

# Reducing Escalation of Commitment in High-Risk Investment Projects

## An Empirical Study of Behavioral Accounting Activities in German Companies

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### Abstract

Escalation of commitment describes the human trait to continue with a failing course of action, i. e., persisting with the original course of action, although new information suggests the opposite. This leads to delayed termination of failing projects. Empirical evidence shows that concerning investment projects, escalation of commitment leads to inefficient allocation of funds, higher costs and more severe organizational disruption by project failures. This paper builds on the conceptual work of Zayer [Zay07] and introduces a framework for integrating different biases that lead to escalation of commitment. Furthermore, this paper describes the development of a large scale survey for an empirical test of the model. The survey strives to measure the effect of behavioral accounting activities on reducing escalation of commitment in real world investment projects. At the time of the deadline for this paper, the survey has been closed recently. More than 550 managers and internal auditors have participated in the survey. The analysis of the results is currently being conducted.

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# 1 Introduction

## 1.1 Relevance of an Empirical Test of Deescalation Activities

Escalation of commitment describes the human trait to continue with a failing course of action, i.e., persisting with the original course although new information suggests the opposite (e.g. [SC02], p. 104 with reference to [SR87], [BDD89] and [Sta97]). This leads to delayed termination of failing projects. Project termination can be defined as “the decision by the firm to discontinue work on a project prior to its intended completion or before the goals of the project have been realized” ([Dea68], p. 118).

### 1.1.1 Scientific Relevance

Researchers have addressed escalation of commitment for about thirty years ([Sta76]). Over decades of research, more and more psychological factors relevant for escalation tendencies, have been identified (see figure 1 on page 6). Literature on escalation of commitment had been very fragmented and partially inconsistent for a long time.

Recently, Zayer ([Zay07]) has developed a model that integrates the different psychological factors. This model serves as a framework for the empirical study that is outlined in this paper. By testing Zayer’s model, this research will make a significant contribution to the understanding of escalation of commitment and provide the first empirical findings concerning the *relative strength* of the different psychological factors ([Cam99], p. 81 and [KRMZ03], p. 2). Moreover, the study is one of the first that tries to measure psychological factors concerning escalation of commitment *in real world settings*, whereas the broad majority of research has used laboratory experiments.

### 1.1.2 Relevance for Practice

Empirical evidence shows that concerning investment projects, escalation of commitment leads to inefficient allocation of funds, higher costs and more severe organizational disruption by project failures ([Mer88], p. 31). Research suggests that escalation of commitment is a phenomenon which leads to *systematic* delay of exit decisions. In other words, far more projects are terminated too late, rather than to early ([Lan93], pp. 147 and [Mer88], p. 31).

As [Lan93] found out, different industries show different exposure toward escalation of commitment. However, all industries have in common that they terminate very few projects at the right time. With 16.7 per cent of project terminations at the right time, mechanical engineering companies are the most successful, compared to only 10 per cent in the field of electrical engineering and 7.7 per cent in the chemical industry ([Lan93], p. 150). Terminated R&D projects exceed the prior planned time budget by 76 per cent on average ([AN70]). This indicates that the question whether to terminate a project or not, will usually not be considered, until the original time budget has run out ([Lan93], p. 76).

According to estimations of Lange ([Lan93]), around 50 per cent of all R&D costs are spent for failing projects. “Yet, the importance of quickly terminating a failing project can hardly

be overemphasized” ([Mer88], p. 31). This fact is of crucial importance especially in areas such as R&D, where the majority of high risk projects are expected to fail ([BAHI68], p.11, [MRS<sup>+</sup>71], p. 52 and [Lan93], p. 78). A cost analysis in this area shows that more funds are allocated to terminated or unsuccessful projects than to successful ones ([Lan93], o. 79 ff). These empirical facts clearly show the importance of managerial activities that reduce the escalation of commitment ([Lan93], p. 151). Whereas a lot of actions and methods have been recommended (see chapter 3.3), till now, no empirical test has been performed, in order to find out the *relative strength* of each action for the reduction of escalation of commitment. However, this would be useful for practice. Empirical findings of the relative strength of each action provide a guideline for priorities concerning deescalation activities.

## 1.2 Structure of this Paper

The remainder of this paper is organized into four chapters. Chapter 2 specifies the research focus. It explains the level of generalization, states the research questions and explains the choice of the research method. Chapter 3 provides a brief overview on the escalation of commitment literature. Subsequently, the Zayer’s model [Zay07] is presented, which provides the framework for the empirical investigation. Chapter 3 closes with the description of selected recommended activities for reducing escalation of commitment. Chapter 4 describes the development of the survey instrument, the pretests and the empirical investigation. Finally the limitations of the study are discussed in chapter 5.

## 2 Research Focus

### 2.1 Level of Generalization

This research project focuses on the primary decision maker’s psychological factors that lead to escalation of commitment. The model, presented in this paper (see figure 2 on page 9) aims for generalizability for all *internal, complex, high-risk, multiple stage investment projects, where the primary decision maker has (at least partially) responsibility for the start or the execution of the project*. These specifications are necessary conditions for the applicability of the model due to the following reasons.

- If the project is not *internal*, the activities for reducing escalation of commitment might not be applicable or effective.
- If the project is not *complex*, perception deficits might not be a relevant issue.
- If the project does not involve *high risk*, evaluation errors might be avoidable.
- If there are not at least two points of time (i. e. *multiple stages*), where investments in the project are considered, escalation of commitment cannot occur by definition.
- And finally, if the primary decision maker is not (at least partially) *responsible* for the start or the execution of the project, he has no reason for self justification tendencies.

Although this specification might seem to be quite narrow at the first glance, it can be applied to a wide range of project types that have been found prone to escalation of commitment, e. g.:

- research and development projects ([SC02]),
- software projects ([HTW03], [KTIM95], [KR99], [KRM00], [KR01], [KRMZ03], [MK00], [SKD01], [TSKM03], [TKF06] and [ZKRM03]),
- strategic decisions ([Kis00] and [LH99]),
- market entry decisions ([Cam99], [Rap95] and [RSES98]),
- large scale construction projects ([RS93]) and others more.

It is important to note that this research does focus on psychological factors in the sense of cognitive limitations of individual decision makers, their effects on project escalation and possible activities for reducing these cognitive problems. The approach does not focus on principle agent problems, interaction effects (unless they interfere with cognitive limitations such as self justification) and group decisions. Although aspects like these are highly relevant for decisions about project continuation or termination, these effects had to be excluded for complexity reasons.

## 2.2 Research Questions

The research project aims to solve four research questions that refer to the escalation of commitment model for *internal, complex, high-risk, multiple-stage investment projects, where the primary decision maker has (at least partially) responsibility for the start or the execution of the project* (cp. figure 2 on page 9).

