TECHNISCHE UNIVERSITÄT MÜNCHEN

Lehrstuhl für Entrepreneurship

Psychological Empowerment: Quantitative Research on Antecedents and Outcomes in Research & Development Projects

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Vollständiger Abdruck der von der Fakultät für Wirtschaftswissenschaften der Technischen Universität München zur Erlangung des akademischen Grades eines Doktors der Wirtschaftswissenschaften (Dr. rer. pol.) genehmigten Dissertation.

Vorsitzende: Univ.-Prof. Dr. Nicola Breugst

Prüfer der Dissertation:

1. Univ.-Prof. Dr. Dr. Holger Patzelt
2. Univ.-Prof. Dr. Isabell M. Welpe

Die Dissertation wurde am 26.05.2014 bei der Technischen Universität München eingereicht und durch die Fakultät für Wirtschaftswissenschaften am 15.08.2014 angenommen.

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ABBREVIATIONS

Amos: IBM SPSS Amos 20.0.0

CI: Confidence interval

LCI: Lower confidence interval

LEM: Linear equation modeling

PE: Psychological empowerment

PROCESS: PROCESS for SPSS

PSP: Project Success Panel

R&D: Research and development

SDT: Self-determination theory

SPSS: IBM SPSS 20

UCI: Upper confidence interval

VIF: Variance inflation factor

ABSTRACT

Instilling psychological empowerment in employees is one of the most important tasks of modern leadership. Building on quantitative research and the development of a new psychometric scale related to project management this thesis shows: First, individuals' characteristics and their work team environment influence perceptions of access to information and resources – two important antecedents of psychological empowerment. Second, while a project briefing strengthens the link of the psychological empowerment–commitment relationship, team relatedness acts as a boundary condition.

ZUSAMMENFASSUNG

Die Entwicklung von Eigenverantwortung („psychological Empowerment“) in Mitarbeitern ist eine der Hauptführungsaufgaben der heutigen Zeit. Auf der Basis quantitativer Forschung und einer neu entwickelter Skala mit Bezug zum Projektmanagement zeigt diese Dissertation Folgendes: Erstens, individuelle Charakteristika und das Teamumfeld beeinflussen die persönliche Wahrnehmung bzgl. Zugang zu Informationen und Ressourcen – zwei wichtige Voraussetzungen für die Entwicklung von Eigenverantwortung. Zweitens, während ein Projektbriefing den Effekt von Eigenverantwortung auf Engagement für die Firma stärkt, unterdrückt eine gute Teambeziehung diesen Effekt.

1 INTRODUCTION

1.1 Research topic and scientific relevance

Researchers have long recognized that the ever faster globalizing world with ever changing business environments requires ever shorter innovation cycles in order to satisfy sophisticated customer preferences and sustain the competitive advantage of companies (Kessler & Chakrabarti, 1996). Others have argued that companies that have the ability to generate and develop creative ideas for new products – when market needs are changing – have a key to success (Lopez-Cabrales, Pérez-Luño, & Cabrera, 2009; Subin & Workman Jr, 2004). Innovation refers to the implementation of such creative ideas in an organizational context (e.g., Amabile, Conti, Coon, Lazenby, & Herron, 1996). Consequently, research and development (R&D) project teams have become essential units in companies. These are set up to generate creative ideas and to transfer these into useful technology, products, or services for economic gain (Iansiti & West, 1999; Thamhain, 2003).

Success in R&D is therefore becoming a key source of competitive advantage in a globalized economy with high rates of technological change and hard competition (Chang & Choi, 2007). However, the aforementioned changes in the marketplace are placing ever increasing pressure on the R&D work function (Kessler & Chakrabarti, 1996). The increased risk associated with rapidly changing technology has also made R&D tasks uncertain, equivocal and prone to face more obstacles (Balachandra, Brockhoff, & Pearson, 1996; Bodensteiner, Gerloff, Quick, & Slinkman, 1991; Herstatt, Verworn, & Nagahira, 2004). R&D teams depend (for a large part) on the intellectual and creative efforts of knowledge workers. Consequently, motivating competent R&D professionals is critical for successful product development (Chang & Choi, 2007; Farris & Cordero, 2002).

As one method to achieve this, the provisioning of empowerment – defined[1] as an intrinsic task motivation comprising the four cognitions of meaning, competence, self-determination, and impact (Spreitzer, 1995a) – from senior management to R&D project teams is a key success factor differentiating best from worst performing R&D projects

[1] This definition reflects psychological empowerment. An overview of research on empowerment and competing definitions will be given in chapter 2.

(Cooper, Edgett, & Kleinschmidt, 2004). What is more, an empowered workforce is widely claimed to be essential for the effective functioning of modern organizations (Argyris, 1998; Bowen & Lawler, 1992; Janssen, 2004; Kirkman & Rosen, 1999; Sparrowe, 1995). During the establishment of empowerment initiatives and research on it, the focus lay on changing processes, roles, structures and work designs aiming at empowering employees. The overarching aim was to increase decision making authority, power and discretion over resources to lower levels in the hierarchy (Eylon & Bamberger, 2000; Kanter, 1977). However, initiatives to empower employees have not always brought the benefits with them that were desired (Argyris, 1998; Barker, 1993; Malone, 1997). Building on the differential effects that materialized when empowerment initiatives were implemented, researchers argued that is not the actual empowerment initiative that brings with it the benefits that managers hope for. Instead, it is employees' perceptions of those empowerment efforts that are important for determining the resulting levels of employees' intrinsic motivation (Bandura, 1977, Bandura, 1982).

So, more or less in the last 20 years, researchers have abstracted their research endeavors from the perspective of structural empowerment, focusing on psychological empowerment. Psychological empowerment abstracts from the aforementioned structural perspective, treating it as a necessary but not sufficient condition for psychological empowerment (Kirkman & Rosen, 1999; Seibert, Silver, & Randolph, 2004; Spreitzer, 1996b; Spreitzer, 2008). It focuses on the perception of these conditions relating to empowerment, and if they provide efficacy information (Bandura, 1977, Bandura, 1982), thereby defining a motivational process (Conger & Kanungo, 1988). The most widely used conceptualization of psychological empowerment to date in organizational research stems from Spreitzer (1995a) (Maynard, Gilson, & Mathieu, 2012; Seibert, Wang, & Courtright, 2011). She defined psychological empowerment as a cognitive state comprising the four distinct dimensions of meaning, competence, self-determination, and impact (Spreitzer, 1995a).

Psychological empowerment has been found to be an individual's psychological process that mediates the effect of structural conditions in the workplace and individuals characteristics on desirable outcomes in the workplace. It has been found to affect employees' levels of job satisfaction (Aryee & Chen, 2006; Barroso Castro, Villegas Perinan, & Casillas Bueno, 2008; Zhou, Wang, Chen, & Shi, 2012), organizational commitment (Avolio, Zhu, Koh, & Bhatia, 2004; Kraimer, Seibert, & Liden, 1999), job or task performance (Aryee, Walumbwa,

Seidu, & Otaye, 2012; Liden, Wayne, & Sparrowe, 2000; Zhou et al., 2012), innovative behavior (Jung, Chow, & Wu, 2003; Pieterse, van Knippenberg, Schippers, & Stam, 2010; Spreitzer, Janasz, & Quinn, 1999), creativity (Alge, Ballinger, Tangirala, & Oakley, 2006; Zhang & Bartol, 2010), organizational citizenship behavior (Alge et al., 2006; Bartram & Casimir, 2007; Raub & Robert, 2007) and personal well-being (Spreitzer, Kizilos, & Nason, 1997). Consequently, many researchers have already conducted research investigating psychological empowerment (Maynard et al., 2012; Seibert et al., 2011), pointing to its relevance for the scientific community.

This thesis certainly is not the first effort to investigate psychological empowerment. Nonetheless, it addresses some of the important research gaps that still remain. Alongside, it provides some valuable contributions not only to research on psychological empowerment, but also for research on leadership, teams, and employees' affective commitment to the organization.

1.2 Research questions

All research calls to be answered throughout this thesis and contributions to be made will be derived and described in detail in the individual studies comprising this thesis. Hence, the focus of this section is to outline the main research questions to be addressed in each of the three studies. Throughout this thesis, research calls by multiple researchers will be brought forward. The leading research questions addressed were provided by two recent, comprehensive literature reviews (Maynard et al., 2012; Spreitzer, 2008) and one recent, extensive meta-analysis (Seibert et al., 2011).

The first study of this thesis aims at developing three new constructs and accompanying scales that can be utilized to advance research on psychological empowerment in a meaningful way. Since this thesis is set in a R&D project context, this shall provide the foundation for this effort. Consequently, the new constructs need to satisfy two conditions. First they need to be applicable in the aforementioned context, and second, they need to be embedded in the existing nomological network of psychological empowerment as this precondition for construct validity (Clark & Watson, 1995; Cronbach & Meehl, 1955) enables meaningful research. The start of a R&D project was determined as a meaningful context for several reasons. First, several researchers stressed that the creation of supportive conditions and motivating employees at the beginning of a new project, increased chances of success for the upcom-

ing project (Besner & Hobbs, 2006, p. 47; Cohen & Bailey, 1997; Ericksen & Dyer, 2004; Hackman, 1987; Hackman, 2002). However, scholars investigating project starts have mostly done this conceptually or qualitatively (see e.g., Gareis, 2000; Halman & Burger, 2002; Hamburger, 1992; Johansen & Torp, 2003; Weaver & Bourne, 2001), and mostly failed to investigate how employees could be motivated. To conclude, the start of a project seems to hold promise for improving levels of psychological empowerment for project team members, since this early phase "is critical to project success and value creation" (Besner & Hobbs, 2006, p. 47). So, study one will investigate the following main research question.

- *How can employees' levels of psychological empowerment be influenced at the start of a project?*

When looking at individual characteristics and their influence on perceptions of empowerment, it becomes apparent that only little research has been conducted to date (Seibert et al., 2011). Yet, initial conceptions already stressed the importance of individual differences on perceptions of empowerment (see Conger & Kanungo, 1988; Spreitzer, 1995a; Thomas & Velthouse, 1990). However, researchers to date have largely neglected this issue in their research efforts (for rare exceptions see Avey, Hughes, Norman, & Luthans, 2008; Jha & Nair, 2008). Consequently, this study contributes to research on psychological empowerment by adding three different individual characteristics. It integrates goal orientations and metacognitive abilities and examines their relationships with a known antecedent of psychological empowerment – access to information. Investigating how different antecedents relate to each other has been a neglected research topic to date (Maynard et al., 2012; Seibert et al., 2011) and therefore, the effect of the individual characteristics on employees' levels of perceived access to information will be examined.

Furthermore, this thesis addresses the issue of one's team's influence on levels of psychological empowerment. There is evidence of the positive effects of team empowerment on individual psychological empowerment (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007a; Hempel, Zhang, & Han, 2012; Seibert et al., 2004) and in general on the positive effects of team settings on the individual employee (Beersma, Hollenbeck, Humphrey, Moon, Conlon, & Ilgen, 2003; Hirst, van Knippenberg, Chen, & Sacramento, 2011; Shin, Kim, Lee, & Bian, 2012). However, little research has examined the effect of a team on an individual's levels of psychological empowerment (for an exception see Liden et al., 2000). Consequently, this

study contributes to the literature on psychological empowerment by taking up the cues provided towards the positive effect of one's team on one's motivation (Karau & Hart, 1998). It follows the call for research to integrate one's team from Maynard et al. (2012), and theorizes two team related factors to have an impact on employees' perceived levels of access to resources: team relatedness and team competence. Thus, the following main research questions are going to be addressed in study two.

