09
Scenario 2	26	8.54	3.00
Scenario 3	24	9.29	2.73
Scenario 4	25	9.40	1.80
Total	100	8.98	2.69
High Involvement	51	8.63	3.01
Low Involvement	49	9.35	2.28
Total	100	8.98	2.69

Note. Dependent Variable: Information Usage (Info_1).

Hypothesis 5 (H5)

H5 hypothesized that emotional commitment has a negative effect on risk perception in situations of high uncertainty. Several ANOVA's were conducted to measure if there is a statistically significant difference between groups on their risk perception mean. The first one-way ANOVA contained all four scenario-groups. There was a statistically significant difference between groups as determined by one-way ANOVA ($F(3, 96) = 4.34$, $p = .01$). To determine where the significant difference lied, the post hoc test Tukey HSD was run. Results can be found in Table 15. The mean of scenario-group 1 did not differ significantly from that of scenario-group 4 ($p = .06$), but the mean of scenario-group 2 did. Since the p-value was very close to being significant, another one-way ANOVA was run that only contained the first ($M = 9.24$, $SD = 2.75$) and fourth ($M = 11.24$, $SD = 3.27$) scenario-group. The control groups (Scenarios 2 and 3) were left out. Now there was a statistically significant difference between groups as determined by one-way ANOVA ($F(1, 48) = 5.47$, $p = .02$). A final one-way ANOVA was run with the high ($M = 8.86$, $SD = 2.45$) and low emotional involvement group ($M = 10.51$, $SD = 3.18$). There was a statistically significant difference between these groups as determined by one-way ANOVA ($F(1, 98) = 8.45$, $p = .01$). It can be concluded that emotional commitment does have a statistical significant negative effect on risk perception in situations of high uncertainty. H5 is supported by the data.

Table 15 – Tukey HSD Results with Risk Perception (Risk_1) as the Dependent Variable

Group (i)	Group (j)	M (i)	Mean Difference ($X_i - X_j$)	SE	p
Scenario 1	Scenario 2	9.24	.74	.78	.78
	Scenario 3		-.51	.80	.92
	Scenario 4		-2.00	.79	.06
Scenario 2	Scenario 1	8.50	-.74	.78	.78
	Scenario 3		-1.25	.79	.37
	Scenario 4		-2.74*	.78	.00
Scenario 3	Scenario 1	9.75	.51	.80	.92
	Scenario 2		1.25	.79	.37
	Scenario 4		-1.49	.80	.25
Scenario 4	Scenario 1	11.24	2.00	.79	.06
	Scenario 2		2.74*	.78	.00
	Scenario 3		1.49	.80	.25

Note. * Mean Difference is significant at the .05 level.

Hypothesis 6 (H6)

H6 hypothesized that emotional commitment has a positive effect on the allocation of resources in situations of high uncertainty. An one-way ANOVA was conducted to measure if there was a statistically significant difference between groups on their resource allocation mean. The one-way ANOVA contained all four scenario-groups. There was a statistically significant difference between groups as determined by one-way ANOVA ($F(3, 96) = 5.56, p = .00$). To determine where the significant difference lied, the post hoc test Tukey HSD was run. Results can be found in Table 16. The mean of scenario-group 1 differs significantly from that of scenario-group 4 ($p = .01$). Overall, the means of the groups that have higher levels of emotional commitment (Scenarios 1 and 2) differ significantly from the groups that have lower levels of emotional commitment (Scenarios 3 and 4). It can be concluded that emotional commitment does have a statistical significant positive effect on resource allocation in situations of high uncertainty. H6 is supported by the data.

Table 16 – Tukey HSD Results with Resource Allocation (Invest_1) as the Dependent Variable

Group (i)	Group (j)	*M* (i)	Mean Difference (X i – X j)	*SE*	*p*
Scenario 1	Scenario 2	10.64	.18	.78	.99
	Scenario 3		2.27*	.79	.03
	Scenario 4		2.44*	.79	.01
Scenario 2	Scenario 1	10.46	-.18	.78	.99
	Scenario 3		2.09*	.79	.04
	Scenario 4		2.26*	.78	.02
Scenario 3	Scenario 1	8.38	-2.27*	.79	.03
	Scenario 2		-2.09*	.79	.04
	Scenario 4		.18	.79	.99
Scenario 4	Scenario 1	8.20	-2.44*	.79	.01
	Scenario 2		-2.26*	.78	.02
	Scenario 3		-.18	.79	.99

Note. Mean Difference is significant at the .05 level.

Results of Study 2

PLS-SEM Results

The Initial Phase

The hypothesized relationships between the dependent variables and emotional commitment as the independent variable were tested. Since emotional commitment was the independent variable, only H4-H6 could be tested. Covariates have been added to the model. The results from the structural model are presented in Table 17. Appendix 7 presents the visualization of the structural model. The standardized coefficients and their significance levels as well as the R^2-value were reported for each dependent variable. The *t*-values and the coefficient's significance levels have been obtained through 2000-samples bootstrapping.

Table 17 – PLS_SEM Estimation Results of the Initial Phase

	Dependent Variables					
Independent	Information Usage		Risk Perception		Resource Allocation	
Variables	*β*	*t*-value	*β*	*t*-value	*β*	*t*-value
EC_1	-.15	1.07	-.10	.88	.58**	8.56
Age	.23*	2.17	-.11	.96	-.07	1.12
Gender	.13	1.11	-.12	1.13	.05	.54
Education	-.05	.47	.26*	2.07	-.04	.47
R^2	.08		.11		.36	

Note. Significant tests were conducted using Bootstrapping (2000 samples). Path Coefficients with * are significant at the 5 percent level, ** is significant at the 1 percent level.

Emotional commitment does not have a significant effect on information usage. Therefore H4 is not supported by the data. Emotional commitment does not have a significant effect on risk perception. In this model, H5 is not supported by the data, but the ANOVA result still indicated that there is a significant difference in means. The hypothesized direct effect of emotional commitment on resource allocation - H6 - can be confirmed by the data. With a coefficient of .58 and a t-value of 8.56, the effect is positive, substantial, and significant. Other findings indicated that age has a significant positive effect on information usage and that education has a significant positive effect on risk perception.

The Second Phase

In Table 18, the results of the second phase are presented. Appendix 7 presents the visualization of structural model. The effect of emotional commitment on information usage increased a little bit, but is still not significant. Emotional commitment has – in comparison with the initial phase - a substantial and significant effect on risk perception. The effect of emotional commitment on resource allocation is even more substantial and significant. Age still has a significant effect on information usage and education still has a significant effect on risk perception.