- Q<sub>1</sub>:** Is it possible to find empirical evidence in real world context for the effect of different cognitive limitations on project escalation?
- Q<sub>2</sub>:** Is it possible to find empirical evidence in real world context for the effect of behavioral deescalation activities on cognitive limitations?
- Q<sub>3</sub>:** Which relative strength do the different cognitive limitations on project escalation have?
- Q<sub>4</sub>:** Which relative strength do the different deescalation activities on the cognitive limitations have?

## 2.3 Selection of Research Method and Data Collection Method

In behavioral research, laboratory experiments are the most frequently used method ([MR01]). Likewise, experiments are a major source for findings concerning escalation of commitment ([SS92], p. 421.) Nevertheless, despite their strength concerning the control of variables, experiments do not seem to be appropriate for this research project. First, this research intends to quantify the relationship between a number of variables (see figure 2 on page 9). This would require a very complex experiment with a large number of experimental groups ([MSS06], p.97). Second, laboratory research might lack external validity, which is of major interest in this research project ([Ste60], p.55). Case Studies would be well applicable for the first

two research questions, but they would not be appropriate for getting reliable quantitative data of the relative strength of the influence of each variable. The same argument applies for field research. A large scale survey has been identified to be the most appropriate method. It appears to be the most suitable approach for each of the four research questions. Due to the large number of participants, it will be possible to apply enhanced statistical methods for quantitative comparison of a large number of variables. At the same time, empirical findings from a large scale survey will provide quantitative data of real world projects and enhance external validity of behavioral research ([Dil00], p. 9).

### 3 Prior Research

#### 3.1 Cognitive Limitations With Regard to Escalation of Commitment

Since Staw introduced escalation of commitment as an explanation for escalating projects [Sta76], a large body of literature has emerged. This chapter briefly summarizes the main psychological factors that have been proposed and experimentally tested over the last three decades. Figure 1 provides an overview of the development of the escalation of commitment literature and the different psychological factors, discussed in this chapter. The discussion of the effects follows the structure of the escalation of commitment model, presented later in this article (see chapter 3.2).

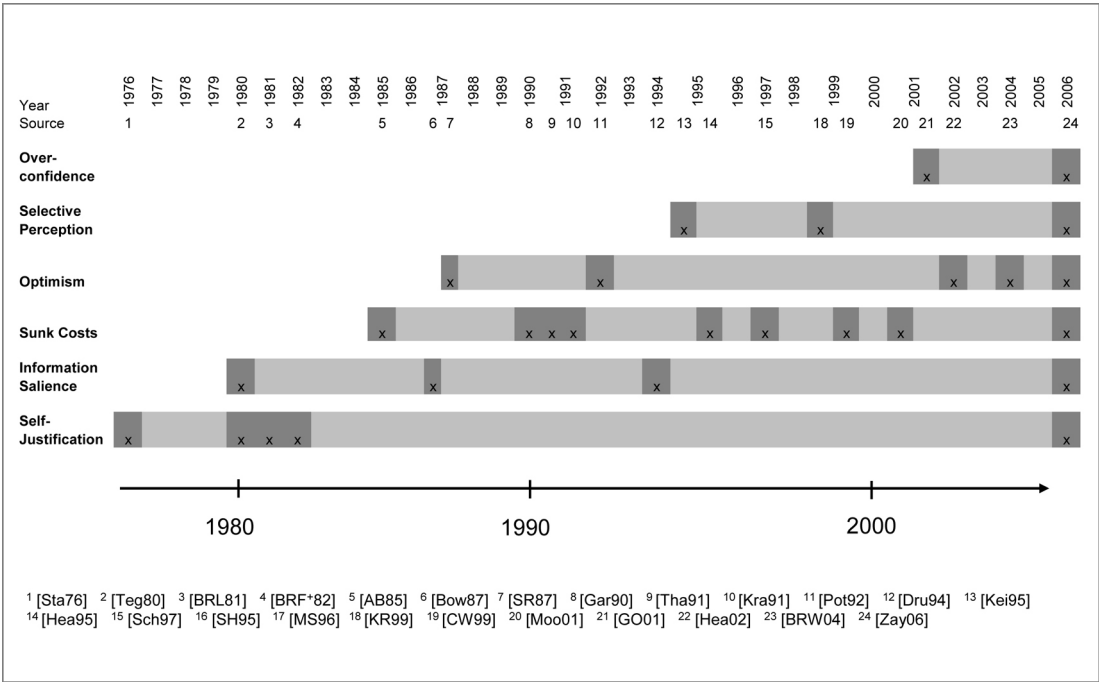


Figure 1: Publications in the field of escalation of commitment

### 3.1.1 Perception Deficit

A precondition for rational project termination is the perception of all relevant problems. In the case of complex and ambiguous feedback, this might not be the case. Indeed, cognitive limitations lead to a perception deficit, due to two major problems.

(1) Individuals can only perceive certain information, if it exceeds a *perception threshold*, determined by “background noise” ([ZG96], p. 118). Therefore the information salience of the negative feedback plays an important role for escalation of commitment ([AB85], [Bow87] and [Dru94]).

(2) Individuals tend to *selective perception* (sometimes referred to as Confirmation Bias or Confirming-Evidence Bias), which means that they seek out information that supports their existing point of view, while at the same time avoid information that contradicts it ([HK06], p. 123). Accordingly, if the decision maker is convinced about his project, he will be biased against the perception of negative information, an aspect that contributes to his escalation of commitment tendency ([KTIM95] and [KR99]). Although well established in experimental research ([DS58]), there are some doubts remaining about the strength of selective perception of experienced managers ([Wal88]). The research project presented in this paper, might generate valuable additional insights concerning this discussion, by providing data from managerial decisions in real project context.

### 3.1.2 Need for Self Justification

Negative information about a project might strengthen the decision maker’s motives to continue with a failing project. Instead of striving to contribute to the company’s value, he might rather start to focus on face saving. This psychological effect is called *self justification*. The decision maker’s behavior is not necessarily opportunistic—it can occur even if the decision maker owns the company. Self justification has been the first identified psychological factor influencing escalation of commitment ([Sta76]). Self justification has two dimensions, the internal perspective (sometimes referred to as psychological self justification), which is concerned with the self-perception of the decision maker ([Sta76] and [Teg80]) and the external perspective (sometimes referred to as social self justification), which refers to the decision maker’s concern to “lose face” ([BRL81] and [BRF<sup>+</sup>82]).