- *How do employees' individual characteristics influence employees' perceived access to information (as an antecedent to psychological empowerment)?*
- *How do employees' teams influence employees' perceived access to resources (as an antecedent to psychological empowerment)?*

In addition, this thesis will investigate possible contingent factors of the psychological empowerment-outcome relationship. The positive effect of an increase in employees' levels of psychological empowerment on desirable attitudes and behaviors in the workplace has been soundly established through prior research (Spreitzer, 2008). Yet, scholars have also brought forward evidence that there might be contingencies moderating the effect of employees' levels of psychological empowerment on outcomes (Ahearne, Mathieu, & Rapp, 2005b; Janssen, 2004). This might be a reason, why the well-meant positive effect of empowerment initiatives have sometimes not ensued (Argyris, 1998; Barker, 1993; Malone, 1997). This thesis will investigate possible moderators of the psychological empowerment-affective organizational commitment relationship. Some researchers have already begun investigating possible boundary conditions of this relationship (see Hon & Rensvold, 2006; Janssen, 2004; Joo & Shim, 2010). Nonetheless, researchers have argued that this area still presents a fruitful opportunity for future research (Aryee et al., 2012; Janssen, 2004; Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 1995a; Spreitzer, 2008). Hence, study three will try to follow their calls for research and consider the following main research question.

- *Which factors is the psychological empowerment–affective organizational commitment relationship contingent upon?*

Table 1 summarizes the main research calls this thesis strives to do justice.

Area	Research call
General research calls	"We have come a long way over the last two decades, but there is still work to be done in integrating the current knowledge base toward a more holistic theory of empowerment at work." (Spreitzer, 2008, p. 68)
	"However, as the themes detailed above and the research directions highlighted in Table 1 suggest, there is still more work to be done [on psychological empowerment]. […]. Accordingly, we anticipate that it will remain a very salient issue for many years to come, and we look forward to seeing how the literature continues to develop." (Maynard et al., 2012, pp. 1273–1274)
Individual characteristics	"However, to date, research focused on individual psychological empowerment has yet to consider individual orientations. Accordingly, we suggest that future research in this area explore the impact that individual dispositions such as goal orientation, team orientation, and learning orientation may have in shaping individual psychological empowerment. […].As such, it behooves future researchers to examine these relationships." (Maynard et al., 2012, p. 1245)
	"Psychological empowerment perceptions can be shaped by contextual antecedents and individual characteristics and can have benefits for employees and for organizations across a variety of contexts. We hope these conclusions promote further research on and implementation of empowerment at work." (Seibert et al., 2011, p. 998)
Teams	"In fact, based on our review, we found only one study that has considered peers or teammates and psychological empowerment. Such suggestions are intended not to minimize the value of the relationship with one's leader but rather to highlight that the relationship with peers also may be important." (Maynard et al., 2012, p. 1247)
Moderators	"Accordingly, we feel that the time is right for those interested in psychological empowerment to consider a deeper understanding of factors that play mediational and moderating relationships involving psychological empowerment." (Maynard et al., 2012, p. 1271)
	"There is evidence that additional moderators may operate for virtually all of the relationships observed in our study, but sufficient information to examine these moderators was not available in the primary studies." (Seibert et al., 2011, pp. 996–997)

Table 1: Summary of main research calls followed in this thesis

1.3 Structure of the thesis

This thesis is structured around three different studies, with each study comprising one chapter. Since the focus is on these three studies, the remaining chapters act as a bracket, fulfilling two purposes: providing adjacent theory and background information to and minimizing redundancies between the three studies.

Following this introductory chapter is the theoretical foundation of this thesis, within which an overview of the history, concept and state of research on psychological empowerment will be given. Chapter 3 is concerned with the overall research setting and methodology of this thesis. It will describe the "Project Success Panel" as the overarching research project

within which this thesis was conducted and will delimit this thesis and the work done for it. It will provide an overview of both samples employed in this thesis, with respect to their relevance, acquisition process, and descriptive statistics. Then, all previously existing variables necessary for this research effort will be introduced by giving a brief explanation of where they were derived from and what they encompass. Finally, some overarching methodical and statistical remedies are described to alleviate possible concerns of biases present in both samples, providing additional credibility for the findings of the three studies.

Chapter 4 then contains the first study of this thesis. This construct and scale development effort shall result in three new constructs accompanied by validated scales that shall be used in the two latter studies of this thesis. Following an inductive approach, it will lay the foundation for the three constructs through literature review as well as discussions with academic and industry experts. These will then be refined and validated using various statistical methods employing both samples. After establishing statistical validity, the three new constructs will then be reviewed and adapted through discussions with scholars of the field. Finally, the findings of this study will be discussed, with research avenues identified to be later addressed in the subsequent studies 2 and 3.

The second study, in chapter 5, aims at expanding knowledge on psychological empowerment by theorizing how different perceptions of contextual antecedents and individual characteristics of employees are relevant for forming employees' perceptions of access to information and resources which in turn influence levels of psychological empowerment. The three new variables of briefing, team relatedness, and team competence along with the three individual characteristics of learning goal orientation, performance goal orientation as well as meta-cognitive monitoring will be modeled either as antecedents or moderators of employees' perceptions of access to information and resources. Quantitative data from a sample of industry R&D employees is then used to test the theorized relationships. The results of this study hold important contributions for scholars in the fields of employee cognition, teams, and most importantly psychological empowerment.

The third study in chapter 6 makes an effort to contribute not only to research on psychological empowerment but also on affective commitment. It will theorize and test if the three new constructs of briefing, team competence and team relatedness are moderators of the psychological empowerment-affective organizational commitment relationship. Drawing mainly on theories of organizational support, collective efficacy as well as self-determination and

choice-processes, the hypotheses will be developed. The resulting model will, again, be tested using the sample of industry R&D employees. The results provide support for researchers arguing for the importance of conducting research on boundary conditions of psychological empowerment. This is especially true, since this study finds opposing moderating effects. Furthermore, it strengthens arguments by other researchers that multiple relationship types in the workplace (supervisor and team) need to be considered when determining employees' levels of affective commitment in the workplace. The contributions of these findings will be provided at the end of this chapter.

Chapter 7 discusses the overall results of this thesis. Since, the detailed results and in-depth contributions can already been found at the end of each study, this chapter provides a summary of these. In addition, it outlines possible implications for managers and project leaders. To finish, the limitations of this thesis are discussed and avenues for future research are proposed, before the closing conclusion.

2 THEORETICAL FOUNDATION OF THIS THESIS: PSYCHOLOGICAL EMPOWERMENT

The aim of this chapter is to give an overview on research of psychological empowerment. It will describe its historical roots, the overall definition and most used conceptualization as well as the state of the research in this area. For the latter, it will provide a synopsis of the most desired attitudinal and behavioral outcomes that are often associated with psychological empowerment. In addition, it will give an overview into what leads to psychological empowerment. This chapter will also outline the most important discussions surrounding research on psychological empowerment. These are the topic of moderator analysis as well as concerns relating to causality.

Empowerment research is far from new. However, it is still currently viewed as highly relevant in organization and management research (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008). Initial research on empowerment can be found in theories of employee involvement and participation (e.g., Lewin, 1947), as well as organizational change, affirmative action, and the quality of work life (Kanter, 1977). Practical relevance seems to be given as well, since in a survey conducted by Lawler et al. (2001) among Fortune 1000 companies at least 70 percent of responding enterprises had adopted some form of empowerment initiative among their employees. The aim behind such initiatives generally is to empower employees to take initiative, keep the interest of the company in mind, and act like owners of the business (Spreitzer, 2008). However, despite the many research efforts conducted to date, the discussion on the benefits of empowerment is still ongoing (Maynard et al., 2012), and there remains need for further research (Spreitzer, 2008).

The first conceptualizations of empowerment go back on the job characteristics model developed by Hackman and Oldham (1980) and on Bandura's (1977; 1982; 1986) work on self-efficacy. Starting from these initial theories, two distinct literature streams developed: structural empowerment and psychological empowerment. Structural empowerment is more concerned with a macro perspective, like facets of the job, team designs, organizational arrangements, policies, and procedures (Eylon & Bamberger, 2000), with the aim to increase discretion on decision making, power, and formal control over resources for employees (Kanter, 1977). Psychological empowerment on the other hand views structural empowerment as a necessary but not sufficient condition, in other words as a contextual antecedent of

psychological empowerment (Kirkman & Rosen, 1999; Seibert et al., 2004; Spreitzer, 1996b; Spreitzer, 2008). Psychological empowerment is less concerned with how organizational conditions (i.e., structural empowerment) are, but instead focuses on the perception of these conditions relating to empowerment (Bandura, 1977, Bandura, 1982), thus defining a motivational process (Conger & Kanungo, 1988). In order to be psychologically empowered, individuals and teams must believe that they have control over their tasks (Conger & Kanungo, 1988; Spreitzer, 1995a; Thomas & Velthouse, 1990). As Conger & Kanungo put it, psychological empowerment is "a process of enhancing feelings of self-efficacy among organizational members through the identification of conditions that foster powerlessness and through their removal by both formal organizational practices and informal techniques of providing efficacy information" (1988, p. 474).

Spreitzer (1995a) was first to take up on earlier conceptual work (e.g., Bandura, 1977, Bandura, 1982; Conger & Kanungo, 1988; Hackman, 1987; Thomas & Velthouse, 1990), and developed a four-dimensional construct of psychological empowerment. She thereby explicitly defined psychological empowerment as a cognitive state, rather than a stable dispositional trait or a contextual intervention. According to her, psychological empowerment is a psychological state referring to the personal belief employees have regarding their role in the organization (Spreitzer, 2008). It is defined as an intrinsic task motivation comprising the four cognitions of meaning, competence, self-determination, and impact (Spreitzer, 1995a). An individual is intrinsically motivated when he or she performs an activity without receiving an apparent reward except the activity itself; this motivation can be innate or learned (White, 1959). In essence, one is performing the activity for the enjoyment one experiences from the activity or the satisfaction one gets from it (Deci, 1971). After refinement of her initial work she constructed and validated a multi-dimensional instrument to asses psychological empowerment at the individual level (Spreitzer, 1996b; Spreitzer et al., 1997). Definitions of her four dimensions are:

- *Meaning* is the value of a work goal or purpose, judged in relation to an individual's own ideals or standards (Thomas & Velthouse, 1990).
- *Competence*, or self-efficacy, is an individual's belief in his or her capability to perform activities with skill (Bandura, 1989; Gist, 1987).
- *Self-determination* reflects autonomy in the initiation and continuation of work behaviors and processes (Bell, 1989).
- *Impact* is the degree to which an individual can influence strategic, administrative, or operating outcomes at work (Ashforth, 1989).

Spreitzer (1995) argued that these four cognitions reflect one's active orientation towards one's work role, and that all four dimensions are needed to truly experience empowerment. In her words "if any one dimension is missing, then the experience of empowerment will be limited" (Spreitzer, 2008, p. 61). Moreover she argues that an individual rather than being empowered or disempowered, can experience psychological empowerment along a continuum, thus being more or less empowered. Evidence towards the four-dimensional nature of the construct has been put forward multiple times through convergent and discriminant validity (for an overview see Maynard et al., 2012) along with verification for the latent second-order construct of psychological empowerment consisting of the above described four dimensions (Seibert et al., 2011).