Table 18 – PLS-SEM Estimation Results of the Second Phase.

Independent Variables	Dependent Variables					
	Information Usage		Risk Perception		Resource Allocation	
	β	t-value	β	t-value	β	t-value
EC_2	-.18	1.56	-.51**	6.79	.75**	14.95
Age	.25**	2.83	-.16*	2.40	-.02	.30
Gender	.09	.74	-.01	.14	.05	.79
Education	.10	.98	.23**	2.78	.02	.28
R^2	.11		.38		.58	

Note. Significant tests were conducted using Bootstrapping (2000 samples). Path Coefficients with * are significant at the 5 percent level, ** is significant at the 1 percent level.

Paired Samples t-Test Results

Two paired-samples t-test were conducted to compare the emotional commitment of scenario-groups 1 and 4 in the initial phase (t1) and second phase (t2) conditions. The first t-test contained the means of emotional commitment (t1, t2) for scenario-group 1. It is noted that

the correlation between the two conditions was estimated at $r = .64$, $p = .00$. There was no significant difference in the scores for the initial phase ($M = 18.80$, $SD = 1.76$) and second phase ($M = 18.56$, $SD = 1.64$) conditions; $t(24) = .83$, $p = .42$. The second t-test contained the means of emotional commitment (t1, t2) for scenario-group 4. It is noted that the correlation between the two conditions was estimated at $r = .81$, $p = .00$. Again, there was no significant difference in the scores for the initial phase ($M = 14.12$, $SD = 4.66$) and second phase ($M = 13.36$, $SD = 4.64$) conditions; $t(4) = 1.34$, $p = .19$.

Two paired-samples t-test were conducted to compare the information usage of scenario-groups 1 and 4 in the initial phase (t1) and second phase (t2) conditions. The first t-test contained the means of the information used (t1, t2) for scenario-group 1. It is noted that the correlation between the two conditions was estimated at $r = .66$, $p = .00$. There was no significant difference in the scores for the initial phase ($M = 8.72$, $SD = 3.01$) and second phase ($M = 9.52$, $SD = 2.14$) conditions; $t(4) = -1.72$, $p = .10$. The second t-test contained the means of the information used (t1, t2) for scenario-group 4. It is noted that the correlation between the two conditions was estimated at $r = .80$, $p = .00$. For this group, there was a significant difference in the scores for the initial phase ($M = 9.40$, $SD = 1.80$) and second phase ($M = 10.24$, $SD = 2.30$) conditions; $t(4) = -3.06$, $p = .01$.

Two paired-samples t-test were conducted to compare the risk perception of scenario-groups 1 and 4 in the initial phase (t1) and second phase (t2) conditions. The first t-test contained the means of the perceived risk (t1, t2) for scenario-group 1. It is noted that the correlation between the two conditions was estimated at $r = .52$, $p = .01$. There was no significant difference in the scores for the initial phase ($M = 9.24$, $SD = 2.76$) and second phase ($M = 9.80$, $SD = 2.86$) conditions; $t(4) = -1.66$, $p = .32$. The second t-test contained the means of the perceived risk (t1, t2) for scenario-group 4. The correlation between the two conditions was not significant at $r = .32$, $p = .12$. There was no significant difference in the scores for the initial phase ($M = 11.24$, $SD = 3.27$) and second phase ($M = 12.20$, $SD = 2.42$) conditions; $t(4) = -1.41$, $p = .17$.

Two paired-samples t-test were conducted to compare the resource allocation of scenario-groups 1 and 4 in the initial phase (t1) and second phase (t2) conditions. The first t-test contained the means of the resources allocated (t1, t2) for scenario-group 1. It is noted that the correlation between the two conditions was estimated at $r = .79$, $p = .00$. There was no significant difference in the scores for the initial phase ($M = 10.64$, $SD = 3.24$) and second phase ($M = 11.00$, $SD = 2.43$) conditions; $t(4) = -.90$, $p = .38$. The second t-test contained the means of the resources allocated (t1, t2) for scenario-group 4. It is noted that the correlation between

the two conditions was estimated at $r = .68$, $p = .00$. Again, there was no significant difference in the scores for the initial phase ($M = 8.20$, $SD = 2.82$) and second phase ($M = 7.32$, $SD = 3.33$) conditions; $t(4) = 1.76$, $p = .09$.

Discussion

Both studies sought to fill a gap in decision-making theory – specifically commitment to decisions – by exploring antecedents of emotional commitment and the effects of emotional commitment on decision-making effectiveness. A lot of research has been done that focused on commitment turning sweet or sour (e.g., Kahn, 1990; Staw, 1981; Bazerman & Moore, 2008). Escalation of commitment literature provides many explanations for why decision-makers behave antithetical on many occasions. Engagement literature provides explanations for why decision-makers spent more effort on future objectives. These explanations are important for understanding decision-making processes. The next step is to expand beyond these current mechanisms, or in this case the psychological processes beforehand. Researchers like Langley and Mintzberg hinted at the notion that there must be some form of initial commitment (Langley et al., 1995; Mintzberg et al., 1976; Van Riel et al., 2012), described as an affective component preceding action. The initial process in which this commitment is formed and cultivated remains vague and elusive. Theory wise, it starts with the discovery and understanding of initial commitment itself. Unveiling this commitment is an important aspect of these studies. While many other studies focused on escalation of commitment (e.g., Staw, 1981; Staw & Ross, 198b), emotion and escalation (e.g., Harvey & Victoravich, 2009), and the effects of emotion on decision-making in general (e.g., Schwarz & Clore, 1983; Loewenstein & Lerner, 2003; Forgas & George, 2001), these studies took a step into the unknown by combining initial commitment with emotion and exploring its effect on early stage decision-making effectiveness.

With the hypotheses formulated and the research questions proposed, interesting results emerged. First, all respondents received the same information packages and had to make the same decisions. Two emotional involvement scenarios were written. In both scenarios, the primary goal was to make and finish a handheld device. What goes in the device and who it

was for were the only differences. These differences were made with expectancy theory and valence in mind. It turns out that the high emotional involvement group experiences significantly more emotional commitment than the low emotional involvement group. H1 hypothesized this positive effect, therefore it was supported. It is a very important finding, because it indicates the existence of initial emotional commitment before project decisions are even made.