### 3.1.3 Evaluation Errors

If a problem has been perceived, and if the decision maker’s goal system is not dominated by the need for self justification, the decision making process reaches the evaluation phase. In this phase, the benefits of terminating or continuing the project have to be evaluated. Two major psychological biases relevant at this stage have been identified: (1) sunk cost effect and (2) optimism.

(1) Individuals are averse to wasting resources ([AB85]). To cancel a project that has needed investments, seems like waste. Therefore people take the past investments into account when evaluating a project. This bias is known as *sunk cost effect* ([DP06], p. 379 and [HK06], p. 122).

This bias violates the rules of prescriptive decision theory. According to decision theory, a rational evaluation has to be solely based on future cash flows ([HM86], p. 117). Taking sunk costs into account leads to evaluation errors and increases the escalation of commitment tendency ([AH00], p. 295, [Cam99], [GSR90], [Hea95], [Kra91], [Moo01], [Sch97] and [Tha91]).

(2) The second important factor for evaluation errors from the cognitive point of view is *optimism*. Individuals tend to overestimate their ability to influence the project outcome. This leads to an underestimation of potential pitfalls and an increased willingness to take risks ([DKM<sup>+</sup>07], p. 279). Irrational optimism can therefore contribute to evaluation errors and thereby to escalation of commitment ([BRW04], [Hea02], [Pot92] and [SR87]).

### 3.2 Model of Escalation of Commitment

While a lot of research has been carried out concerning methods for rational project evaluation and decision making (for an overview see [Hub96], pp. 154), a theoretical framework of the *psychological effects* that lead to economical-irrational continuation of failing projects has been missing so far. Recently, such a framework has been developed by Zayer [Zay07]. This framework integrates and structures well-known effects like selective perception, self-justification, sunk-cost effects and others, mentioned above. Accordingly, this concept is the first comprehensive, theory-based behavioral framework for escalation of commitment in an economic context. Additionally, Zayer allocates activities for reducing escalation of commitment to his framework.

Figure 2 shows (a simplified version of) [Zay07]’s model, including the activities for reducing psychological antecedents for escalation of commitment that are explained in chapter 3.3.

Additionally to the psychological pitfalls, Zayer identifies three moderating effects, namely (1) point of time of first problem perception, (2) willingness to utilize decision scope and (3) overconfidence.

(1) As research suggests, *timing* is critical for the impact of perceived problems on escalation of commitment. According to experimental findings, early negative salient feedback reduces escalation of commitment ([BRF<sup>+</sup>82], [Dru94] and [Dru95]). If in contrast, the negative information is revealed late, it might increase escalation of commitment ([Teg80]).

(2) The degree of the change of goals is limited by the *unquestioned decision scope* of the primary decision maker. Reducing this scope will therefore reduce the change of goals for decisions about the project ([Teg80], pp. 40).

(3) Good decision making requires meta knowledge—the understanding of the limits of one’s knowledge and estimates about the precision of the evaluations ([RS92], p. 7). Individuals have a deeply rooted *overconfidence* in their judgments. It can be expected that increased overconfidence increases evaluation errors and thereby contributes to escalation of commitment. The tendency for overconfidence decreases with experience but even experienced experts still overestimate their guesses ([RS92]). The overconfidence effect has been seen in many different professions. Only very few occupations seem to be immune against overconfidence. Among them are auditors who actually show a tendency for underconfidence ([TSLR82]).

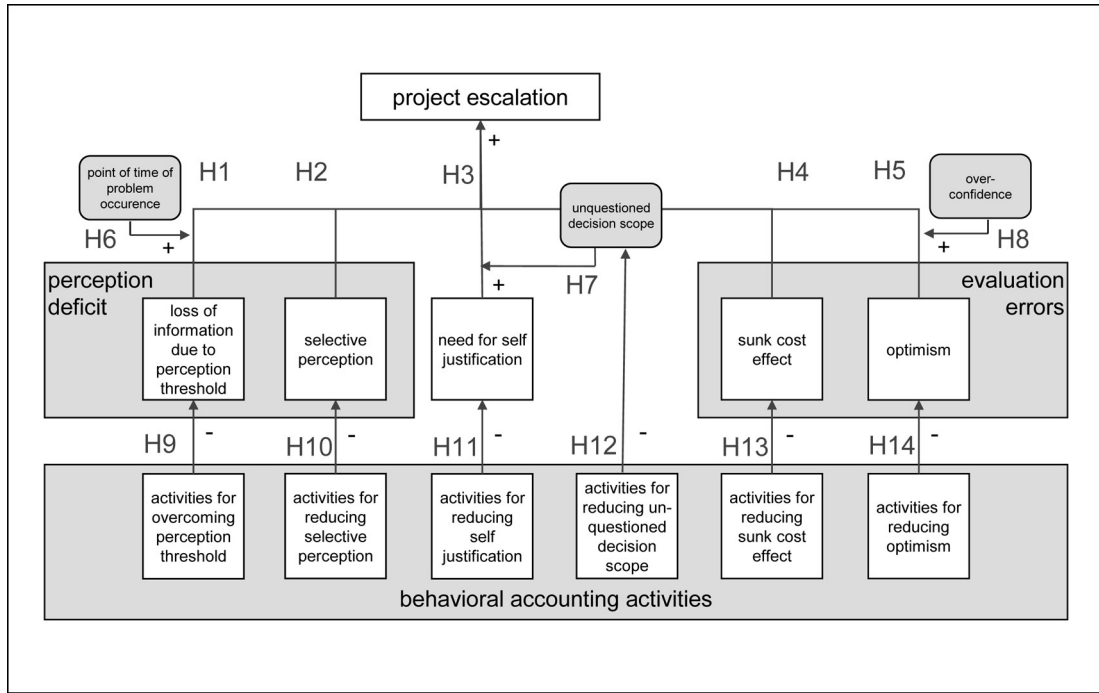


Figure 2: E of C Model, adapted from [Zay07], p. 223

### 3.3 Behavioral Accounting Activities for Reducing E of C

A large amount of deescalation activities has been proposed in literature. This article focuses on activities that (1) are directly related to the cognitive biases mentioned in chapter 3.1, (2) have been empirically tested (usually by laboratory experiments) and (3) seem to be implementable with reasonable effort.

#### 3.3.1 Activities for Overcoming Perception Threshold

In order to overcome the perception threshold, the first activity is to *generate active decision situations*. If the decision maker is forced to decide from time to time about continuation or termination of the project, he will have to face relevant information. Therefore, planning mile-stones and establishing formal rules for active decisions at each milestone can help to overcome the perception threshold ([KR99], p. 70 and [MFM04]).