In opposition to this, other scholars have brought forward evidence that psychological empowerment does not provide the benefits it is appraised for (Argyris, 1998; Barker, 1993; Malone, 1997). To that account, Argyris stated that "managers love empowerment in theory, but the command-and-control model is what they trust and know best (1998, p. 98). Malone (1997) described empowerment efforts as following the cliché, with only limited empowerment implemented in most organizations. Barker (1993) even found empowerment initiatives to be detrimental. He examined self-managing teams and found that the removal of formal authority and control by taking out the project leader, led to a system of peer control and pressure among the team members. As one employee of a manufacturing company told him:

"He felt more closely watched now than when he worked under the company's old bureaucratic system. He said that while his old supervisor might tolerate someone coming in a few minutes late, for example, his team had adopted a "no tolerance" policy on tardiness and that members monitored their own behaviors carefully". (Barker, 1993, p. 408)

Still, results from meta-analysis largely support the positive effects of psychological empowerment (Seibert et al., 2011). Psychological empowerment has been theorized and found to influence a variety of outcome variables. Those can be behavioral or attitudinal (e.g., Spreitzer, 1995a; Spreitzer, 2008). Based on Hackman and Oldham's (1980) and Deci and Ryan's (1985) argument that psychologically empowered workers are likely to have satisfied intrinsic needs for autonomy and growth, attitudinal constructs such as affective commitment and job satisfaction (e.g., Avolio et al., 2004; Kraimer et al., 1999) have been incorporated into research multiple times. Avolio et al. (2004), for example, found that psychological empowerment was positively related to levels of organizational commitment and that it mediated the effects of transformational leadership on organizational commitment as well. Kraimer et al. (1999) examined the relationship between the four dimensions of psychological empowerment and found that each mediated the direct effects of different structural job characteristics on career intentions and organizational commitment.

The positive relationship between psychological empowerment and task performance was one of Spreitzer's (1995) core propositions. She argued that psychologically empowered employees take a more active orientation towards their work. Consequently, performance has been empirically examined as consequences of psychological empowerment and found to be significantly related (e.g., Bartram & Casimir, 2007; Liden et al., 2000), again pointing to the importance of the construct. Liden et al. (2000) examined, if the individual dimensions of psychological empowerment mediated the impact of job characteristics, leader-member exchange and team-member exchange on job performance. While he could not validate any mediating effect, he did find that the competence dimension significantly and positively affected levels of job performance. In addition, Bartram and Casimir (2007) theorized and found that psychological empowerment mediated the positive relationship between transformational leadership and employees' in-role performance. This effect has also been validated through meta-analysis. Seibert et al. (2011) found the corrected correlation coefficient between psychological empowerment and task performance to be .36 and the 95%-confidence interval (CI [.24; .47]) pointing to a significant relationship.

Other desired behaviors that have been shown to be associated with psychological empowerment are innovation (e.g., Pieterse et al., 2010; Spreitzer et al., 1999)[2], creativity (e.g.,

[2] Jung, Chow, and Wu (2003) actually found a negative relationship between empowerment and organizational innovation but attribute this to their Taiwanese sample which they think likely to be more sensitive to power

Jung et al., 2003; Zhang & Bartol, 2010) and organizational citizenship behavior (e.g., Alge et al., 2006; Raub & Robert, 2007). Pieterse et al. (2010) examined the relationship of both transactional and transformational leadership and psychological empowerment on employees' levels of innovative behavior. They found that psychological empowerment not only had a positive significant direct effect on innovative behavior, but that it also positively moderated the beneficial effect of transformational leadership and negatively moderated the detrimental effect of transactional leadership behavior. Zhang and Bartol (2010) investigated, whether empowering leadership behavior leads to increased employee creativity through psychological empowerment. They established evidence for this effect. Additionally, they found the impact of psychological empowerment on creativity to be mediated by intrinsic motivation and creative process engagement. Alge et al. (2006) investigated a model where information privacy was related to psychological empowerment which in turn predicted discretionary behaviors such as organizational citizenship behavior.

With these benefits in mind, many firms have adopted some form of empowerment approach. However, these benefits have not always ensued (Lawler et al., 2001). To tackle this problem, many researchers have been committed to investigate antecedents of psychological empowerment. Although different categorizations of antecedents exist, there are at large two main categories: contextual antecedents and individual characteristics (Seibert et al., 2011). Contextual antecedents actually go back on Kanter's (1977; 1983) earlier work which emphasized organizational structure, policies, and practices as indicators of empowerment. Researchers today actually view those contextual factors as antecedents of psychological empowerment (see e.g., Kirkman & Rosen, 1999; Spreitzer, 1995a; Wallace, Johnson, Mathe, & Paul, 2011). In a recent meta-analysis, Seibert et al. (2011) grouped contextual antecedents of psychological empowerment into four categories on the individual level. Table 2 shows examples of contextual antecedents of psychological empowerment classified in four categories.

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distance. In such an environment, higher levels of empowerment do not stimulate risky decisions which are needed for innovation.

High-performance managerial practices	*Socio-political support*	*Leadership*	*Work design characteristics*
Structural empowerment	Access to resources	Participative leadership	Job enrichment
Information sharing	Organizational climate	Leader-member exchange	Role ambiguity
Rewards, Incentives	Peer support	Charismatic leadership	Task feedback
Training	Social exchanges	Trust in leader	Work characteristics

Table 2: Exemplary overview of contextual antecedents of psychological empowerment (adopted from Seibert et al., 2011)

Following this classification, high-performance managerial practices are concerned with identifying best practices to optimize their employees' output at work (Seibert et al., 2011), whereas socio-political support is concerned with the material, social, and psychological resources work provides for employees (Cohen, Ledford, JR., & Spreitzer, 1996). Leadership in this context stresses the significant role of the leader in an employee's work context (Sparrowe & Liden, 1997) and based on job characteristics theory, work design characteristics are related to employees' perceptions of meaning, self-determination, competence, and impact (Bandura, 1977; Fried & Ferris, 1987). Although much research has already been conducted, researchers still call for a deeper understanding of the different antecedents of psychological empowerment (Seibert et al., 2011). This thesis will try to add to this discussion in chapters 4 and 5.

Especially, research concerned with how individual characteristics shape employees' empowerment perceptions is scarce (Avey et al., 2008; Jha & Nair, 2008; Spreitzer, 1995a are rare exceptions to this). Avey et al. (2008) concurrently examined the effects of transformational leadership (a contextual variable) and employees' positive psychological capital on intention to quit and cynism via individual psychological empowerment as a mediator. In their sample of 341 working adults, they found that positive psychological capital was a much stronger predictor of psychological empowerment than transformational leadership (Betas were .61 and .27). So there is an indication that individual characteristics are important when determining levels of psychological empowerment. Yet, researchers have noted that they are often absent in research on psychological empowerment (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008) and called for research in this area. This thesis will examine individual characteristics when forming employees' psychological empowerment in chapter 5.

The above mentioned inconsistent results of the effect of empowerment on its outcomes might be attributable to external circumstances. Empowerment might indeed be effective, but

there might be other conditions present in the organization or work context that prevent it from functioning well (Bowen & Lawler, 1992). Therefore, identifying those boundary conditions is an important research question regarding employee empowerment, but only few researchers have done work in this area (Aryee et al., 2012; Jiang, Sun, & Law, 2011; Raub & Robert, 2007; Seibert et al., 2011; Zhang & Bartol, 2010). For example, Zhang and Bartol (2010) found that leader encouragement of creativity, positively moderated the relationship between psychological empowerment and creative process engagement. Jiang et al. (2011) examined the effect of perceived empowerment practices on organizational citizenship behavior which was moderated by organicity. Organizations with low organicity are characterized by rigid, tight and traditional bureaucracies, whereas organizations with high organicity are characterized by flexible, loose and decentralized structures. The effect of empowerment on organizational citizenship behavior was more pronounced when organicity was high. In a paper by Raub and Robert (2007), they theorized and tested, if culture acts as a moderator of psychological empowerment on behavioral outcomes. They found that the effect was weaker in cultures where power distance is high. In their meta-analysis, Seibert et al. (2011) found that industry moderated the relationship between psychological empowerment and job satisfaction. Furthermore, geographic region was confirmed as a moderator between psychological empowerment and task performance, thus supporting Raub and Robert's findings. In another study (Aryee et al., 2012), examined the moderating influence of service orientation on the psychological empowerment–service performance relationship and found this relationship to be significant and positive. Their rationale is that psychologically empowered employees feel that they can make an impact, have the competence, attribute meaning to the task, and feel autonomous. However, the individual level of service orientation determines if they are willing to do so. Considering the findings of some potential moderators of psychological empowerment and the scarceness of research on it, scholars have repeatedly called for more investigations into this area (Aryee et al., 2012; Janssen, 2004; Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 1995a; Spreitzer, 2008). This thesis will follow these research calls in chapter 6.

The mediational nature of the psychological empowerment construct, causally linking antecedents with outcomes has been deeply grounded in theory and is generally acknowledged by most researchers. However, only few researchers took on the effort to conduct longitudinal designs to provide further evidence of these causal linkages (Maynard et al., 2012). Indeed, "one could as easily ‘confirm’ a Y → M → X mediational chain, as one can an X → M

→ Y sequence" (Mathieu & Taylor, 2006, p. 1033) using statistical analysis on cross-sectional research designs only. Giving an example, an employee's increased job satisfaction might lead to higher levels of empowerment through higher levels of meaning resulting in an enriched job design. This would happen, when the employees' project leader realizes the value the employees place on certain facets of their job (meaning) thus providing them with more opportunities to perform them. To fully alleviate these concerns, one had to make sure that the antecedent (X), mediator (M), and outcome variable (Y) are measured temporarily lagging and that there are no other influences (i.e., omitted variables) explaining the correlation between the variables of interest (Stone-Romero & Rosopa, 2008). Both problems could only be tackled using an experimental design which enables the researcher to exclude every other influence present in a real world setting (Robson, 2011). Often, this is impractical when trying to make inferences in an organizational setting. Mathieu and Taylor (2006) recommend employing longitudinal study designs to at least allow for the lagged collection of data. Only little research could been found that tried to tackle this problem to date (see Birdi, Clegg, Patterson, Robinson, Stride, Wall, & Wood, 2008; Hochwälder, 2008; Laschinger, Finegan, Shamian, & Wilk, 2004 for rare exceptions).

Birdi et al. (2008) investigated if the adoption of seven different management practices led to increases in company productivity. They collected longitudinal data on 308 manufacturing companies in the UK and found that out of the seven management practices only empowerment and extensive training were significantly related to company performance. On the other hand, Laschinger et al. (2004) investigated, if psychological empowerment mediated the effects of structural empowerment on job satisfaction in a sample of 185 staff nurses. They found that changes in levels of structural empowerment over time lead to changes in levels of psychological empowerment and job satisfaction. However, they also found that changes in psychological empowerment had no additional direct effect on changes in job satisfaction above the ones already explained by structural empowerment. Consequently multiple researchers have called for longitudinal research on psychological empowerment (Birdi et al., 2008; Hochwälder, 2008; Laschinger et al., 2004; Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008). While this thesis does not especially address this research gap, it aims to serve as an enabler. The new constructs to be developed in chapter 4 might prove useful for such an endeavor as will be discussed in the research outlook in chapter 7.