H2 hypothesized that project impact would have a positive effect on emotional commitment. Two scenarios with a high and low project impact were written. The mean difference between the high and low project impact group indicates that there is indeed a positive effect on emotional commitment. The effect is unfortunately not significant, therefore H2 was not supported. A possible explanation for the rejection is that the scenarios were not intense enough to increase or decrease the effects of emotion on behavior (Loewenstein & Lerner, 2003). Another explanation is that both scenarios triggered intrinsic and extrinsic motivations – although different - in respondents to continue with the project (Vroom, 1964). This would explain the fairly high means of both groups (see results). As for H3, no significant moderation effect of project impact on the relationship between emotional involvement and emotional commitment was found. Although the means were slightly higher for the high project impact groups, it made no difference if the respondents received the high or low emotional involvement scenario (see Table 13).

Emotional commitment had a negative effect on information usage. The groups that experienced higher levels of emotional commitment had lower means of information usage (see Table 14). Alas, the difference in means was too small for it to be significant. H4 was therefore not supported. A possible explanation is that each group used approximately the same amount of information, but processed it differently. The groups with lower levels of emotional commitment could process the information more rationally, while the groups with higher levels of emotional commitment suffered from confirmation bias (Griffin & Tversky, 1992) and the effects of affect on analytical processes (Stickney, 2009). A practical explanation for the non-significant difference in means would be the low number of respondents per group and the relatively high standard deviation (see Table 14). More statistical power could lead to stronger results in the same direction as the theory described. For the second phase of the project, there was a significant increase in information usage for the low emotional commitment group while the high emotional commitment group did not differ significantly from the initial phase. This supports the thought that emotional commitment can have a negative effect on information usage in situations of high uncertainty. Age had a positive effect on information usage.

Unfortunately, the younger age group only consisted of 12 respondents, making generalization difficult.

The results of Study 1 indicated that emotional commitment had a significant effect on risk perception, supporting H5. The PLS-SEM results only showed a significant effect for the second phase. PLS-SEM does not compare groups, hence the difference with the ANOVA results. Overall, it can be concluded that emotional commitment has a negative effect on risk perception. The effect becomes stronger over time. Having a better education seems to have a positive effect on risk perception. A possible explanation of the results is that respondents, who experienced higher levels of emotional commitment, overweighed the probability that the project could be completed (Vallone, Griffin, Lin, & Ross, 1990). This could be a result of overconfidence that respondents had in their forecasts (Dunning, Griffin, Milojkovic, & Ross, 1990; Griffin, Dunning, & Ross, 1990) and overestimating their ability to control future outcomes (Kahneman & Riepe, 1998). Emotional commitment made respondents perceive less risk, indicating a strong disbalance between perceived risk and actual risk. Perceiving less risk supports the theory that decision-makers would take more risk due to the value function being more positive.

The strongest effect found was hypothesized in H6. Emotional commitment had a substantial and significant effect on resource allocation. The effect becomes even stronger over time. The information packages were negatively framed, but the groups with higher emotional commitment still had higher resource allocation means (see Table 16). Abandoning the project was an undesirable outcome that those respondents refused to acknowledge (McNamara et al., 2002). This relates back to prospect theory where the continuation of the project has a higher value and a stronger weight. An interesting find is the increased power of emotional commitment on resource allocation (see *t*-test results). In the second phase of the project, the resource allocation means increased for the high emotional commitment groups while the means decreased for the low emotional commitment groups. Although the means within groups did not increase or decrease significantly, there is much to be said about the increase between groups. Even though the information in the second phase became more negative, the high emotional commitment groups increased their allocation of resources. The sunk costs effect is likely to be a part of the explanation (Keil et al., 1995b; Arkes & Blumer, 1985).

Managerial Implications

Some conceptual and empirical findings may prove to be helpful implications for decision-makers in an organizational context. It starts with the awareness that the type of project

and the type of end-user can make decision-makers more emotionally involved in the project. Of course, insights about emotional involvement were already known. What matters is the awareness and being conscious of these antecedents that decision-makers sometimes seem to lack. For example, emotional commitment can affect managers that manage small and low impactful projects. If an organization wants to be wary of escalation of commitment, it should not only focus on highly impactful projects. Measuring the manager's emotional commitment towards the project should make organizations more aware of the impact that the manager may have on the firm's resources. The decision-makers that determine the budgets and distribute them among projects could also be affected by emotional commitment. Awareness on more than just the manager's level is likely to be key in determining a project's viability. As soon as decision-makers feel the need to allocate more resources, a conscious thought can pop up which says: ''hey this might be the phenomenon of emotional commitment''. The decision-makers can ask themselves the question if those resource decisions follow the path of engagement or escalation. Inability to make this distinction indicates that the decision-maker is already on said path. An actionable implication is the usage of second opinions. A second manager or a third party can act as a additional decision-gate for important decisions. Another possibility is using group-decisions when it comes to project continuation or resource allocation decisions. A final implication is the re-evaluation of the used information by the manager or another party.

Limitations and Suggestions for Further Research

First, the final sample had the minimal number of 100 respondents. When comparing groups, the sample size splits in two or even four. Stronger results are likely to be gathered with a larger sample size, improving the generalizability of the results. When sample sizes are small, relatively high standard deviations can make results non-significant. For example, both studies showed a non-significant effect of emotional commitment on information usage. Future research could explore this angle, as well as focusing on all the different dimensions of risk perception. Another interesting suggestion is the examination of commitment to previously made decisions, instead of future decisions.

Second, the final sample consisted of random respondents. Both studies did not account for decision-making experience, nor did the final sample represent decision-makers in an organizational context. The nature of the task itself is a limitation to both studies. It is unknown if respondents could relate to making impactful resource allocation decisions in a managerial setting. Most people do not understand or relate to project managers making high stake

decisions. Drawing the sample from a more professional environment would improve the generalizability of the results to an organizational context.

Third, a measurement scale of emotional commitment was created, which tried to fully encapsulate the phenomenon. Still, the concept of emotional commitment needs to be further developed. The development of new measurement scales comes along with that.

Fourth, the design of the experiment allowed for respondents to grade their own information usage and risk perception. Biases and differences in information processing could distort respondents' input. Another limitation is that the design of the questionnaire proved to be difficult for many respondents, hence the high rate of unfinished questionnaires. The question remains if the remaining respondents fully understood what was asked of them. Future research could help improve designs that would help measuring emotional commitment in a variety of settings. A start would be to take a closer look at the different effects of intrinsic and extrinsic motivations on emotional commitment.