Another important point is the availability of project information for the decision maker. *Regular reporting* of project progress and obstacles can significantly contribute to deescalation ([BSR79], [BRF<sup>+</sup>82], [Dru95], [RB75] and [Teg80]). Concerning the reports, *quantitative information* and *clarity of criteria for success and failure* can help the decision maker to recognize relevant information among the ambiguous plurality of feedback information ([Gho97], [JM70], p. 8., [KR99] and [KL89]).

### 3.3.2 Activities for Reducing Selective Perception

Selective Perception can be reduced by explicit advice to keep the danger of escalation of commitment in mind. Therefore, decision makers should get the instruction that termination is a valid option that should always be taken into consideration ([NBB<sup>+</sup>82] and [KS04]).

### 3.3.3 Activities for Reducing Self-Justification

Literature suggests at least three antecedents for self-justification. (1) The degree of personal responsibility for the project, (2) the need for psychological (internal) self-justification and (3) the need for social (external) self-justification.

Each antecedent can be reduced by appropriate activities.

(1) The degree of personal responsibility can be reduced by following the *shelter&share strategy* ([HTW03]). In this case a neutral person (e.g. an internal auditor) apart from the primary decision maker bears a part of the responsibility. He has to sign major decisions and thereby signals the primary decision maker that someone else supports his decisions. Sharing responsibility will make it easier to terminate a project, if the decision turns out to have undesired results.

(2) The need for internal self-justification can be diminished by communicating the decision maker that the quality of his decision process is more important than the actual outcome. This is reasonable, because in high risk environments, even the best decision can lead to failure. Process quality should therefore be controlled ([KR99], [KD98] and [SS92], p. 424).

(3) The need for external self-justification can be alleviated with the *support&sympathy strategy* ([HTW03]). This strategy implies a failure tolerant cooperate culture ([KR99], p. 68). The decision maker will be ensured that neither his career nor his reputation will suffer from project termination ([HTW03]). Reducing external threat has been found an effective method for reducing escalation of commitment ([SS92], p. 424).

### 3.3.4 Activities for Reducing Unquestioned Decision Scope

An important aspect concerning the change of goal systems is the reduction of the unquestioned decision scope. These activities are necessary for reducing escalation of commitment, if the need for self-justification could not be fully avoided. If the decision maker is forced to state his explicit goals, he cannot use his personal, self-justification motives as a rationale ([BR85]). Therefore, he has to find valid goals—or has to approve project termination. According to empirical evidence, *open declaration and discussion of the goals* reduce escalation ([BR85] and [Teg80]). Several empirical studies have shown that *predetermined, publicly known stopping rules* significantly reduce escalation of commitment ([Baz86], [BMS97], [BSR79], [KR99], [SS92] and [Teg80]). In order to avoid too early termination, the predetermined rules should not be applied without further thought. However, the excess of a predetermined limit should lead to serious discussion about project termination ([BR85] and [Hea95]).

### 3.3.5 Activities for Reducing Sunk Cost-Effect

Several possibilities for diminishing the sunk cost effect have been found adaptable. First, the sunk costs should be explicitly labeled as sunk costs (e.g. by management accounting). Combined with the advice that sunk costs shall not influence future decision making, this activity seems to have the potential to reduce irrational evaluation. Second, administrative staff should provide the decision maker with adequate evaluation methods and tools ([Gho97], p.108 and [NS96]). Third, opportunity costs (i.e. other projects that could be funded, if the current project would be terminated) should be made clear to the decision maker in order to stimulate thoughts about future possibilities rather than regret of lost past investments ([KR99], [McC86], p.282 and [NN86]), although this method did not always show significant results ([KR99], pp.73).

### 3.3.6 Activities for Reducing Optimism

Literature mentions two main drivers for exaggerated optimism, decision maker's (1) perceived control and (2) track record.

(1) Perceived control refers to the illusion of control over outcomes that are risk dependent. The control illusion can be reduced by providing external data (e.g. the percentage of failed projects in the respective field) and *external evaluation*. Since outsiders do not suffer from perceived control, they should always be asked to independently evaluate a project ([LK03]).

(2) The effect of the decision makers' track record lies in the fact that decision makers have often been responsible for projects before and have probably been successful even with difficult projects. Having resolved problems once, successful decision makers might overestimate their own abilities. In order to question their exaggerated optimism, it is helpful, as experiments have shown, to introduce controlled conflict by using the so called *devil's advocacy* ([Sch88], p.777). This technique involves a person that deliberately argues from the most pessimistic standpoint and thereby forces the decision maker to provide proof for his expectations ([Cos81] and [SSR86]).

Table 1 summarizes the identified activities for reducing psychological factors that lead to escalation of commitment. Additionally, the literature that gives supporting evidence for the effectiveness of each activity is provided.

## 4 Empirical Test of the Escalation of Commitment Model

Until now, Zayer's framework has not been put to empirical test. This shall be conducted within this study. In order to achieve this goal, the first step was to reassess Zayer's framework and to (1) transform it into hypotheses that represent a structural equation model. Then, the existing empirical literature had to be analyzed in order to (2) find tested constructs for measuring the elements of the framework. For constructs that had never been tested before, (3) new items had to be developed. At this point, reliability and validity had to be addressed in order to integrate appropriate (4) control mechanisms into the data collection. In order to (5) get empirical data, a survey among technical managers and internal auditors is conducted.

Psychological challenge	Deescalation activity	Supporting literature
perception threshold	generate active decision situation	[KR99], [MFM04]
	report project status and problems	[BSR79], [BRF <sup>+</sup> 82], [Dru95], [RB75] and [Teg80]
selective perception	give quantitative feedback and apply clear evaluation criteria	[Gho97], [JM70], [KR99] and [KL89]
	make clear that project termination is an option	[NBB <sup>+</sup> 82] and [KS04]
	shelter & share strategy	[HTW03]
self-justification	focus on process quality	[KR99], [KD98] and [SS92]
	support & sympathy strategy	[HTW03], [KR99] and [SS92]
unquestioned decision scope	open declaration and discussion of the goals	[BR85] and [Teg80]
	predetermined stopping / discussion rule	[Baz86], [BMS97], [BSR79], [BR85], [Hea95], [KR99], [SS92] and [Teg80]
		no empirical evidence known
sunk cost effect	label sunk costs as sunk costs	[Gho97] and [NS96]
	provide adequate evaluation methods	[KR99], [McC86] and [NN86]
optimism	provide opportunity costs	[LK03]
	provide external evaluation	[Sch88]
	use devil's advocacy	

Table 1: Behavioral Accounting activities for reducing escalation of commitment and supporting literature

The participants of the study are asked to remember a certain project with which they are familiar and that has been terminated. Then they will be requested to answer all questions with respect to this concrete project. The data shall then be analyzed with appropriate (6) mathematical-statistical methods in order to approve (or falsify) the assumed relations between the variables. If adequate measures can be found, it should be possible to show empirically that Zayer's framework is sound and that companies employing certain escalation reducing activities based on the findings of behavioral accounting are more successful in terminating failing projects.