To conclude this chapter, it has to be pointed out that this literature overview does not provide a complete overview of all studies conducted on psychological empowerment to date.

It rather does provide an overview of the research and discussions related to psychological empowerment. It aimed to provide insights into the history, the concept and the state of the research landscape of psychological empowerment, highlighting the key journal articles and pointing to research gaps. While this thesis cannot address all of them, it puts forward answers to some, as were described in the introduction already. Finally, this literature overview shall provide the basis for the later chapters of this thesis. To minimize redundancies, it will be referred to this chapter wherever needed.

3 RESEARCH SETTING AND METHODOLOGY

For a better understanding towards the overall research endeavor conducted for this thesis, this chapter will provide an overview of the research setting and methodology. The next pages outline the overall research project in which this thesis was conducted and the approach followed by this thesis. Next, the data sets employed for the research effort will be described along with their acquisition process. Finally, an overview of all previously existing variables that were used in this thesis will be given and some potential concerns relating to biases present in the data tried to alleviate.

3.1 The context of this thesis: The Project Success Panel (PSP)

This thesis is part of a larger research project – the Project Success Panel, or PSP – conducted at the Chair of Entrepreneurship of the Technische Universität München led by Prof. Dr. Dr. Holger Patzelt and Dr. Judith Behrens. Additional researchers involved in this endeavor were Prof. Dean Shepherd from the Kelley School of Business at Indiana University, assistant professor Marcus Wolfe from Ball State University, and three PhD candidates. These were Carola Hummel, Sonja Dittrich and the author of this thesis. This thesis provided the starting point for the overall research project. Since the project was still ongoing at the time of completion of this thesis, only the work relevant for this thesis will be outlined here.

The research project is set in the field of corporate entrepreneurship and innovation. Its motivation is to conduct research on project transitions of team members working on innovation and R&D projects. Broadly speaking, a project transition is concerned with an employee's perception of the exit from the last project, the start of the new project, and the transition phase between the two projects. Since no concept for project transitions in the above described context could be found in the existing literature, the PSP involves the clarification of the concept and embedding it in the theoretical context. It furthermore aims to derive the triggers of this project transition for the individual employee. In summary, the PSP strives to answer the following five research questions:

- What is a project transition?
- What triggers an effective project transition?
- Why are some individuals better at transitions than others?
- Why are employees of some organizations better at transitions than employees of other organizations?

For this, the PSP aims to develop a new construct for project transitions. This shall represent individual employees' perceptions when transitioning from one project to the next. A first validation of this new construct will be made through a scale development effort involving a pre-test sample of university researchers, and ultimately a longitudinal sample of innovation and R&D employees and managers as both are involved in these projects (Katz, 1982; Katz & Allen, 1985). Firm sizes should be above 500 employees, as this size separates small from large firms (David, 1994), increasing the likelihood of a meaningful sized R&D department. Figure 1 provides an overview of the surveys conducted for the Project Success Panel as well as its main characteristics.

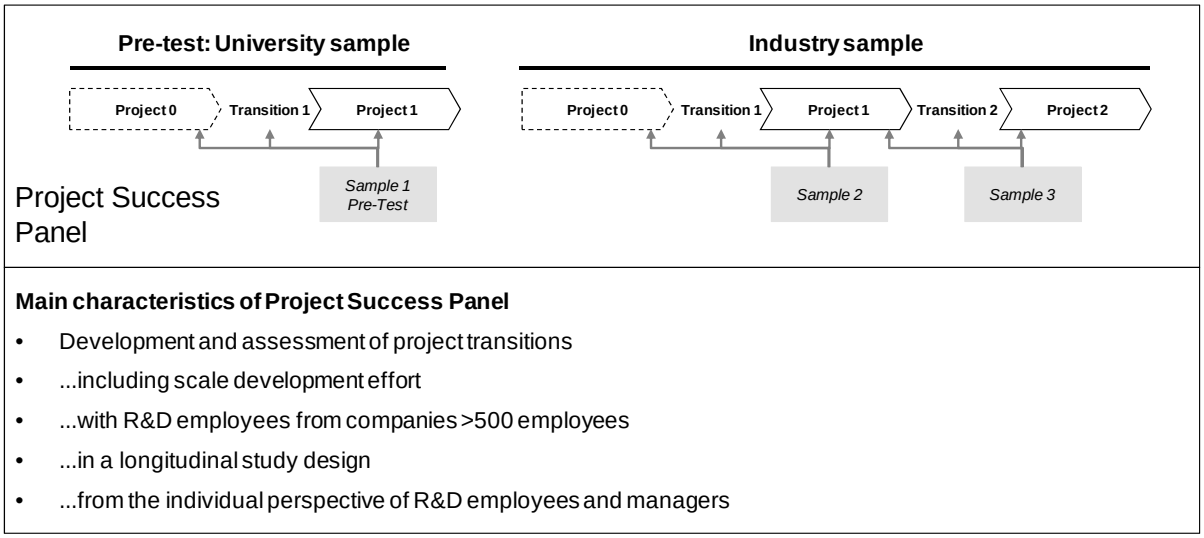

Figure 1: Overview of Project Success Panel

3.2 Approach of this thesis

This following section will summarize and describe the work conducted for this thesis. All relevant aspects including the reasons for the chosen path and work method will be discussed in-depth in the individual studies. The research effort started with an analysis of the relevant literature, which led to initial thoughts and ideas for research questions and to the necessity of scale development to conceptualize and measure project transitions. Initial ideas

were first discussed with researchers at the chair of Entrepreneurship at the Technische Universität München and sent for review to the research partners at Kelley School of Business at Indiana University and Ball State University. Based on these discussions, an interview guide was developed. This guide supported semi-structured interviews with industry experts from different industries. Five 30-minute interviews were conducted to validate the newly theorized constructs and their initial items as well as to potentially generate new items.

The results were incorporated in a pre-test questionnaire which was then reviewed by 6 research assistants and PhD candidates at the research chair. The questionnaire was distributed among 434 researchers from almost all faculties of the Technische Universität München. Based on the results of this survey, a statistical analysis of the new scales was conducted to establish initial evidence towards the psychometric properties of the new scales, and reduce the number of items for use in the main questionnaire. The main questionnaire was then developed based on the initial research questions, and again refined through discussions with researchers in the US and Germany. Participants of the main sample were acquired in a multi-step process, leveraging personal contacts and using a contact database containing relevant companies, and managers.

The results of this survey again were employed for statistical analysis using linear equation modeling to finalize the scale development effort. These scales were then incorporated in scientific models created to answer the research questions derived at the beginning of this thesis. The results of this effort can be found in this document. Figure 2 illustrates which of the samples were used in the different chapters of this thesis.

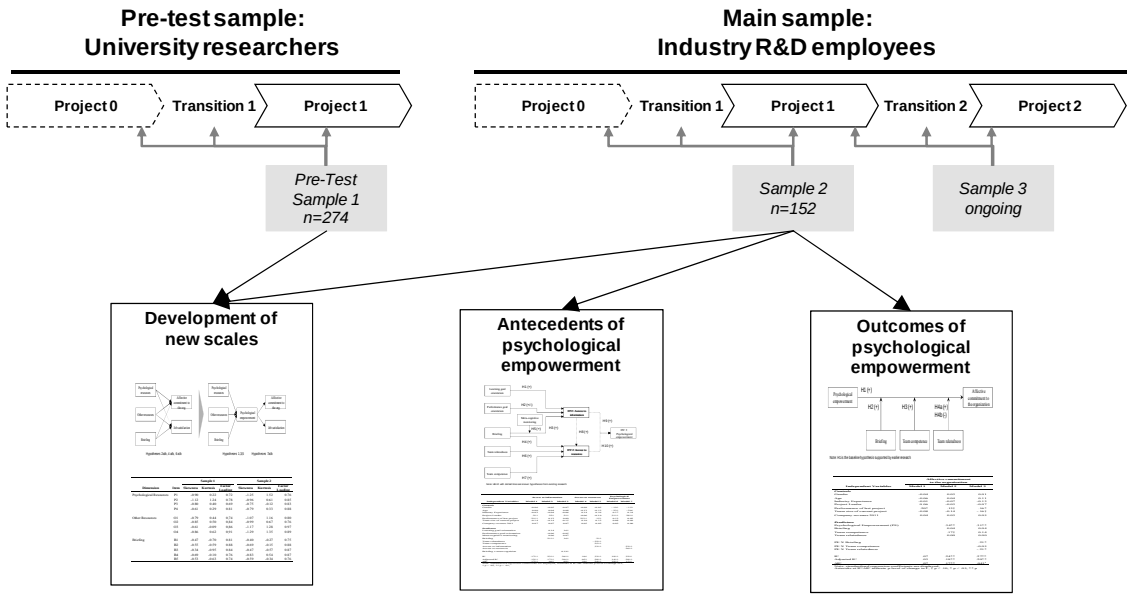

Figure 2: Use of samples from the Project Success Panel for this thesis

Figure 2 shows that while the main sample (152 participants) was drawn upon to test the hypotheses in context of R&D and innovation work, the pre-test sample (274 participants) was utilized for scale development as well to increase validity of the new scales employed for hypothesis testing.

3.3 Data sets acquired for this thesis

One aim of this thesis is the development of new constructs and scales to measure them. This will be done in chapter 4. Following the recommendation of Hinkin (1998), during the development of new scales, it is necessary to expose these scales to multiple independent samples. In this study, two different samples were surveyed. First, for pre-testing the new scales and item reduction, the questionnaire was distributed to a sample of university researchers. Second, for validation of the results a sample of R&D/innovation project teams in large companies was surveyed. In the remainder of this chapter, both samples will be described along with all variables that were drawn upon from existing research. This is done to minimize redundancies in later chapters and references to this chapter will be made throughout the thesis where ever necessary. Following, for both samples the questions (1) why each sample was selected, (2) how it was acquired, and (3) how the sample does look like will be answered.

3.4 Sample 1: Scientific researchers (Pre-test for scale refinement)

3.4.1 Data collection

For pre-testing the newly developed scales a convenience sample was used, since from a methodological standpoint this usually suffices (Clark & Watson, 1995; Netemeyer, Bearden, & Sharma, 2003). For this approach to be feasible, the pre-test sample has to be somehow related to the main sample for which the scales are ultimately constructed – in the present study employees working in the field of innovation, product development, and R&D. For reasons of availability, a sample of university researchers from different faculties of the Technische Universität München was surveyed. In order to be deemed equivalent to the new scales' target group (following Netemeyer et al., 2003), they had to work on tangible research topics (e.g., computer software) as opposed to an intangible topic (e.g., a paper on organizational psychology).

The questionnaire was developed in English based on existing scales from international scientific journals and to provide consistency the new scales were also developed in English. Yet, since the sample was based in Germany, the questionnaire was administered in German. Back-translation was used to test for accuracy (Brislin, 1970; Craig & Douglas, 2006). Being a native German speaker, the author of this thesis translated the questionnaire to German. Five PhD candidates at the research chair translated it back from German to English. A post-doctoral researcher than reviewed the original and the back-translated versions for categorical, functional, and conceptual equivalence and deemed them to be equivalent; so no further changes were made. For ease of completing the questionnaire it was created, distributed, and administrated with the online tool Unipark.[3]

The sample was collected by two business diploma students who were both trained for the purpose of the study. To minimize potential biases from different persons collecting the sample, the students each got a randomly but evenly split sample of research chairs to contact. This means, both students contacted all faculties, but never contacted the same research chair, to rule out calling the same person twice. They called participants directly, asking them for their permission to send them the online questionnaire and asked if they could send the ques-

[3] For a full overview of the questionnaire please contact Dr. Judith Behrens at the Chair of Entrepreneurship at the Technical University of Munich

tionnaire to the researchers sharing the same room as well. This was done to maximize the commitment of the researchers to complete the questionnaire as well as the speed of inviting additional researchers to the questionnaire.