Fifth, working with manipulation and psychometric variables increases the risk of deviations from normality and homoscedasticity. Study 1 and Study 2 suffered on some occasions from these departures. The ANOVAs were run, even if the assumption for normality was not met. The reason for this continuation was the increased risk of type 1 errors that non-parametric tests can produce if the f-value is low. F-values were not sufficiently high enough to warrant non-parametric tests like the Kruskal-Wallis test. Using the same items in the second phase as in the initial phase improves the comparability, but could have affected the interpretability of the results. Future research should include a longitudinal study (e.g., time series analysis) that takes a closer look at the build-up of emotional commitment.

Conclusion

The question that laid at the centre of both studies focused on the effects of emotional involvement and project impact on emotional commitment and how this emotional commitment affects decision-making effectiveness. An experimental research design was made in which the predictors were manipulated to create different levels of emotional commitment among groups. Study 1 used 14 initial phase items to examine the hypothesized effects. Study 2 used the same 14 initial phase items and the 14 identical second phase items to examine some of the hypothesized effects, as well as the build-up of emotional commitment between phases. Emotional involvement did have a significant impact on emotional commitment, project impact did not. The existence and presence of emotional commitment among groups was measured. Measuring the effects of emotional commitment on decision-making effectiveness was the next step. Emotional commitment did not significantly affect information usage, although a small negative effect was found. The negative effect became slightly stronger in the second phase, but still not significant. A small significant negative effect was found on risk perception. The negative effect became stronger in the second phase. A substantial and significant effect was found resource allocation. This effect became stronger in the second phase. The results of Study 1 supported the thought that that the phenomenon of emotional commitment is real and that it affects decision-making effectiveness. The results of Study 2 supported the thought that emotional commitment builds-up over time and increases its effects on decision-making effectiveness. The findings open up directions for future research as well as adding the phenomenon of emotional commitment to the decision-making literature.

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Appendix

Appendix 1: The Scenarios

Scenario 1   Med-Child-High

Hieronder staat uw toegewezen project. Over dit project krijgt u vragen, dus lees de omschrijving goed.

Projectomschrijving

Qualtro Inc. heeft het managen van een nieuw project uitbesteed aan Innovator N.V. U bent gevraagd om dit nieuwe project te managen. Onderzoekers van Qualtro Inc. hebben een mutatie van het reovirus gemaakt. Dit gemodificeerde virus valt kankercellen aan zonder normale cellen te vernietigen. Na verschillende tests schijnt het virus vrij effectief te zijn bij kinderen. Honderd kinderen gediagnosticeerd met kanker (stage 2 t/m 4) waren onderdeel van een experimentele behandeling. De testresultaten gaven aan dat maar liefst 30% van de kinderen een gedeeltelijke remissie vertoonde. Uiteindelijk is zelfs 10% in complete remissie gegaan! De testresultaten zijn veelbelovend, maar er zijn nog veel hordes die overwonnen moeten worden. Onderzoekers van Qualtro Inc. gaven aan dat er een speciale 'stasis container' ontwikkeld moet worden voor distributie. Andere specialisten gaven aan dat er een nieuw toedieningsysteem moet worden ontwikkeld om het reovirus veilig op de juiste plaats in het lichaam te krijgen. U bent verantwoordelijk voor het creëren en ontwikkelen van dit mogelijk levensreddende apparaat.

Qualtro Inc. heeft een groot deel van de totale resources van het bedrijf tot uw beschikking gesteld. U krijgt de verantwoordelijkheid over een groot team van veertig werknemers. Bij een succesvol product zouden veel kinderen geholpen kunnen worden. Dit project kost waarschijnlijk een substantieel deel van de totale resources. Er is serieus risico op falen, maar een succesvol project kan zeer belangrijk zijn, wat natuurlijk een implicatie is voor uw positie bij Innovator N.V. Andersom ook waarschijnlijk..

Hieronder vindt u een paar vragen over dit project en u als manager. Geef aan of u het eens bent met de stellingen:

Scenario 2   Tooth-Pris-High

Hieronder staat uw toegewezen project. Over dit project krijgt u vragen, dus lees de omschrijving goed.

Projectomschrijving

Qualtro Inc. heeft het managen van een nieuw project uitbesteed aan Innovator N.V. U bent gevraagd om dit nieuwe project te managen. Onderzoekers van Qualtro Inc. hebben een mutatie van het reovirus gemaakt. Dit gemodificeerde virus valt kankercellen aan zonder normale cellen te vernietigen. Na verschillende tests schijnt het virus vrij effectief te zijn bij kinderen. Honderd kinderen gediagnosticeerd met kanker (stage 2 t/m 4) waren onderdeel van een experimentele behandeling. De testresultaten gaven aan dat maar liefst 30% van de kinderen een gedeeltelijke remissie vertoonde. Uiteindelijk is zelfs 10% in complete remissie gegaan! De testresultaten zijn veelbelovend, maar er zijn nog veel hordes die overwonnen moeten worden. Onderzoekers van Qualtro Inc. gaven aan dat er een speciale 'stasis container' ontwikkeld moet worden voor distributie. Andere specialisten gaven aan dat er een nieuw toedieningsysteem moet worden ontwikkeld om het reovirus veilig op de juiste plaats in het lichaam te krijgen. U bent verantwoordelijk voor het creëren en ontwikkelen van dit mogelijk levensreddende apparaat.

Qualtro Inc. heeft slechts een klein deel van de totale resources van het bedrijf tot uw beschikking gesteld. U krijgt de verantwoordelijkheid over een klein team van acht werknemers. Het winstvooruitzicht is aan de matige kant door het geringe aantal zieke kinderen. Bij een succesvol product zouden een aantal kinderen geholpen kunnen worden. Dit project kost hoogstwaarschijnlijk een substantieel deel van de totale resources. Er is serieus risico op falen, maar een succesvol project zou belangrijk kunnen zijn, wat natuurlijk een implicatie is voor uw positie bij Innovator N.V. Andersom ook waarschijnlijk..

Hieronder vindt u een paar vragen over dit project en u als manager. Geef aan of u het eens bent met de stellingen:

Scenario 3   Med-Child-Low

Hieronder staat uw toegewezen project. Over dit project krijgt u vragen, dus lees de omschrijving goed.