#### 4.1 Hypotheses for a Structural Equation Model

According to the model of escalation of commitment for high risk investment projects presented above, the following hypothesis shall be tested in real world context.

- H<sub>1</sub>:** With increasing loss of information due to perception threshold, project escalation increases.
- H<sub>2</sub>:** With increasing selective perception, project escalation increases.
- H<sub>3</sub>:** With increasing need for self justification, project escalation increases.
- H<sub>4</sub>:** With increasing sunk cost effect, project escalation increases.
- H<sub>5</sub>:** With increasing optimism, project escalation increases.
- H<sub>6</sub>:** The point of time of problem occurrence is a moderating factor. The later the point of time, the stronger will perception thresholds lead to project escalation.
- H<sub>7</sub>:** The unquestioned decision scope is a moderating factor. The larger the unquestioned decision scope, the more will the need for self justification lead to project escalation.

- H<sub>8</sub>:** Overconfidence is a moderating factor. The stronger the overconfidence, the more will optimism lead to project escalation.
- H<sub>9</sub>:** With better activities for overcoming perception threshold, loss of information due to perception threshold decreases.
- H<sub>10</sub>:** With better activities for reducing selective perception, selective perception decreases.
- H<sub>11</sub>:** With better activities for reducing self justification, self justification decreases.
- H<sub>12</sub>:** With better activities for reducing unquestioned decision scope, unquestioned decision scope decreases.
- H<sub>13</sub>:** With better activities for reducing sunk cost effect, sunk cost effect decreases.
- H<sub>14</sub>:** With better activities for reducing optimism, optimism decreases.

## 4.2 Research for Existing Constructs

Before developing new constructs, a thorough search for existing constructs should always be undertaken. In the case of this research project, three main sources for constructs have been searched through, (1) managerial construct reviews, (2) individual articles and (3) psychological test-databases and construct reviews.

(1) The reviewed articles comprised the marketing scales handbook vol. I-IV ([BH92], [BH96], [BIJH01] and [BIHJ05]), the management accounting control scales handbook ([Sch07], the summary and analysis of multi-items scales used in logistics research ([KSS<sup>+</sup>02] and the review of construct measurement issues in behavioral accounting research ([KS98]).

(2) Diverse sources have been searched systematically for individual articles. Among these sources are: Ebsco, ABI Inform / Pro Quest, ScienceDirect, Springerlink, SSRN, IDEAS-REPEC, Citeseer and scholar.google.com.

(3) The psychological sources which have been searched are Health and Psychological Instruments (HaPI), Mental Measurement Yearbook (by Buros Institute) and the test collection of the Educational Testing Service (ETS Test Link).

Although many related constructs have been found, no construct could be identified that exactly matched the phenomenons in focus of this research project. Therefore, items had to be adapted and new items had to be developed. The following chapter deals with this task.

## 4.3 Development of New Constructs

The development of new constructs follows established procedures ([Chu79], [DeV02], [Dia05], [Nun78] and [Ros02]).

In the following paragraphs, the operationalization of the constructs will be explained.

Project escalation is the economic-irrational, systematic termination delay of a failing project. Two different measures have been developed in order to measure *project escalation*. First, reflexive indicators are used to measure project escalation as a latent variable. Items for this construct ask the participants about their opinion toward the termination of the project. The

questions inquire, whether the project has been terminated too early, at the right time or too late. Second, the project escalation are measured indirectly with questions about the budget overrun concerning costs, man hours and calendar time (for a similar approach see [DP06]).

The psychological factors and moderating variables are measured with reflective indicators using multiple items. For a description of the pretests in the development process of these scales see 4.5 on page 16.

The activities for overcoming the psychological problems are measured with formative multiple item scales.

#### 4.4 Reduction and Control of Potential Measurement Errors

Several methods are employed, in order to reduce and control potential measurement errors, (1) different informants, (2) dual measurement of project escalation, (3) control constructs for social desirability and leniency bias, (4) method variance (mv) marker and (5) general activities for reduction of method biases.

(1) The empirical data is collected from two distinct sources, namely key decision makers and non key decision makers. On the one hand, *key decision makers* are asked. In the context of this study, a key decision maker is defined as person, which is responsible for the decision about project termination or continuation. They receive a version of the questionnaire, where the psychological factors are operationalized as self reporting measures. Evidently, this method is vulnerable to the social desirability bias (for measurement control of this bias see paragraph (3)). The social desirability effect refers to the fact that people sometimes try to answer questions in that way that the answers will reflect socially accepted behavior ([CM60]). It has to be expected that the answers of the decision makers will vary systematically with the individual degree of social desirability bias.

On the other hand, *internal auditors and members of project teams* (i. e. people are not in the position to decide about project termination or continuation) will be asked in order to allow for comparisons with the key decision maker sample. Internal auditors and members of project teams are supposed to be less vulnerable to the social desirability bias, because they are not personally responsible for the decision about project termination or continuation. Auditors are expected to be more objective, than the persons that are directly involved with the project ([KR99], p. 71). This second group received a version of the questionnaire, where the psychological factors are operationalized as evaluations of the decision maker's (i. e. *not* the auditor) performance concerning the different psychological factors. This approach is vulnerable to the leniency bias (for measurement control of this bias see paragraph (3)). According to this bias, individuals evaluate the behavior of a friend better than the same behavior exhibited by a stranger or an enemy. If internal auditors are asked to evaluate the decision makers performance, it seems plausible that their answers will systematically vary with their attitude toward the decision maker.

This procedure leads to two distinct samples. From the methodological point of view, matched dyads would have been even better for analysis. However, past experience shows that matched dyads are very difficult to achieve in large numbers. This is even more for a sensitive topic

like escalation of commitment. Therefore, the two sample approach has been preferred. Nevertheless, even unmatched data from two different samples containing people with two distinct positions, will improve validity estimation. Although each measurement is expected to have measurement errors, the use of two different sources will make comparisons and thereby measurement error estimates possible.

(2) The dependent key variable, project escalation, has been measured in two ways (for details see chapter 4.3). Comparisons between the results of the two measures, will improve validity estimates.

(3) If main sources for measurement can be identified *ex ante* of the data collection, the use of control constructs is a reasonable way to allow for more detailed measurement error analysis ([PMLP03], p. 896). In the case of this study, social desirability and leniency bias have been identified as main possible error sources (cp. paragraph (1)). Therefore two constructs will be added to the model. One construct will measure the respondents tendency for social desirability ([KSRM00] and [TP05]). The other construct will measure the relation relationship (or attitude) of the respondent, to the decision maker that has been responsible for the termination decision. Figure 3 shows, how control constructs can be used to analyze measurement errors.