In total the students called 681 researchers (listed in the university directory as PhD candidates) from 63 research chairs out of the faculties of civil, geotechnical and environmental engineering, chemistry, electrical engineering and information technology, computer science, mechanical engineering and physics. Out of those, 318 researchers agreed either to participate themselves or that they would approach several other researchers for participation. All participants then received an email invitation to the online questionnaire. One research chair counting 7 researchers wanted to fill out the questionnaires offline, so a paper version was created and send out by one of the students. Answers were returned via fax, and one of the students entered the data into Unipark. Participation was fully voluntary, and as an incentive each person completing the questionnaire could provide their email address to enter a draw for one out of three Amazon vouchers each worth 50 € or one casket of wine. Participants were assured of full confidentiality and anonymity. No details about the research topic were provided apart from a relation to project work.

The questionnaires were sent out over a period of seven weeks from October to December 2012. To maximize the response rate, several reminders were sent via email, if the questionnaire was not completed yet. The first reminder was sent two weeks after invitation to the study, the next two weeks after that, and the last one to all remaining participants two weeks prior to the end of the administration period of the pretest questionnaire.

3.4.2 Description of sample

A total of 661 questionnaires were sent out, of which 434 or 66 percent were started, and 274 or 41 percent of usable questionnaires were completed. Usable in this case means that all relevant scale data had been filled out. For six of those questionnaires some of the control data fields such as "Age" or "Number of projects" were missing or inconclusive. These were still deemed sufficient for usage as a larger sample delivers more stable results for factor analysis (Bartlett, Kotrlik, & Higgins, 2001), and no concerns arose for validity, since the missing cases appeared to be random (Hair, 2010).

Out of the 274[4] research scientists 84.6 percent were German and 75.5 percent were male. Most participants or 82.4 percent were PhD students; 3.3 percent were technical assistants; 8.4 percent Post-Docs; 3.6 percent professorial candidates, and 1.5 percent professors. Two participants or less than 1 percent failed to provide any information on their position at their current chair, but since questionnaires were only sent out to researchers being present in the university directory, they were still included in the overall sample.

	Age	Work Experience	Organization Tenure	Team Tenure	# of projects
# of valid entries	269.00	268.00	269.00	269.00	268.00
Mean	31.37	5.46	3.68	3.80	5.57
Median	30.00	4.00	3.00	3.00	2.00
Modal	30.00	3.00	3.00	1.00	2.00
s.d.	5.81	5.34	4.06	5.01	15.99
Minimum	23.00	0.00	0.00	0.00	0.00
Maximum	64.00	37.00	35.00	55.00	200.00

Table 3: Descriptive statistics of pre-test sample

The average age of participants was 31.4 years with a mean of 5.5 years of working experience, 3.7 years of tenure in the current organization, and 3.8 years in the current team. The number of projects the average participant had already participated in was 5.57 with a standard deviation of 15.99 and a maximum of 200. The median of this variable however was 2.0.

It has to be pointed out that 6.3 percent of the participating researchers stated that they had worked on no project in their current job at the time of the questionnaire[5]. So there might be an error in the data since the respondents had not experienced a project start in their current organization yet. For two reasons this was deemed an acceptable risk. First, the question was about the past project experience, which means that if participants were currently performing their first project the correct answer should have been zero. Supporting this argument, the researchers were asked if they were currently working on a project before sending them a questionnaire. Second, this was a pre-test sample. The final scale will be determined

[4] Since providing personal information was voluntary, some participants failed to provide personal data. This information on missing data can be found in Table 3

[5] The exact question was: "How many projects have you worked on in your current job?"

through further refinement using the actual target group. Concluding, the risk of introducing a bias in the data is acceptable, so those participants were included in the sample to get more stable results through a larger data set.

In addition, all researchers were asked about their field of education and the main subjects represented in the sample were: Mechanical engineering (15.3 percent), physics (14.2 percent), general engineering (11.7 percent), electrical engineering (10.2 percent), chemistry (9.5 percent), civil engineering (8.8 percent), and computer science (4.4 percent). The rest of the answers ranged from biology to industrial engineering, and aerospace engineering. Again 16 participants or 5.8 percent of the total sample failed to provide an answer to this question but were still deemed usable for the reasons already mentioned concerning the selection of the sample (Hair, 2010).

Summing up the evidence, the pre-requisites for the convenience sample drawn out earlier seem satisfied. So, the results of the scale refinement performed with this sample should be applicable to the main sample of industry R&D employees.

3.5 Sample 2: Industry research & development (Scale validation and theory testing)

3.5.1 Data collection

For refinement and validation of the new scale (chapter 4) as well as for theory testing (chapters 5 & 6), a sample of R&D and innovation project team members was acquired. Acquiring an industry sample differs from acquiring a convenience sample of scientific researchers (Fricker & Schonlau, 2002). The appropriate industries and companies might be already known to the researcher. But, apart from contact data of the board of management and maybe to marketing or the press department, the employees actually relevant to this research topic cannot be identified beforehand. Multiple channels were used for the acquisition of the industry sample. First, personal contacts in relevant companies[6] were engaged to enable leverage. The sample was drawn from across all industries, the prerequisite being that participating companies had an innovation or R&D department. To each of those contacts, information about the research was either conveyed by phone and by email or only via email. The contacts were asked to point out relevant managers in the innovation or R&D department

[6] The justification of the sample will be given in the individual studies.

for whom this research could be relevant. Second the chair of entrepreneurship acquired a contact database of Hoppenstedt containing a list of innovation and R&D contacts in various companies and across industries. In this, the largest firms in terms of turnover were identified, increasing the likelihood of a bigger R&D department. Contacts from the selected enterprises were either mailed a letter containing information on the research or were "cold" called. In these calls information about the research was provided. The calls were followed by an email containing written information on the project. Figure 3 depicts the flyer used during the acquisition process of the industry sample.

Figure 3: Flyer for company acquisition used during the PSP

The study was conveyed to the contact persons as the "Project Success Panel" to imply practical relevance, which is especially important when undertaking cold calls (Walther, 2005). The information package contained a short description of the general topic of the research, the requirements, and tasks the company and its employees had to fulfill, and a draft of possible results that would be handed over at the end of the study.

After all necessary information was conveyed, the approached technical directors, division or department managers of the innovation or R&D departments then decided about participation. The study was conducted in Germany[7] and involved only middle or lower level employees which in a lot of cases were bound to collective labor agreements. They were therefore represented by the workers' council, and due to the nature of the study – collecting data on employees – the participation of the employees and therefore the company as a whole was subject to the decision of the workers' council. To alleviate possible concerns of the workers' councils, absolute anonymity of the results per employee was assured and a non-

[7] Two questionnaires were completed by employees working in an English business unit of a German based company.

disclosure agreement was offered. Also, the workers council representative was asserted that all results would be discussed with them, before it would be given to management. In addition, a Q&A document was prepared, detailing the background of some of the questions in the questionnaire. It is worthy to note, however, that out of the four workers councils approached only one agreed to let the represented employees participate. This might lead to a bias towards companies where management and workers council help and support each other more strongly and which might hint at an atmosphere with higher levels of trust, empowerment, and commitment throughout the organization. A multivariate analysis however, found no difference between employees represented by a workers council and those that weren't (Wilks lambda = .88; $p > .05$)[8].

As the next step in the acquisition process, if managers and/or workers' councils had decided to participate, managers assured the sampling of participants within the company and sent an Excel-template containing the names and contact data of the respective employees to the research chair. As for sample 1, since sample 2 was also based in Germany, the questionnaire was administered in German and the back-translation method was used to test for accuracy (Brislin, 1970; Craig & Douglas, 2006). The author of this thesis (as a native German speaker) translated the questionnaire to German and five PhD candidates at the research chair translated it back from German to English. Again, a post-doctoral researcher reviewed the original and the back-translated versions for categorical, functional, and conceptual equivalence and deemed them to be equivalent. So, no changes were made to the questionnaire after this procedure. Afterwards, the questionnaire was pre-tested by a manager of one of the participating companies. For this, the pre-tester filled out the questionnaire voicing his thoughts and discussing the appropriateness and understandability of items with the author of this thesis. The questionnaire was deemed adequate for use and only minor changes in wording were integrated. For ease of completing the questionnaire, it was created, distributed, and administrated with the online tool Unipark.[9]

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[8] All psychometric variables included in the second sample were used to compute Wilk's lambda. Those are learning goal orientation, performance goal orientation, social desirability, team relatedness, team competence, briefing, access to information, access to resources, job satisfaction, affective commitment to the organization and psychological empowerment.

[9] For a full overview of the questionnaire please contact Dr. Judith Behrens at the chair of Entrepreneurship at the Technical University of Munich

After this, invitations to an online questionnaire were sent out to the selected employees. Participation on employee level was still fully voluntary as the respective management team had no access to participation information. In addition, participants were assured of full confidentiality and anonymity. No details about the research topic were provided apart from a relation to project work. This was done to alleviate possible problems with social desirability bias (Joinson, 1999). Again, a rigorous reminding process followed to maximize the overall as well as the per company response rates. The first reminder was sent out two weeks after invitation to the study, two weeks after that the management team of each company was reminded of the importance of a maximized participation, and information about the current response rate of the company was provided. The next reminder was sent out six weeks after the initial invitation and a final one two weeks prior to the studies ending.

3.5.2 Description of sample

As outlined above, participants of the study were not invited one-by-one, but instead the acquisition process of employees and project leaders took place through upper and middle management – sometimes even at board level. Overall 230 managers or board members were contacted with a success rate of acquisition of 10.0%. The main reasons for not taking part in the study were mostly the lack of time of already strained employees. Other reasons mentioned were a lack of interest in the study and ongoing restructuring efforts – making it impossible to asses a specific team or its responsible management. Finally, five companies were already performing similar studies supported by management consultants, providing evidence towards practical relevance of this research effort.

In total 23 companies participated in the study, and as was aimed for a broad industry range could be achieved. There were 6 companies from the industrial goods sector, 3 automotive companies, 3 firms working in the field of chemicals and materials, 3 logistics companies, 3 companies could be classified as telecommunication, information technology and related services, 2 as utilities, and 3 companies were from other sectors. Concerning size, the mixture was also satisfying with participating companies ranging from as little as 500 to as many as 420,000 employees. Figure 4 gives an overview of the characteristics of participating companies.