Projectomschrijving

Qualtro Inc. heeft het managen van een nieuw project uitbesteed aan Innovator N.V. U bent gevraagd om dit nieuwe project te managen. Onderzoekers van Qualtro Inc. hebben een nieuw type plastic ontwikkeld dat slechts tegen kleine hoeveelheden druk bestand is. Hoewel het

gebruik ervan gelimiteerd is, is het plastic wel gemakkelijk te gieten. Het idee is om tandenborstels te maken. De tandenborstels zouden dan sterk genoeg zijn om mee te poetsen, maar te slap voor andere toepassingen. Bijvoorbeeld slijpen en steken. Qualtro Inc. wilt dat u een mobiel apparaatje ontwikkelt dat deze tandenborstels op locatie kan maken. Het apparaat moet 105 graden Celsius kunnen halen voor vormingsdoeleinden. Het apparaat moet plastic haren kunnen drukken in het frame. Het belangrijkste is dat het apparaat veilig is in gebruik. U bent verantwoordelijk voor het creëren en ontwikkelen van het totale plaatje.

Qualtro Inc. heeft een groot deel van de totale resources van het bedrijf tot uw beschikking gesteld. U krijgt de verantwoordelijkheid over een groot team van veertig werknemers. Bij een succesvol product zouden veel klanten geholpen kunnen worden. Dit project kost waarschijnlijk een substantieel deel van de totale resources. Er is serieus risico op falen, maar een succesvol project kan zeer belangrijk zijn, wat natuurlijk een implicatie is voor uw positie bij Innovator N.V. Andersom ook waarschijnlijk..

Hieronder vindt u een paar vragen over dit project en u als manager. Geef aan of u het eens bent met de stellingen:

Scenario 4   Tooth-Pris-Low

Hieronder staat uw toegewezen project. Over dit project krijgt u vragen, dus lees de omschrijving goed.

Projectomschrijving
Qualtro Inc. heeft het managen van een nieuw project uitbesteed aan Innovator N.V. U bent gevraagd om dit nieuwe project te managen. Onderzoekers van Qualtro Inc. hebben een nieuw type plastic ontwikkeld dat slechts tegen kleine hoeveelheden druk bestand is. Hoewel het gebruik ervan gelimiteerd lijkt, is het plastic wel gemakkelijk te gieten. Het idee is om tandenborstels te maken. De tandenborstels zouden dan sterk genoeg zijn om mee te poetsen, maar te slap voor andere toepassingen. Bijvoorbeeld slijpen en steken. Qualtro Inc. wilt dat u een mobiel apparaatje ontwikkelt dat deze tandenborstels op locatie kan maken. Het apparaat moet 105 graden Celsius kunnen halen voor vormingsdoeleinden. Het apparaat moet plastic haren kunnen drukken in het frame. Het belangrijkste is dat het apparaat veilig is in gebruik. U bent verantwoordelijk voor het creëren en ontwikkelen van het totale plaatje.

Qualtro Inc. heeft slechts een klein deel van de totale resources van het bedrijf tot uw beschikking gesteld. U krijgt de verantwoordelijkheid over een klein team van acht werknemers. Het winstvooruitzicht is aan de matige kant door het geringe aantal klanten. Bij een succesvol product zouden een aantal klanten geholpen kunnen worden. Dit project kost

hoogstwaarschijnlijk een substantieel deel van de totale resources. Er is serieus risico op falen, maar een succesvol project zou belangrijk kunnen zijn, wat natuurlijk een implicatie is voor uw positie bij Innovator N.V. Andersom ook waarschijnlijk..

Hieronder vindt u een paar vragen over dit project en u als manager. Geef aan of u het eens bent met de stellingen:

Appendix 2: Items of Emotional Involvement and Project Impact

Emotional involvement (I-PANAS-SF):
You are now being tasked with managing this new project. Think about yourself and how you feel, does managing this project make you feel:
1. Ashamed – proud
2. Nervous - Exited
3. Doubtful - Determined
4. Afraid – Fearless*
5. Calm - Active

Perceived project impact: (1= *strongly disagree* to 5= *strongly agree*)
The board of directors wants to know what you think about the project's impact. Specify how much you agree with the following statements.
1. I think this project can have a positive impact on the available time and energy
2. I think this project can have a positive impact on the firm's financial resources
3. I think this project can have a positive impact on the firm's success
4. I think this project can have a positive impact on our society in general*
Note. * Item has been removed.

Appendix 3: The Questionnaire

Welkom!

Ik wil u alvast bedanken voor het invullen van deze enquête! De tijd voor het invullen van deze enquête bedraagt ongeveer 12-18 minuten. Het zijn slechts 34 vragen, de tijd zit hem in het lezen van korte stukjes informatie. De enquête is anoniem en de antwoorden zullen alleen worden gebruikt voor mijn afstudeeronderzoek. U kunt te allen tijde de enquête afsluiten en

op een ander moment verder gaan. Let op: het is geen competitie, er zijn geen goede of foute antwoorden. Het gaat erom dat u de vragen goed leest en de gegeven informatie naar eigen inzicht gebruikt. De teksten zijn in het Nederlands, <u>de informatierapporten en de vragen in het Engels</u>.

In deze enquête neemt u de rol aan van een projectmanager. U krijgt een project toegewezen. Over dit project krijgt u verschillende vragen. Een innovatieproject wordt vaak gestructureerd middels een zogenaamd stage-gate model. Dit houdt in dat het project wordt ingedeeld in verschillende fases (stages), waarbij elke fase wordt gevolgd door een evaluatie (gate). Deze enquête is volgens hetzelfde principe gestructureerd. Het project dat u moet gaan managen gaat door verschillende fases. Bij elke fase krijgt u een paar informatierapporten. Deze informatierapporten moet u gebruiken om beslissingen te nemen m.b.t. investeren, risico's en betrokkenheid.

Om u te helpen inleven vindt u hieronder een korte omschrijving van uw rol en het bedrijf waarvoor u werkt. Op de volgende pagina krijgt u een project toegewezen.