(4) The term mv-marker stands for a variable that can be used to calculate the method variance. The method has been proposed by Lindell and Whitney [LW01] and consists of the inclusion of a construct that is *not* correlated at least to one other construct, according to the underlying theories. Empirical results can then be analyzed for correlations between the two constructs. Due to the fact that the correlation between the constructs should be zero, any difference from zero represents a variance, induced by systematic measurement error (i. e. common method bias).

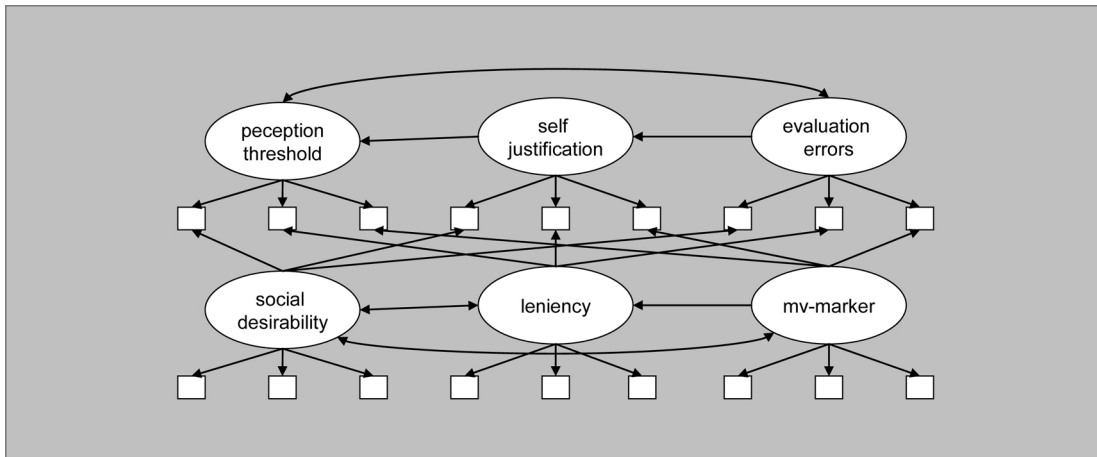


Figure 3: The use of control constructs, adapted from [PMLP03], pp. 896

(5) Literature suggests a lot of additional activities for reducing common method error (e. g. [Dil00], [Hag93], [HB04] and [PMLP03]). Some examples for methods that have been found appropriate and applicable are a guaranty for anonymity and the inclusion of the “don’t know / does not apply” answer category. The items within each block are presented in random order

(i. e. in different order for different participants). Furthermore, two version of the questionnaire are used, whereby one version presents the three main pages of the questionnaire in reversed order. In the end of the questionnaire, the participants are asked, whether the questions were interesting, easy to understand and unambiguous and whether the length of the questionnaire was appropriate.

## 4.5 Pretests

Several pretests have been conducted in order to improve the new scales and the survey as a whole.

The first pretest consisted of a sorting procedure. The construct definitions were given to 17 people. Having read the definitions, the participants received all items in random order. The participants were then asked to allocate each item to one of the constructs or to the category “other”. The results lead to the elimination of some constructs and items that turned out to lack distinctiveness.

In a second step for improving content validity, 24 persons from the target population where given the construct definitions and the items belonging to each scale. This time, the persons were asked to rate each item whether it is “not at all representative”, “somewhat representative” or “clearly representative” for the construct. The four items with the best score for each construct were selected for the final scale.

In a third pretest phase the complete questionnaire was discussed with academics and with practitioners from the target population. As a result, some formulations were modified in order to improve unambiguousness and the length of the questionnaire was reduced.

For the forth pretest, the complete questionnaire has been sent to 456 technical managers and 417 internal auditors. 31 (6,8 %) managers and 40 (9,6 %) auditors completed the questionnaire. Reliability analysis showed satisfizing results. Due to the low absolute number, no factor analysis has been used and no items were deleted. Comments from the free-text field indicated that two people that had answered the questionnaire with a project in mind that had ended in talk, had the impression that some questions did not fully apply to their situation. Therefore the introduction page was slightly modified and projects that ended in talk were removed from the list of examples for failed projects. Apart from this, no problems ocured. Therefore, the questionnaire was used for main data collection without other significant changes.

## 4.6 Collection of Empirical Data and Analysis of the Data

The empirical data is collected with an on line survey (cp. chapter 2.3). People with two different job positions have been addressed, containing approximately 4000 individuals each. One sample consists of internal auditors , the other sample comprises technical management. These positions have been chosen in order to get data from people who are key decision makers *and* from people that are not the key decision makers. As the pretest has shown, most of the persons in technical management positions are key decision makers concerning projects, whereas most of the internal auditors are not key decision makers.

At the present time, the survey has been closed recently. More than 550 managers and internal auditors have participated. This number is sufficiently large to use sophisticated statistical methods as structural equation models. Therefore, the data is currently being analyzed with AMOS.

## 5 Limitations of the Study

Some major limitations of the study result from the model being tested. As mentioned before, due to complexity reduction, the model is based on several simplifying assumptions.

Probably the strongest limitation is the focus on a *single* decision maker. The model does neither include group decisions nor different hierarchy levels. The extension of the model in order to explain these effects, seems a worthwhile subject for future research.

Concerning the model's power to explain project escalation, it should be kept in mind that the model only comprises psychological factors of the decision maker. In real world projects, a lot of other factors will influence project termination and escalation, e. g. organizational aspects, external factors etc.

Furthermore, the model only includes explanations that have already been tested successfully in experimental context. Nevertheless, additional explanations exist and might be included in subsequent research, if empirical evidence supports them.

Another limitation is the selection of deescalating activities. Many more activities have been proposed in literature. Due to practical research restrictions (length of questionnaire in order to maintain an acceptable response rate), only a small number of activities could be included. The selection of activities has been done with great care. Only activities with direct reference to existing theories have been included. Nevertheless, it is possible that other activities, which are not included in this empirical test, have a stronger impact on deescalation.