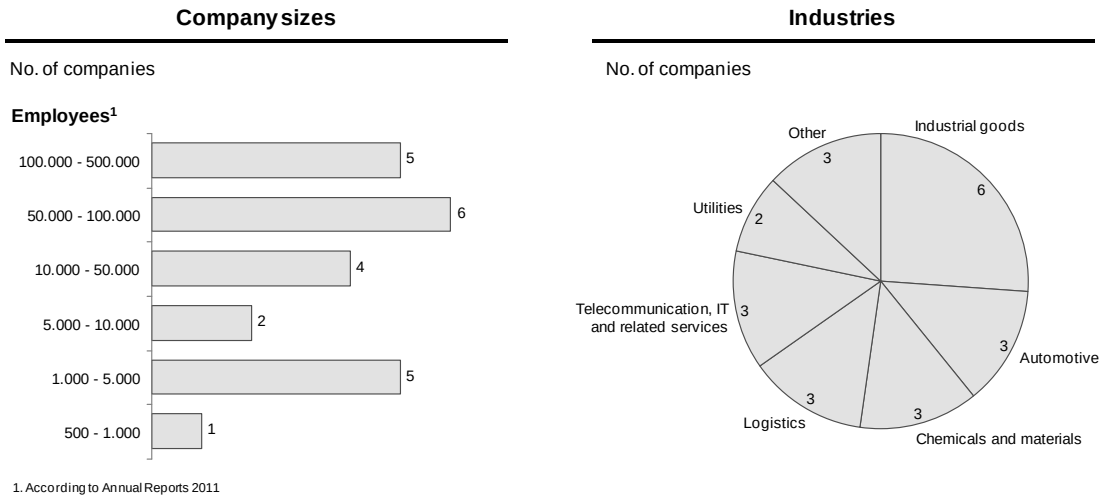

Figure 4: Company sizes and industry distribution of sample 2

From these 23 companies, in total 152 participants[10] fully completed the questionnaire; since 237 questionnaires were sent out, the response rate within the acquired sample was 64.1%. This response rate could only be achieved, because management in each participating company was already committed to supporting the study. Most companies, that is 13 out of 23, were represented by 1-3 employees, but there was also one company that managed to turn out 54 fully completed questionnaires representing 35.5% of the overall sample, which might give rise to a possible selection or sampling bias (Heckman, 1979). Analysis showed that this was not the case[11]. Table 4 provides the descriptive statistics of the industry sample.

[10] Originally 26 companies committed to the study, but two of those companies only committed one participant, who neither completed the questionnaire nor was reachable to clarify reasons for this. After the deadline of the study there were 153 completed questionnaires from 24 companies. One questionnaire had to be eliminated from the sample, because only neutral answers were given throughout the questionnaire. Since again, this was the only participant from that company, the final sample consists of the still acceptable number of 152 participants from 23 companies.

[11] To check, if a bias might be present in the sample, discriminant analysis was conducted including the independent and dependent variables of chapters 5 and 6. These are learning and performance goal orientation, meta-cognitive monitoring, team relatedness and competence, briefing, access to information and resources, psychological empowerment, job satisfaction and affective commitment to the organization. Wilk's lambda of .82 indicates no significant difference between the company with many participants and the rest of the sample.

	Age	Industry Experience	Organization Tenure	Position Tenure	# of projects
# of valid entries	135.00	152.00	152.00	152.00	152.00
Mean	40.96	11.76	9.66	5.76	10.88
Median	40.00	9.50	6.00	3.00	5.00
Modal	32.00[a]	0.00	4.00	1.00	3.00[a]
s.d.	9.98	9.83	9.16	6.54	19.58
Minimum	23.00	0.00	0.00	0.00	0.00
Maximum	71.00	48.00	48.00	31.00	170.00

[a] Multiple modal values, lowest value shown

Table 4: Descriptive statistics of industry sample

Out of the 152 R&D employees (only 135 participants did provide a valid entry for their age) 78.9 percent were German and 87.5 percent were male. Almost half of all participants or 48.0 percent had at least a German diploma or Master's degree; 22.4 percent had a PhD; 8.6 percent a bachelor degree; 4.6 percent had a German "Abitur" or equivalent, and 5.3 percent had a high-school degree (or "Realschulabschluss"). The rest of the participants or 10.5 percent[12] did not provide any information about their level of education. 55% of the participants could be classified as project leaders, so the sample had an almost even split between project leaders and project team members.

The average age of participants was 41 years with a mean of twelve years of industry experience, almost ten years of tenure in the current organization, and close to 6 years of tenure in their current position. The number of projects the average participant had already participated in was 10.88 (s.d. 19.58) and the maximum number of projects a single participant had was 170.

As in sample 1, about 9.2 percent of the participants stated, that they had worked on no project in their current job at the time of the questionnaire[13]. So as for the pre-test sample, there might be a potential bias, since the subjects have not experienced a project start in their current organization yet. As already presented in section 3.4 for the sample of university scientists, this should not be the case. To further augment this argument; this time managers of

[12] One entry for level of education is missing due to a system error in the online questionnaire system.

[13] The exact question was: "How many projects have you worked on in your current job?"

the participating companies had hand-picked the R&D employees for the questionnaire, so it is very unlikely that almost every tenth participant had no project experience at the time of the study. It is more likely that these participants simply chose not answer the question since it was – for reasons of anonymity – not mandatory. In addition, all employees were asked about their field of education, and the subjects with the most answers were: Mechanical engineering with 24.3 percent, electrical engineering with 15.8 percent, and chemistry and physics with both 7.9 percent.

3.6 Existing variables used in this thesis

3.6.1 Variables for scale development and theory testing

Seventeen variables were included in this thesis' studies from existing research for two reasons. First, to allow testing the validity of the newly developed scales in chapter 4, several other measures have to be included in the questionnaire (Hinkin, 1998)[14]. And second, the variables are further used for theory testing in chapters 5 and 6, either as independent variables, dependent variables or both. All variables were tested for reliability using Cronbach alpha (Cronbach, 1951), with values between .60 and .70 deemed the lower limit of acceptability (Hair, 2010).

First, for **psychological empowerment,** Spreitzer's (1995) four dimension scale with each dimension containing 3 items was used. The four dimensions comprise meaning with an exemplary item being "The work I do is very important to me", competence with "I am confident about my ability to do my job" as an example, self-determination measured, for example, through "I can decide on my own how to go about doing my work", and finally impact with "My impact on what happens in my department/project team is large" as an exemplary item. The items were measured in a 7-point likert scale format with answers ranging from 1 "totally disagree" to 7 "totally agree". Cronbach alpha (Cronbach, 1951) for psychological empowerment in sample 2 was .87 which is in line with previous studies.

To measure **affective commitment to the organization**, (Allen & Meyer)'s (1990) eight item 7-point likert scale was used. Their affective commitment "refers to employees' emo-

[14] For a full overview of the questionnaire please contact Dr. Judith Behrens at the chair of Entrepreneurship at the Technical University of Munich

tional attachment to, identification with, and involvement in, the organization" (Allen & Meyer, 1990, p. 1). Exemplary items are, for example, "I enjoy discussing my organization with people outside it" or "I really feel as if this organization's problems are my own". Cronbach alpha of the scale was .75 in sample 1 and .85 in sample 2.

For **job satisfaction** the 3-item 5-point likert scale measure of general or overall job satisfaction was drawn on (Cammann, Fichman, Jenkins, & Klesh, 1983 as used in Rich, Lepine, & Crawford, 2010). The items for this scale are "All in all, I am satisfied with my job", "In general, I don't like my job" (reversed), and "In general, I like working here". Cronbach alpha for the job satisfaction scale in sample 2 was .80.

For **learning goal orientation and performance goal orientation** Button et al.'s (1996) two 8-item scales were included. For them, people adopting a learning goal orientation "strive to understand something new or to increase their level of competence in a given activity" (Button et al., 1996, p. 26). Exemplary items are "The opportunity to do challenging work is important to me" or "When I have difficulty solving a problem, I enjoy trying different approaches to see which one will work". On the other hand, people oriented towards a performance goal orientation are motivated extrinsically and "strive both to demonstrate, and thereby gain favorable judgments of, their competence via task performance or to avoid negative judgments of their competence" (Button et al., 1996, p. 26). Items concerned with performance goal orientation are "I'm happiest at work when I perform tasks on which I know that I won't make any errors" or "I feel smart when I can do something better than most other people. Cronbach alphas in sample 2 of this study sample were .80 for learning and .70 for performance goal orientation.

For **meta-cognitive monitoring** this study builds on the work of Haynie and Shepherd (2009) and their 7-item measure. There, meta-cognitive monitoring is defined as individuals seeking and using feedback to reevaluate internal and external knowledge, idiosyncratic experiences, and accordingly adopt and choose decision frameworks for the purpose of "managing" a changing environment (Haynie & Shepherd, 2009, p. 700). Items accordingly ask "I periodically review to help me understand important relationships" or "I ask myself questions about how well I am doing while I am performing a novel task". Cronbach alpha in sample 2 was .75

For **access to information and access to resources**, this study reverted to Spreitzer's (1996) scales for measurement. She did not provide a concise definition, but the underlying items are concerned with access to organizational information and resources. Items for the former are "I understand the strategies and goals of the organization" or "I understand the top management's vision of the organization"[15] and "I can obtain the resources necessary to support new ideas", "When I need additional resources to do my job, I usually get them", and "I have access to the resources to do my job well" for the latter. Their Cronbach alphas were .86 and .88.

Additionally, for testing discriminant validity, the 18-item **material values** scale developed by Richins and Dawson (1992) was utilized in sample 1. As adopted by them, materialism is defined by the Oxford English Dictionary (1989) as a "devotion to material needs and desires, to the neglect of spiritual matters; a way of life, opinion, or tendency based entirely upon material interests". Cronbach alpha in sample was .86.

Finally, it has to be checked, if **social desirability** poses a threat to any of the new scales or threatens the results of the theory tests. Responding socially desirable "implies a need to be thought well of by others, a need for approval" (Crowne, 1991, p. 18 based on Crowne & Marlowe, 1964). For example, employees who contest the anonymity of a questionnaire would report a better assessment of their supervisor; if they were afraid the same supervisor had access to their individual questionnaire. To test this, a 10-item version of Paulhus' (1984) impression management scale[16] as employed by Shepherd et al. (2010) was used, because it is theorized to represent the conscious effort of respondents at deception. Exemplary items for

[15] The scale measuring access to information originally contained 3-items, but as in most studies only 2 items were consistent. The item "I have access to the strategic information I need to do my job well" cross-loaded as it did in previous studies Seibert, Silver, and Randolph (2004); Spreitzer (1996b) and was therefore excluded from further analysis.

[16] Two questions of the scale were deemed offensive by participants in sample 1, which consequently aborted filling out the questionnaire. For reasons of maximizing participation for the second sample, it was decided to drop the items "When I take sick leave from work, I am as sick as I say I am" and "I would declare everything at customs, even if I knew that it could never be found out".

this scale are "Once in a while I laugh at a dirty joke" and "I always apologize to others for my mistakes". Cronbach alphas in both samples were low at .55 and .43.[17]

3.6.2 Control variables for theory testing

For theory testing in chapters 5 and 6 seven control variables were included in the second questionnaire as well, to prevent issues arising from omitted variable bias (Berk, 1983). An omitted variable bias occurs, if a variable that is not included in the regression is correlated with an included variable (Heckman, 1979). The control variables in this thesis were selected for inclusion for two reasons. First, when there is a theoretical reason that they might be correlated with one of the variables of interest. And second, when a significant correlation has already been found in previous research.