Werk- en bedrijfsomschrijving

U bent gestationeerd in Amsterdam, bij het Europees hoofdkantoor van **Innovator N.V.** Innovator N.V. is een Nederlands bedrijf dat internationaal projecten managet van andere bedrijven. U bent een van de topmanagers van Innovator N.V. U rapporteert direct aan de vicepresident van Europa. Twee jaar geleden bent u aangenomen om deze functie te bekleden. Voordat u deze functie had, heeft u drie jaar gewerkt als succesvolle innovatie vertegenwoordiger van Innovator N.V. in Londen. In uw eerste jaar was u geselecteerd voor 'rookie of the year'. U bent een harde werker. In uw huidige functie, gebaseerd op uw kennis over productinnovatie en het creëren van nieuwe markten, <u>is het uw verantwoordelijkheid om toegewezen projecten tot een succesvol einde te brengen</u>.

Innovator N.V. is een Nederlands familiebedrijf dat wereldwijd bedrijven helpt met het managen van projecten. Innovator N.V. begon als een klein bedrijf in de jaren tachtig, maar is nu uitgegroeid tot een internationaal concern dat zijn familiestructuur heeft weten te behouden. Het bedrijf heeft 1400 werknemers in dienst en heeft kantoren in meer dan dertig landen. **De basis van het bedrijfsmodel is het managen van andermans projecten met de resources van dat bedrijf.** Hoewel Innovator N.V. verscheidene mislukte projecten heeft gekend, zijn het de succesvolle projecten dat Innovator N.V. tot een geduchte concurrent heeft gemaakt. Innovator N.V. heeft een nieuw project binnen gekregen om te managen. Het dagelijks bestuur heeft u gevraagd om dit project tot een goed einde te brengen.

INSERT SCENARIO 1-4

Emotional commitment (MACS): (1= *strongly disagree* to 5= *strongly agree*)
Q1. I would be very involved in my project
Q2. I would be very interested in my project
Q3. I would really care about my project
Q4. I would like my project

U heeft nu het project toegewezen gekregen dat u gaat managen. Het project bevindt zich in een van de beginfases. U krijgt een aantal informatierapporten die u moeten helpen met het beantwoorden van de eerste set vragen. Als u naar beneden scrolt vindt u de

informatierapporten onder de vragen. Lees de vragen en gebruik de informatie die u nodig heeft over het project en de rapporten hieronder om deze vragen te beantwoorden.

De vragen zijn geformuleerd als statements. Geef per vraag aan in welke mate u het eens bent met de stelling.

Resource allocation: (1 = *none at all* to 5 = *a great deal*)
Q5. I would be willing to invest more time in the project.
Q6. I would be willing to invest more financial resources in the project.
Q7. I would be willing to invest more energy in the project.

Perceived risk (PRS): (1 = *strongly disagree* to 5 = *strongly agree*)
Indicate how much you agree with the following statements about risk.
Q8. The project would not fit in with my self-image.
Q9. Managing this project would be risky, because my friends, relatives, and colleagues would not approve of it.
Q10. Managing this project would be risky, because others would think less highly of me.
Q11. This project is stand to lose money if this project is continued instead of another project.
Q12. Given the financial expenses associated with continuing this project, the overall expenses of the project will be too high.
Q13. This project would consume a lot of resources.

INSERT INFORMATION REPORTS 1

U moet nu aangeven in welke mate u gebruik heeft gemaakt van de informatierapporten op de vorige pagina om de vragen te beantwoorden. Wees alstublieft zo specifiek mogelijk. De informatierapporten zijn onder de vragen bijgevoegd.

Hoeveel informatie heeft u gebruikt uit de onderstaande rapporten?

Information usage (PMIS use): (1 = *none at all* to 5 = *a great deal*)
Q14. Budget report
Q15. Resource usage report
Q16. Task in progress report

INSERT INFORMATION REPORTS 1

Fase 1 van het project is afgerond! Dat betekent dat het project nu een stap verder is, namelijk het maken van een prototype! Fase 2 gaat nu beginnen. U zult zien dat de vragen voor deze fase overeenkomen met fase 1. De informatierapporten zijn geüpdatet voor fase 2. Onderstaand vindt u nogmaals uw projectomschrijving, mocht u deze vergeten zijn. Op de volgende pagina krijgt u de nieuwe informatierapporten met bijgevoegde vragen.

INSERT SCENARIO 1-4

Emotional commitment (MACS): (1 = *strongly disagree* to 5 = *strongly agree*)
Q17. I would really care about my project
Q18. I would like my project
Q19. I would be very involved in my project
Q20. I would be very interested in my project

Het project is nu een fase verder! Het project gaat nu fysieke vormen aannemen door de ontwikkeling van een proefmodel. Onder de vragen vindt u de nieuwe informatierapporten (naar beneden scrollen). Lees de vragen en gebruik de informatie die u nodig heeft over het project en de rapporten hieronder om deze vragen te beantwoorden.

De vragen zijn geformuleerd als statements. Geef per vraag aan in welke mate u het eens bent met de stelling.

Resource allocation: (1 = *none at all* to 5 = *a great deal*)
Q21. I would be willing to invest more time in the project.
Q22. I would be willing to invest more financial resources in the project.
Q23. I would be willing to invest more energy in the project.

Perceived risk (PRS): (1 = *strongly disagree* to 5 = *strongly agree*)
Q24. This project is stand to lose money if this project is continued instead of another project.
Q25. Managing this project would be risky, because my friends, relatives, and colleagues would not approve of it.
Q26. This project would consume a lot of resources
Q27. The project would not fit in with my self-image.
Q28. Managing this project would be risky, because others would think less highly of me.
Q29. Given the financial expenses associated with continuing this project, the overall expenses of the project will be too high.

INSERT INFORMATION REPORTS 2

 U moet nu aangeven in welke mate u gebruik heeft gemaakt van de geüpdate informatierapporten om de vragen op de vorige pagina te beantwoorden.. Wees alstublieft zo specifiek mogelijk. De informatierapporten zijn onder de vragen bijgevoegd.

Hoeveel informatie heeft u gebruikt uit de onderstaande rapporten?

Information usage (PMIS use): (1 = *none at all* to 5 = *a great deal)*
Q30. Resource usage report
Q31. Budget report
Q32. Task in progress report

INSERT INFORMATION REPORTS 2

Het project is ten einde. Er volgen nog een paar vragen.

Q33. Ben u een: man/vrouw
Q34. In welke leeftijdscategorie valt u: 18-24 25-99
Q35. Wat is uw hoogst genoten opleiding: geen, middelbare school, bachelor, master, doctoraat.