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Appendix: Survey instrument  
(Translated version of the German questionnaire)

<b>part 1</b>		
<p>Have you ever dealt with a project that has been terminated before the initial goal had been reached?</p> <p>Examples:            A product development project where the goals turned out to be technically impossible or where the product was no longer needed.            An internal process optimization project that has been terminated unsuccessfully.            A strategic project (e.g. a company acquisition or expansion into foreign markets) that had been terminated, although the initial goal has not been reached.            etc.</p>	Yes <input type="radio"/>	No <input type="radio"/>
<p>Have you ever dealt with a project (in the broadest sense) that failed? I.e. a project that ended, although the initial goal had not been reached?</p> <p>Examples:            The launch of a new product that was not successful at the market.            The implementation of a software that never reached its intended goal.</p>	Yes <input type="radio"/>	No <input type="radio"/>
<p>Have you ever dealt with a project (in the broadest sense), where a restart / relaunch has been undertaken (e.g. in order to bring the project back on track)?</p>	Yes <input type="radio"/>	No <input type="radio"/>
<p>Your answers to these questions determine the further questionnaire. Therefore, please answer carefully.</p>		
<b>part 2</b>		
<p>Please remember projects that have been terminated in a premature stage (i.e. projects that have been terminated, before the goal had been reached) you dealt with in the past. Among those projects chose the one, you remember best. (This can be a project at one of your former employers, too.)</p> <p><b>Important: Refer to this specific, premature terminated project for all of the following answers!</b></p>		
<p>What kind of project has this project been?</p>	<input type="radio"/> Basic Research <input type="radio"/> Development <input type="radio"/> Implementation (e.g. Software) <input type="radio"/> Optimization / Process Improvements <input type="radio"/> Outsourcing <input type="radio"/> Launch of a New Product <input type="radio"/> Market Entry <input type="radio"/> Plant Construction <input type="radio"/> Real Estate Construction <input type="radio"/> other: ...	
<p>Have you been responsible for the premature termination or continuation of the project? (This person will be called „decision maker“ in the following.)</p>	<input type="radio"/> Yes, I have been the key decision maker. <input type="radio"/> No, I have <u>not</u> been the key decision maker. <input type="radio"/> There has been no single decision maker, but several equally ranked decision makers. I have been one of them. <input type="radio"/> There has been no single decision maker, but several equally ranked decision makers. I have <u>not</u> been one of them.	
<p>At which level within the companies' hierarchy was the decision maker located?</p>	<input type="radio"/> The decision maker was, at the same time, the owner of the company. <input type="radio"/> The decision maker was not the owner of the company, but held a position at the top level of the hierarchy (e.g. CEO). <input type="radio"/> The decision maker did <u>not</u> hold a position at the top level of the hierarchy.	

**part 3**

Please answer all questions with regard to the same project you have chosen at the beginning of this questionnaire.

If you are not one hundred percent sure about a certain answer, please give an estimation. Please use the option “Don’t know/Does not apply” only in exceptional cases.

Please evaluate the following statements for the period from beginning until premature termination of the project.

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Milestones have been defined, i.e. measurable sub-goals with deadlines.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The project had to get an approval before the start of each of the respective subsequent parts of the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It has been decided about project continuation on a regular basis (e.g. at the milestones).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Progress reports (e.g. key performance indicators about deviations concerning costs, time, quality) have been provided to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
For the evaluation of project information, clear criteria did exist (e.g. target values or benchmarking studies).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Information about the project progress have been quantified for me (e.g. specific operating figures were provided).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
I have been warned explicitly that projects are often terminated too late (e.g. by means of data from past projects).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It has been made clear to me that I have to abandon the project, if the goals can no longer be reached.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
There have been other people (e.g. accountants) who explicitly shared responsibility for the failure of the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have not only be judged according to the results of my decisions, but for the quality of my decision making process, too. (I.e. it has been evaluated, whether the decision had been justified at the particular point in time.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It has been communicated that my reputation would not be harmed from premature project termination.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
It has been communicated that a premature project termination would not have any negative consequences for my career.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
The goals that I pursued with the continuation of the project have been announced.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My project goals have been discussed (e.g. concerning their chances for success).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
At the beginning of the project (and e.g. at the milestones), distinct termination criteria have been communicated amongst the project participants. (I.e. if certain sub-goals were not reached, the project should be terminated.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Estimations about the chances of success have been conducted by using analogies with other projects.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Someone took the role of the "Advocatus Diaboli" (i.e. someone argued pessimistically on purpose).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Sunk Costs (i.e. past investments that cannot be recaptured) have been explicitly displayed as such.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sunk Costs have been marked as irrelevant for decision making (i.e. it has been transparent that only future costs and revenues are relevant for decision making).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Adequate methods for project evaluation have been available to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I got support from an expert (e.g. accountant) concerning the use of the project evaluation methods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The project report informed about alternative investment possibilities for the resources of the failing project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**part 4**

Please answer all questions with regard to the same project you have chosen at the beginning of this questionnaire.

If some of the questions seem similar, this is necessary due to scientific methodology.

<b>Please evaluate the timing of the project termination.</b>	Not correct at all			Inter-mediate-ly correct			Ab-solutely correct	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Looking back...								
...the project has been terminated too late.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...it has been hold on to the project too insistently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...the project should have been terminated earlier.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not correct at all			Inter-mediate correct			Ab-solutely correct	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Looking back...								
...the project would probably have been successful, if continued.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...it would have been better to hold on to the project more insistently.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...it would have been better, not to give up so quickly.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...it would have been better to try a new start (relaunch), instead of terminating the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Too little			Exactly right			Too many	Don't know / Doesn't apply
	-3	-2	-1	0	1	2	3	
Please evaluate, whether until project termination too little, exactly the right amount or too many resources have been invested into the project.								
Man-days (full time work)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Costs (financial resources)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Length of the project (calendar time from beginning until termination of the project)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Much worse			Exactly the same			Much better	Don't know / Doesn't apply
	-3	-2	-1	0	1	2	3	
Please evaluate the quality of the following aspect for your chosen project in comparison to other terminated projects you know.								
Timing of the project termination	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Justification of the termination decision	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Quality of the project outcomes (to the extent they were finished)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Costs (Budget adherence, efficient use of resources etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Time (Length of the project, timeliness etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

<b>Which proportion of the resources originally planned (at the time of project start) has been used until the premature termination?</b>	
Please state the proportion in percent from the total amount originally planned. E.g. 50 %, if half of the planned resources had been used until premature termination or 200 % if twice the originally planned resources had been invested.	
Proportion of the man-days in comparison to plan	... %
Proportion of the costs (financial resources) in comparison to plan	... %
Length of the project (calendar time) in comparison to plan	... %

<b>Which proportion of the output originally planned (at the time of project start) has been completed until the premature termination?</b>	
Please state the proportion in percent	
Proportion of completion	... %

	Not correct at all			Inter-mediate correct			Ab-solutely correct	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
The project was very complex.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The project was very risky.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The project was strongly dependent from external factors (e.g. customer, legislator etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please make a guess, how many resources have been spent until premature project termination.	
People – <i>Please provide number of man-days</i>	...
Costs (financial resources) – <i>Please provide amount in THOUSAND Euros</i>	...
Length of Project (calendar time from start until end of the project) – <i>Please provide number of calendar month</i>	...