Tenure, age, and job level were included as controls since they were found to be correlated with psychological empowerment (Seibert et al., 2011). Participants' tenure was measured through industry experience in years. Age was provided by participants as their year of birth and afterwards coded in years. 17 participants failed to provide information concerning their age. For analysis, the missing cases were mean imputed since this is appropriate for a relatively low number of missing cases, and it "only" depresses observed correlations (Hair, 2010). Therefore, the estimates in this study are to be interpreted as lower bound estimates. The variable job level was coded as 1, if the participant occupied a project leader position and 0 if not. According to the classical principles of formal organizations, those in positions at higher levels also have greater formal decision-making authority over the allocation of resources than do those in lower-level positions. Gender (coded as 0 for women and 1 for men) was also included as a control variable. This mainly contributed to additional rigor of the analysis, since there has been positive (Chen & Klimoski, 2003) and negative evidence

[17] The low value for the social desirability variable is not uncommon. Li and Bagger (2007) investigated the reported reliabilities of 107 studies. Although, the median reliability was .76, there were studies reporting values as low as .32. They found that variations in reliability depended mainly on the number of items administered and the country in which the scale is administered. This means that the scale's reliabilities in this thesis are likely to be lower than the mean reliabilities for two reasons. First, only a 10 item instead of the 20 item version was used. And second, reliabilities are highest, when the scale is administered in English. Since it was administered in German in this thesis, this has most likely led to lower reliabilities as well. Effect sizes obtained with the scale for measuring social desirability might therefore be attenuated (Li & Bagger, 2007). This issue will be elaborated on in the limitation section of this thesis. It is advised that future researchers address this issue.

(Boudrias, Gaudreau, & Laschinger, 2004) towards its relationship with psychological empowerment. This is attributed to the notion that women more often have jobs with relatively less power than men (Kanter, 1977; Mainiero, 1986; Smith & Grenier, 1982), a contextual antecedent of psychological empowerment.

Furthermore, team size measured as the number of team members in the current project team and company size measured as Euro revenues in 2011 were included in the analysis, since they might have an impact on dependent variables (see e.g., Chen et al., 2007a; Kirkman, Rosen, Tesluk, & Gibson, 2004; Spreitzer, 1996b). For example, "larger units may tend to be more bureaucratic than smaller ones, yet they may be the source of more resources and more support networks" (Spreitzer, 1996b, p. 494). In addition, larger organizations might be less personable and not as easy to identify with as are smaller organizations, which might have an effect on commitment (Mathieu & Zajac, 1990). Also, team size can determine the amount of available resources (Chen & Klimoski, 2003). For obtaining the size of the project team, participants were asked to indicate "how many people are in the project team?" Company revenues were derived from secondary sources, which were the financial statements of the companies of 2011. Table 5 provides a full overview of all previously existing variables employed of this thesis, the number of items for psychometric scales, their source, an indicator for usage in the following chapters, and the Cronbach alpha values for both samples, where available.

Scale	# of items	Source/measure	Ch. 4	Ch. 5	Ch. 6	Alpha Sample 1[a]	Alpha Sample 2[b]
Psychological empowerment	12	Spreitzer's (1995)	x	x	x	x	.87
Affective commitment to the organisation	8	Allen & Meyer (1990)	x		x	.75	.85
Job satisfaction	3	Camman et al. (1983)	x			n/a	.80
Performance goal orientation	8	Button et al. (1996)	x	x		n/a	.70
Learning goal orientation	8	Button et al. (1996)	x	x		n/a	.80
Meta-cognitive monitoring	7	Haynie & Shepherd (2009)		x		n/a	.75
Access to information	2	Spreitzer (1996)		x		n/a	.86
Access to resources	3	Spreitzer (1996)		x		n/a	.88
Material values	18	Richins & Dawson (1992)	x			.86	n/a
Social Desirability	10/8	Paulhus (1984)	x	x	x	.55	.43
Tenure	-	in years		x	x	n/a	n/a
Age	-	in years		x	x	n/a	n/a
Job level	-	Dummy		x	x	n/a	n/a
Gender	-	Dummy		x	x	n/a	n/a
Team size	-	Number		x	x	n/a	n/a
Revenue in 2011	-	in € mio.		x	x	n/a	n/a
Performance of last project	3	Song et al. 2006		x	x	n/a	.84

[a] n=274; [b]n=152; Note: x marks, if the variable will be used in a chapter or not;
Ch. = chapter; Alphas are Cronbach alphas

Table 5: Overview of variables in this thesis

Finally, the performance of the last project was included as a control variable in this study. This was deemed important, because it has been found to mask effects in empowerment research, when it is not included (Patterson, West, & Wall, 2004). In practice, this "reduces the likelihood of observed outcomes being the result of reverse causality" (Patterson et al., 2004, p. 654). To measure performance of the last project, a scale originally designed to measure innovation was included (see e.g., Dyer & Song, 1997; Song, Dyer, & Thieme, 2006). For the scale to fit the context of a single R&D project the context of "the new product development program" was replaced by "last project". The scale comprises three 7-point-likert-scale items, and an exemplary item would be "the overall performance of my last project has met the objectives". Cronbach alpha of the adapted scale was .84 indicating a good internal consistency.

3.6.3 Transformation of scales for hypotheses testing

Scale scores were attained by averaging the corresponding scale's items. For estimating models with interaction terms, it is advised that all variables be centered before creating the interaction terms for reasons of minimizing potential problems of multicollinearity (Aiken & West, 1991). Newer research clarifies that this not necessarily reduces colinearity between variables but only eliminates the non-essential colinearity between interaction terms and their independent variables (Dalal & Zickar, 2012). For regressing models in this research, variables were z-standardized (see Aguinis, Gottfredson, & Wright, 2011), and to further test for potential problems of multicollinearity between the variables, variance inflation factors (VIFs) were calculated. All VIFs range between 1.04 and 2.25 (compare Table 6). Hence, multicollinearity is unlikely to be a problem in the data set (Hair, 2010).[18] All control variables were carefully derived from existing literature, and all scales employed in the models exhibited at least satisfactory coefficient alpha values, hinting at appropriate internal consistency.

[18] There has been some commotion about, if variables that make up interaction terms in multiple linear regression models should be centered or not in order to minimize potential problems with multicollinearity. Dalal and Zickar (2012) found that independent of centering variables or not, there was no change in the coefficient of the interaction term nor its standard error or significance. Additionally, R^2, delta R^2, and the power to detect the moderating effect were also not affected.

Independent Variables	Dependent variable			
	Access to information	Access to resources	Psychological empowerment	Affective commitment to the org.
Controls				
Gender	1,07	1,04	1,04	1,10
Age	2,15	2,07	2,07	2,25
Industry Experience	2,10	2,06	2,09	2,22
Project Leader	1,39	1,37	1,38	1,51
Performance of last project	1,19	1,13	1,13	1,14
Team size of current project	1,32	1,37	1,36	1,39
Company revenue 2011	1,05	1,04	1,02	1,05
Predictors - antecedents				
Performance goal orientation	1,08			
Learning goal orientation	1,26			
Meta-cognitive monitoring	1,22			
Briefing	1,19	1,56		1,64
Team relatedness		1,43		1,47
Team competence		1,64		1,67
Access to information		1,25	1,39	
Access to resources			1,29	
Psychological empowerment				1,54
Briefing x Meta-cogn. mon.	1,22			
PE x Briefing				1,94
PE x Team relatedness				1,83
PE x Team competence				2,21

n = 152; The variance inflation factors shown are based on the full models

Table 6: Variance inflation factors of all final models

3.7 Testing for potential biases

3.7.1 Social desirability analysis of instruments used for testing

Button et al. (1996) found that both learning goal orientation and performance goal orientation were subject to social desirability in their study in an academic setting. In addition, there are generally some concerns for common source/rater bias which can potentially alter results (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Yet, others have put forward arguments that this might indeed only be a "urban legend" and therefore overstated (Spector, 1987, Spector, 2006). Spector introduces a very compelling argument: If common method variance indeed is a problem, then all variables measured with the same method should share a baseline of covariance that is significant (otherwise it would be irrelevant). Since this is

neither the case in published studies nor in this thesis, the argument that common method bias always is a problem simply would be too easy. Furthermore, several non-statistical remedies as proposed by Podsakoff et al. (2003) – like ensuring anonymity to the subjects – were already built into the study design. Additionally, to alleviate concerns arising from social desirability and common rater/source error and again as proposed by Podsakoff et al. (2003), all final models were again tested including the social desirability variable as a measure of shared common variance. Since none of the correlations of interest changed its level of significance, social desirability, common method and source error are likely not to affect the results of this thesis.

3.7.2 Non-response bias

Survey-type research always faces the risk of non-response bias. That is, "if persons who respond differ substantially from those who do not, the results do not directly allow one to say how the entire sample would have responded" (Armstrong & Overton, 1977, p. 396). Thus, reducing the likelihood of non-response bias being present in the sample, allows the researcher to generalize the results of his models from his sample to the general population of subjects being measured. To compare for non-response bias, the approach employed in recent research was followed (see e.g., Krishnan, Martin, & Noorderhaven, 2006; Shepherd et al., 2011). Since, non-respondents are deemed similar to late respondents (Armstrong & Overton, 1977), the sample was split in early and late respondent halves. A respondent was classified as late, if the time between invitation and accessing the online questionnaire for the last time was above the sample mean. This procedure was done twice. First, including the psychometric variables used in chapter 5 and second entering the psychometric variables in employed in chapter 6. The multivariate analysis of variance found no significant differences between early and late respondents on the variables of learning and performance goal orientation, meta-cognitive monitoring, briefing, team relatedness and competence, access to information and resources, and psychological empowerment (Wilk's lambda = .91; p = .10). And again, it did also not find significant differences between early and late respondents on the variables of team relatedness, team competence, briefing, psychological empowerment, and affective commitment to the organization (Wilks lambda = .95; p = .15). Because of the above computed results, non-response bias should only pose a minor threat to the generalizability of the models derived and validated in later chapters.

In sum, this chapter shall provide the foundation for the studies conducted in the upcoming three chapters of this thesis. It did provide a comprehensive description of both samples that are going to be employed for scale development as well as for theory testing. Furthermore, it did already provide an overview on all variables established by previous research that are going to be employed in this thesis. The section aimed to alleviate some concerns regarding potential biases present in the data, thus providing credibility for this thesis' findings. To minimize redundancies within this thesis, it will be referred to this chapter wherever necessary during the three individual studies that follow this chapter.

4 STUDY 1: DEVELOPING SCALES FOR AFFECTING PSYCHOLOGICAL EMPOWERMENT AT THE PROJECT START[19]

4.1 Introduction - Empowerment in R&D project teams

"The ability to generate […] creative ideas in new products (NPs) […] in response to changing market needs is key to the success of a firm" (Subin & Workman Jr, 2004, p. 114). However, deriving competitive advantages from new product development and R&D is a complex process that involves technical complexities, functional interdependencies, high levels of uncertainty, and highly complex forms of work integration (Brown & Eisenhardt, 1995; Schoonhoven, Eisenhardt, & Lyman, 1990). While a lot of studies have emphasized company policy and organizational parameters for success of innovation activities, researchers have argued for employees as a highly important factor for successful innovation (Anthony J. DiBeila, 1995; Thamhain, 2003). R&D teams have become the work method of choice in organizations for the generation of creative ideas and leading innovation[20] projects to success (Barczak & Wilemon, 2003; Ireland, Hitt, & Sirmon, 2003).