Dank u wel voor het invullen van mijn enquête! Er wordt nogal wat van u gevraagd, dus ik stel het zeer op prijs dat u de tijd heeft genomen om deze in te vullen. Mocht u nog iemand kennen die mij wilt helpen met afstuderen, by all means stuur deze enquête maar door!

Appendix 4: Information Reports 1 and 2

Task in progress report 1

There were a lot of ideas the team had to go through. One idea suited the team best. The team further developed the idea, which took a lot of time (and man-hours). Costs were pretty high due to new laws that protect consumers' safety. The product features had to be adjusted, which gave the team a hard time. Overall, the budget for this stage was only exceeded by 2%. The budget's total was €800.000, the expenditure was €816.400. The board of directors did not like the extra costs, but luckily the idea has now been **approved**. The current task is to go from idea to a working prototype. The materials and expertise are present, although going from idea to prototype is difficult. The chance of going over budget in the next stage is on the high side, but a successful project would cover all expenses. A risk assessment has been made that shows current risks.

Project risk assessment	Probability		Impact	
Executives fail to support project	Low	🟢	🟠	High
Employees become disengaged with project	Very low	🟢	🔴	Very high
Estimates are inaccurate	Low	🟢	🟡	Moderate
Cost forecasts are inaccurate	Low	🟢	🟡	Moderate
Stakeholders have inaccurate expectations	Low	🟢	🟠	High
Resource performance issues	Low	🟢	🟠	High
Resource shortfalls	Low	🟢	🟠	High

Task in progress report 2

Designing the prototype took a lot more resources than anticipated. Not to mention the actual building of the prototype. The budget for this stage was 4 million. The total costs were more than 20% above that number. This indicates that future investments should be higher. Primarily the development of the right components and integrating those components was a massive challenge. Future tasks should be less challenging, due to our expertise in the next stages. The prototype is **likely to finish soon**. Then the rigorous testing can begin. The board of directors questions the economic viability of the project, because the costs are already on the high side. Maybe the board only sees actual costs and not the potential rewards. Bringing this project to a success would greatly benefit myself and the firm. Now, we are one step closer to delivering a finished product. Taking the previous stage into account, a new risk assessment has been made.

Project risk assessment	Probability		Impact	
Executives fail to support project	Moderate	🟡	🟠	High
Employees become disengaged with project	Very low	🟢	🔴	Very high
Estimates are inaccurate	Low	🟢	🟡	Moderate
Cost forecasts are inaccurate	Moderate	🟡	🟡	Moderate
Stakeholders have inaccurate expectations	Low	🟢	🟠	High
Resource performance issues	Low	🟢	🟠	High
Resource shortfalls	High	🟠	🟠	High

Project budget report 1

Project Budget
Costs Of Current Stage

1 = x100

Idea Generation

PROJECT TASKS	LABOR HOURS	LABOR COST	MATERIAL COST	TRAVEL COST	OTHER COST	TOTAL PER TASK
Brainstorming sessions	4	80	3	7	5	95
Analyzing sessions	11	220	6	0	4	230
Focus groups	5	100	4	15	4	123
Analyzing ideas (with experts)	16	320	7	16	3	346
Communication systems	12	240	4	1	15	260
Subtotal			105.400,-			

Concretize Idea

PROJECT TASKS	LABOR HOURS	LABOR COST	MATERIAL COST	TRAVEL COST	OTHER COST	TOTAL PER TASK
Product feature analyses	26	520	64	34	17	635
Potential of product analyses	62	1240	60	14	30	1344
Market viability analyses	90	1800	97	45	60	2002
Feedback analyses	113	2260	12	28	14	2314
Cost and material analyses	30	600	195	3	17	815
total			816.400,-			

Project budget report 2

Project Budget
Costs Of Current Stage

1= x1000

Prototype Design

PROJECT TASKS	LABOR HOURS	LABOR COST	MATERIAL COST	TRAVEL COST	OTHER COST	TOTAL PER TASK
Develop Functional Specifications	15	300	25	1	45	371
Develop System Architecture	16	320	8	0	23	351
Develop Preliminary Design Specification	9	180	11	2	12	205
Develop Detailed Design Specifications	17	340	21	3	23	387
Develop Acceptance Test Plan	11	220	6	0	10	236
Subtotal			1.550.000,-			

Prototype Development

PROJECT TASKS	LABOR HOURS	LABOR COST	MATERIAL COST	TRAVEL COST	OTHER COST	TOTAL PER TASK
Develop Components	41	820	20	3	5	848
Procure Software	35	700	8	1	2	711
Procure Hardware	37	740	12	1	1	754
Development Acceptance Test Package	19	380	6	0	3	389
Perform Unit/Integration Test	32	640	12	1	2	655
total			4.907.000,-			

Resource usage report 1

Resource usage report 1

Top 9 projects	Spending in €	Comparison to current project
Current project	**816.400**	**100%**
'Windowcleaner'	334.724	41%
'Treegrower'	400.036	49%
'Distributor'	514.332	63%
'Cool System'	726.596	89%
'Radianter'	693.940	85%
'Rabit Catcher'	285.740	35%
'Cold Fusion'	1.044.992	128%
'Last Hope'	930.696	114%

Current project's usage	% of company	Evaluation
Usage of company time	6%	Moderate ○
Usage of company employees	4%	Low ○
Usage of company space	4%	Moderate ○
Usage of company hardware	2%	Very low ●
Usage of company money	8%	Moderate ○
Total resource usage	4.8%	Low - Moderate ○

Resource usage report 2

Resource usage report 2

Top 9 projects	Spending in €	Comparison to current project
Current project	**4.907.000**	**100%**
'Windowcleaner'	2.060.940	42%
'Treegrower'	2.747.920	56%
'Distributor'	2.355.360	48%
'Cool System'	3.238.620	66%
'Radianter'	1.766.520	36%
'Rabit Catcher'	1.226.750	25%
'Cold Fusion'	6.477.240	132%
'Last Hope'	5.593.980	114%

Current project's usage	% of company	Evaluation	
Usage of company time	8%	High	●
Usage of company employees	7%	Moderate	●
Usage of company space	4%	Moderate	●
Usage of company hardware	3%	Low	●
Usage of company money	11%	High	●
Total resource usage	6.6%	Moderate	●

Appendix 5: Initial Factor Analysis

Kaiser-Meyer-Olkin Measure of Sampling Adequacy and Bartlett's Test of Sphericity

KMO-MSA.		,760
Bartlett's Test	Approx. Chi-Square	859,562
	df	120
	Sig.	,000

*Patern matrix of Principal component analysis with Promax rotation and the communalities*

	Components				
Items	1	2	3	4	Communalities
Q5Invest			,785		,808
Q6Invest			,687		,716
Q7Invest			,662		,742
Q8Risk		,601			,455
Q9Risk		,838			,699
Q10Risk		,663			,520
Q11Risk		,709			,503
Q12Risk		,787			,601
Q14Info				,864	,751
Q15Info				,691	,638
Q16Info				,738	,588
Phase1_Inv	,911				,728
Phase1_Inter	,860				,856

84

Phase1_Care	,921	,844
Phase1_Like	,852	,788
Q13Risk		,725	,538

Loadings <.300 are not shown in the pattern matrix

a. Rotation converged in 5 iterations.