	Not correct at all			Inter-mediate correct			Ab-solutely correct	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Please evaluate the following statements concerning the first project problems.								
The problems did occur a long time after project start.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The projects' risks surfaced very late.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The first obvious difficulties emerged a long time after project start.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not correct at all			Inter-mediate correct			Ab-solutely correct	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Please evaluate, to what extent the following statements apply to company, where the project took place.								
The company was dependant on the capital market.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The company strived for good communication with the capital market players (e.g. shareholder, analysts, creditors).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Capital market orientation was of utmost importance to the company.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**part 5**

Please answer all questions with regard to the same project you have chosen at the beginning of this questionnaire. Please evaluate the following statements for the period from beginning until premature termination of the project. If some of the questions seem similar, this is necessary due to scientific methodology.

	Never		Sometimes		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Negative Information of importance...								
... escaped my attention, because of the large amount of information about the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...were difficult for me to notice.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...were difficult to distinguish from irrelevant information.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...were too inconspicuous to be well perceived by me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...were difficult to identify for me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
If new information concerning the project appeared,...								
...I was more interested in positive information than in negative.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...I paid less attention to information that contradicted my view.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...I only turned my attention to certain information (i.e. I was subject to selective perception).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
... I focused my attention only on my favourite topics.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If another manager (with average abilities) had been in my situation, he would have...								
... been more interested in positive information than in negative.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...paid less attention to information that contradicted his view.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...turned his attention only to certain information (i.e. would have been subject to selective perception).	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...focused his attention only on his favourite topics.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
I worried about my reputation in case of premature project termination.								
I was afraid that important persons (e.g. supervisors, capital provider etc.) would receive a bad impression about me, in case of premature project termination.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have been under high pressure to finish the project successfully.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I felt the success of the project closely related with my own, personal success.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
A premature project termination seemed to me as a waste of resources, due to the irrecoverable investments (sunk costs) already made.								
I argued for the continuation of the project, because the beforehand made investments would have been lost in case of premature termination.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I regarded a premature project termination as a waste of the prior invested resources.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The more resources had been invested, the more expensive seemed a premature project termination to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
I assessed the project too positively for a long time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have been optimistic concerning the expected outcome of the project.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Although there have been problems, I have been confident that the project would be successful in the end.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The more resources had been invested, the more expensive seemed a premature project termination to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
With regard to the decisions about premature termination or continuation of the project...								
...I had a lot of freedom to pursue my personal interests.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...I had to justify the decision only to myself.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...my decisions have been accepted without questioning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
...it was up to me, whether I wanted to reveal my reasons or not.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Never		Some-times		Often		Always	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
I have been convinced that the estimation of the future development was correct.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have been sure concerning the prognoses.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have been confident that the estimations concerning the project's success would prove true.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I relied upon the prognoses about the future.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

The following questions are necessary due to scientific-methodological reasons. Please answer the questions as precise as possible, even if some of them do not seem to belong to the topic of this questionnaire.	Not correct at all			Inter-mediate-ly correct			Ab-solutely correct	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
Sometimes I tell lies if I have to.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never cover up my mistakes.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I have said something bad about a friend behind his/her back.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I never take things that don't belong to me.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I don't gossip about other people's business.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**part 6**

	Not correct at all			Inter-mediate-ly correct			Ab-solutely correct	Don't know / Doesn't apply
	0	1	2	3	4	5	6	
I have got comprehensive knowledge about the project, for which I filled in this questionnaire.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What was your function during the project?	<input type="radio"/> Human resources <input type="radio"/> Accounting / Finance <input type="radio"/> Procurement <input type="radio"/> Consulting <input type="radio"/> Production <input type="radio"/> Supply Chain Mangement / Logistics <input type="radio"/> Research & Development <input type="radio"/> IT <input type="radio"/> General Management <input type="radio"/> other
What was your main role concerning the project?	<input type="checkbox"/> Project manager (responsible for operational tasks) <input type="checkbox"/> Project sponsor (budget provider) <input type="checkbox"/> Other person involved with the project, employed in the same company (e.g. member of the project team, accountant) <input type="checkbox"/> Other person involved with the project, employed in a another company (e.g. external consultant, customer etc.) <input type="checkbox"/> I have <u>not</u> been directly involved with the project.

How many years of job experience did you have at the time of the premature project termination?	... Years
How many years have you been working for your company at the time of the premature project termination?	... Years

What is the main industry sector of the company, where the project took place in?	<input type="radio"/> Information and Telecommunication <input type="radio"/> Public administration, Education, Social Welfare <input type="radio"/> Chemicals and plastics <input type="radio"/> Finance and Insurance <input type="radio"/> Health and Biotechnology <input type="radio"/> Transportation and Logistics <input type="radio"/> Trade <input type="radio"/> Automobile <input type="radio"/> Consumer goods <input type="radio"/> Electronics, Precision Engineering and Optical devices <input type="radio"/> Energy and Raw materials <input type="radio"/> Building Industry / Construction <input type="radio"/> Mechanical engineering and plant construction <input type="radio"/> Manufacture of food products, beverages and tobacco <input type="radio"/> Other Services
---	---

Please estimate the following numbers for the company, where the project took place (in the year of the project termination).	
Overall turnover (worldwide)	... million Euro
Employees (worldwide)	... people

Are you currently working for the company, where the project took place?	<input type="radio"/> Yes, I am currently working for the company, where the project took place. <input type="radio"/> No (e.g. due to change of job or because you are/were an external consultant)
--	---

**part 7**

Thank you very much for your participation in our study!

Finally, a few questions about this survey.	Yes	No	Don't know
The invitation e-mail for this survey was marked as "spam" in the subject heading.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I found the invitation e-mail for this survey in the spam-folder.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would have taken part in the survey, even if the management report with the results were the only incentive (and no book, iPod lottery etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Not correct at all			Inter-mediate-ly correct			Ab-solutely correct
	0	1	2	3	4	5	6
The topic of the questionnaire was interesting.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The formulations of the questions were easy to understand.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The questions were unambiguous.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

	Much too short			Exactly right			Much too long
	-3	-2	-1	0	1	2	3
With regard to the topic under consideration, I think the length of the questionnaire is...	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please provide your address so that we can send you the incentives.

The fields marked with an asterisk are necessary, if we shall send you an incentive via mail. The e-mail address is needed in order to send you the best practice report.

First Name*	
Surname*	
Position	
E-Mail*	
Company	
Street*	
Zip Code*	
City*	
Phone	

If you have any comments about this survey, you are welcome to state them here. It is especially important for us to know, if certain questions did not fit in your context.

...