Appendix 6: Interaction Effect Plot

Estimated Marginal Means of Emotional Commitment
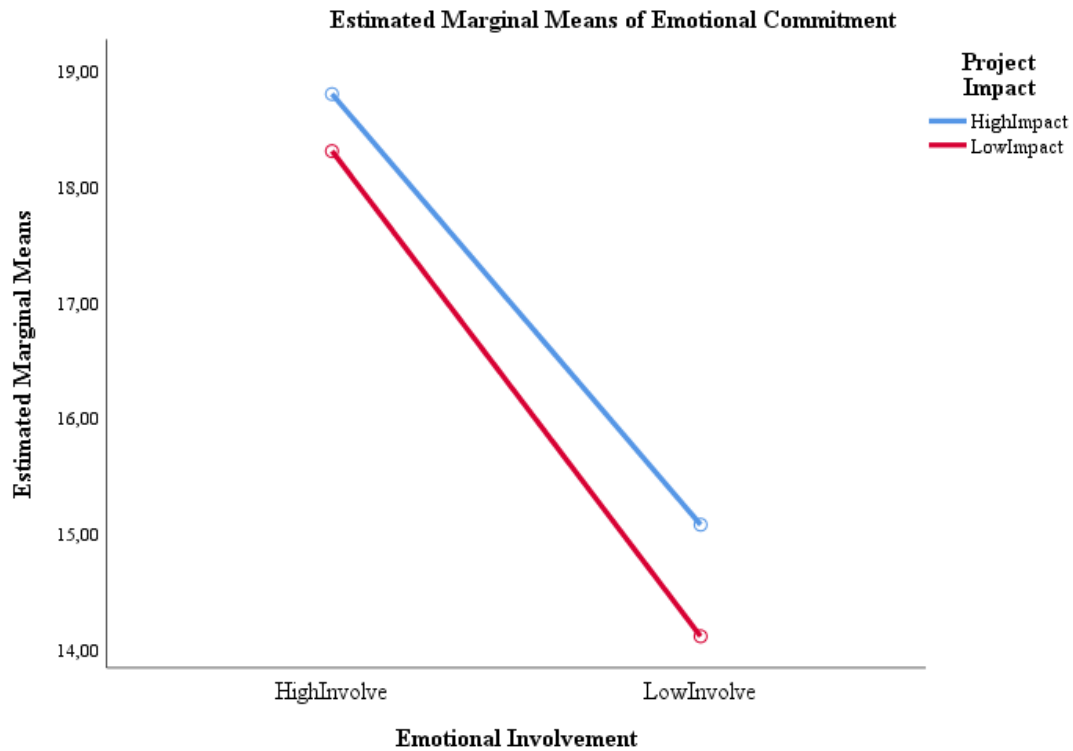
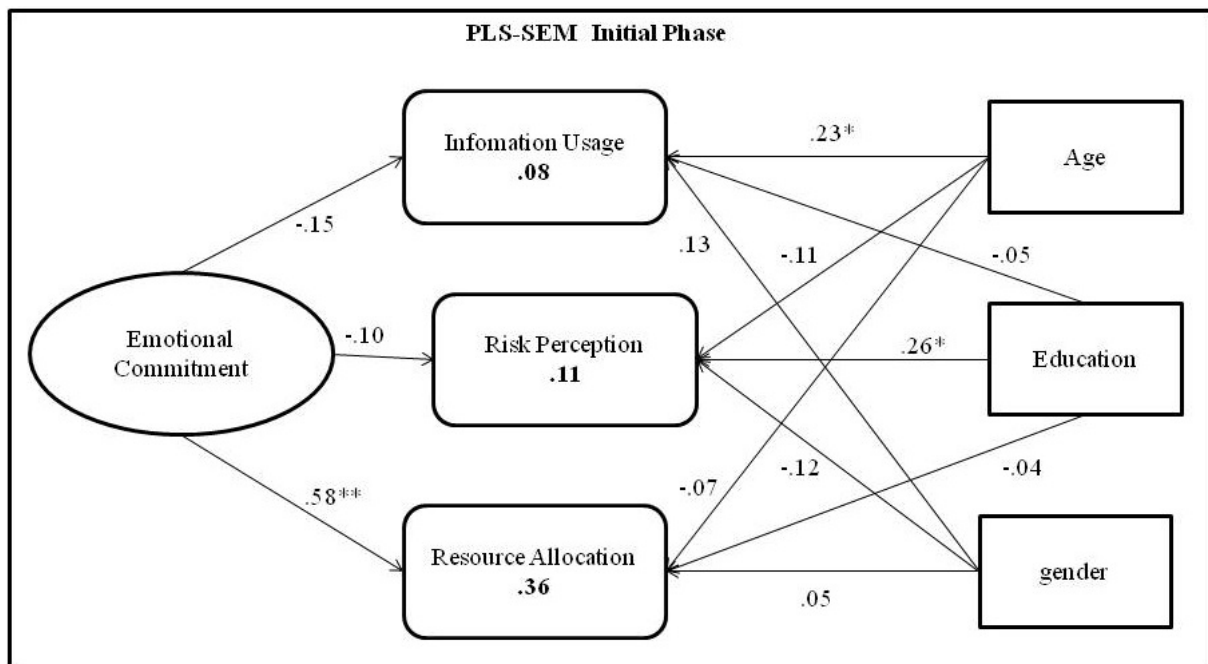*Appendix 7: PLS-SEM Initial Model and Second Model Results*

Figure 5 – PLS-SEM Initial Phase Model Results

Figure 6 – PLS-SEM Second Phase Model Results