The characteristics of the innovation and R&D environment also very much apply to innovation and R&D projects. These are characterized as highly uncertain (Balachandra et al., 1996), ambiguous, and conducted in an environment where routines are of little use (Cardinal, 2001). They also face uncertain goals and performance targets (Berson & Linton, 2005). For these kinds of projects to be successful, employees need to have high levels of motivation and commitment (Wolpert & Richards, 1997). Other researchers pointed out that they also require high degrees of creativity (Weiss, Hoegl, & Gibbert, 2011). Scholars have argued and found that psychological empowerment can have a significant influence on these success fac-

[19] This scale development effort is part of a larger research project at the chair of Entrepreneurship at the Technical University of Munich and is based on a working paper "Generation and validation of a scale for project transitions"

[20] Since innovations often occur in R&D projects and these are a lot of times concerned with new product development (Subin & Workman Jr, 2004; Schoonhoven, Eisenhardt, & Lyman, 1990; Brown & Eisenhardt, 1995).

tors[21] (Avolio et al., 2004; Kraimer et al., 1999; Liden et al., 2000; Zhang & Bartol, 2010). One project phase that has been described as particularly valuable for advancing project success is the project start (Besner & Hobbs, 2006; Ericksen & Dyer, 2004; Hackman, 1987; Hackman, 2002). Thus, enhancing employees' levels of psychological empowerment at the project start seems to be a promising endeavor to advance project success, since this early phase "is critical to project success and value creation" (Besner & Hobbs, 2006, p. 47).

However, most of the constructs affecting psychological empowerment that can be found in the literature are of a much broader and general nature (e.g., Aryee & Chen, 2006; Avolio et al., 2004; Birdi et al., 2008; Chen & Klimoski, 2003). As an example, Avolio et al. (2004) found that transformational leadership positively affects employees' levels of psychological empowerment. "Transformational leaders are theorized to influence their followers by heightening followers' self-awareness, instilling a sense of purpose and mission in followers, and influencing them to transcend lower-order needs and goals for the sake of the long-term benefit of the group to which they belong" (Hoffman, Bynum, Piccolo, & Sutton, 2011, p. 780). As can be seen, this definition is rather broad and spanning more than the context of a single project. To the best of my knowledge, no readily available construct and accompanying scales could be found in the literature that aimed at enhancing employees' levels of psychological empowerment at the project start. This study aims at developing constructs as "tools" that can be more easily applied in the context of a project start and affect employees' levels of psychological empowerment during that project.

This study follows three main goals. First, it aims at developing and testing new scales and putting forward a nomological network in the context of psychological empowerment in which these scales can be embedded. Future research is thereby provided with the means to conduct longitudinal research for testing differences in levels of empowerment between two points in time, which has been called for (Seibert et al., 2011). Second, the effects of leaders on their followers have been described and theorized many times over in the context of leadership techniques (Hodgetts, 1968), leader-member-exchange (Dansereau, JR., Cashman, & Graen, 1973), the design of work teams (Hackman, 1987), transformational leadership (Podsakoff, MacKenzie, Moorman, & Fetter, 1990), and psychological empowerment itself

[21] For an overview of research on psychological empowerment and a full definition, please refer to chapter 2 of this thesis.

(Arnold, Arad, Rhoades, & Drasgow, 2000). Therefore, one of the new constructs will be structured, so that projects leaders will be performing an intervention aimed at increasing employees' levels of empowerment. This could help to further solidify the evidence on the important role of leaders in the context of empowerment (Laschinger, Wong, McMahon, & Kaufmann, 1999). Third, this effort aspires to provide researchers focusing on project management with means to help to alleviate the project conundrum. This basically states, that at the project start much is to be gained in terms of later project success, but the project team is in its most ineffective state (Halman & Burger, 2002). There is evidence that an intervention in the form of early-team events has a profound impact on early team formation, thus marking the project start "a potentially richer vein for exploration than previous research realized" (Ericksen & Dyer, 2004, p. 469).

In the remainder of this study, an inductive approach is taken to derive the foundation of the three new constructs, clarifying the importance of the start of a project, explaining the importance of available resources and the mechanics of successful interventions. Then, building on discussions with academic and industry experts, the three initial and purposely broad concepts of psychological resources, tangible resources, and briefing are derived. Next, scale items for these constructs are generated drawing on existing literature and again leveraging expert interviews. Subsequently, the new scales are validated using a sample of university researchers for scale refinement and a second sample consisting of industry R&D employees for scale validation. Various statistical concepts are employed to ensure internal validity as well as multiple fit statistics to ensure proper model fit. Furthermore, initial evidence is provided towards an initial nomological network of the constructs using bivariate and partial correlation analysis as well as multivariate regressions. After ensuring statistical validity, the initially broad target constructs are narrowed down through discussions with academic experts arriving at the final scales of team relatedness, team competence, and briefing. Finally, the limitations of the present study are described and further research avenues are proposed.

4.2 The foundation of the new constructs

4.2.1 Start of a R&D project

Concerning the timing of the new constructs to be developed and tested in this study, the start of a R&D project holds promise for several reasons. First, a R&D employee performs

multiple projects over time, thus providing multiple opportunities for the new constructs to be applied. Second, R&D is mostly conducted in project settings (Pinto & Covin, 1989), projects are R&D employees' main mode of working, and R&D employees contribute lots of time and energy to them, thus place lots of effort into them (Shepherd et al., 2011). Third, leading, motivating, and empowering R&D employees is especially important, because timely performance measurement of outputs is difficult (Elkins & Keller, 2003; Narayanan, op. 2001). Fourth, most of the work done on project starts has been either conceptual (see e.g., Gareis, 2000; Hamburger, 1992; Johansen & Torp, 2003) or qualitative (see e.g., Halman & Burger, 2002; Weaver & Bourne, 2001), and only slightly touching the topic of motivating employees to achieve project success. However, it has been found that early team forming events have a positive effect on project outcomes, by alleviating the project conundrum (Weaver & Bourne, 2001).

Looking at documents on "how to start a project" that are used by practitioners like the "Project Management Handbook" from the Project Management Institute, the focus lies on the "hard tasks" of project management, for example, analysis of requirements, project scheduling, and time planning (Cleland & Gareis, 2006; Gareis, 2000; Novartis Foundation for Sustainable Management). However, Hackmann (1987; 2002) already stressed the point to create supportive conditions in the early phase of a project that "lead naturally to desired outcomes" (Hackman, 2002: 252). Evidence for this is provided by literature reviews (Cohen & Bailey, 1997) as well as qualitative research (Ericksen & Dyer, 2004). For example, Ericksen and Dyer in their case study of six project teams found that, "project teams whose leaders [...][22] pursue [...] participative launch meetings are more likely to emerge from the formative phase of project team development with high-quality outputs: ample time to complete their projects, appropriate talent, and concurrence on tasks" (2004, p. 456).

There were no easily identifiable constructs that might have an impact on levels of psychological empowerment and be applicable at the start of a project in the existing literature. Consequently, Hinkin's (1998) argued for an inductive approach of construct development. As a starting point, examples were deduced from existing research on psychological empowerment. Afterwards, these examples formed the basis for discussions with three researchers,

[22] They also proposed that leaders had to mobilize quickly and comprehensively as well to gain those high quality outputs, but they described the participative launch meetings as the most important. (Ericksen & Dyer, 2004)

two professors and one post-doc – who are experts in the field – to come up with initial hypotheses about the constructs. This was followed by interviews with five industry experts that were conducted to validate the new constructs.

4.2.2 Resources and psychological empowerment

Many researchers have already argued for the importance of available organizational resources on motivational processes (see e.g., Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Hackman & Oldham, 1980; Hobfoll, 2002; Homans, 1958; Kanter, 1986; Salanova, Agut, & Peiro, 2005; Schaufeli & Bakker, 2004). In general, organizational resources refer to those organizational aspects of a job that are functional in achieving work goals, could reduce job demands, and their associated physiological and psychological costs, and finally, could stimulate personal growth, learning, and development (Demerouti et al., 2001; Hobfoll, 2002; Schaufeli & Bakker, 2004). Hobfoll (2002) argues that the meaning of resources expands beyond the accomplishment of tasks, but it also includes personal well-being and health, through the reduction of stress and the ability to cope with new and changing situations because they can meet resource demands. Schaufeli and Bakker (2004) theorized and found that job resources lowered the perceived levels of job demands, negatively influenced the level of burnout of employees and increased employees' level of engagement. Hence, the presence of available job resources stimulates personal development and increases motivation, because "they remove obstacles at work" (Salanova et al., 2005, p. 1223).

Those resources on the one hand can include resources at the task level (performance feedback), the interpersonal level (peer support), and the organizational or supervisor level (e.g., supervisor feedback; Schneider, White, & Paul, 1998), but also include space, funds, support staff, time, supplies, and materials (Kanter, 1986; Spreitzer, 1996b). Adequate resources can instill the feeling that one is in control over his or her destiny (Spreitzer, 1996b), while a lack of the necessary resources may lead to a sense of powerlessness and dependency (Homans, 1958). In addition, resources foster self-efficacy and control over environmental possibilities (Bowen & Lawler, 1992; Gist & Mitchell, 1992). In Nonaka's (1988) system of "middle-updown management" the management decides about the strategic directives of the company. When this is done, each employee is empowered with the discretion to set time lines and allocate resources accordingly, which enhances their feelings of empowerment (Nonaka, 1988). Spreitzer (1996b) expands this view. She argues that it is not the access to

the resources that is important in shaping perceptions of empowerment, but that employees also need to be informed that those resources are available. Hence, it is the perceived access to resources that influences employees' levels of psychological empowerment (Spreitzer, 1996b). Through meta-analysis, Seibert et al. (2011) have established that socio-political support positively influences employees' levels of psychological empowerment. They define socio-political support as the degree that the work environment provides employees with material, social, and psychological resources. Also, hierarchy can influence the level of empowerment of employees (Avolio et al., 2004). In general, the higher employees are in the hierarchy, the more access to resources they have (Izraeli & Jick, 1975), and access to resources in turn positively influences employees' feelings of psychological empowerment (see e.g., Spreitzer, 1995a, Spreitzer, 1996b).

In light of the research conducted on the effects of resources and its relevance for psychological empowerment, the topic was discussed as a possible new construct with the academic experts mentioned above. These supported the notion that an increase in perceived access to resources at the project start could have an impact on levels of psychological empowerment during the same project. Furthermore, previously researchers emphasized the point that not only perceptions on the availability of physical resources affect levels of psychological empowerment, but also psychological resources (see e.g. Spreitzer, 1995a). Consequently, the researchers agreed that resources should be represented as two constructs: *psychological resources* and *tangible resources*.

4.2.3 An intervention in the context of empowerment

Research on interventions has a long standing history, and dates back as far as 100 years (Kluger & DeNisi, 1996). Interventions in this sense have found broad consideration in an organizational context in practice and research. Examples for such interventions are incentives as used in the Scanlon Plan (White, 1979), the change to flextime, and other work schedules (Nollen, 1982; Ronen, 1981), organization development (Nicholas, 1982), and management by objectives (Kondrasuk, 1981). These intervention efforts were by their nature structural interventions as they focused on changing structures, rules, and policies (Eylon & Bamberger, 2000).

Considering the motivational aspect of psychological empowerment, this research abstracts from those structural interventions. Instead, drawing on the definitions of Guzzo et al.

(1985) and Kluger and DeNisi (1996) an intervention can be defined as: *actions taken by (an) agent(s) to provide and share information*. The intervention has the aim to increase motivation (attitude) and performance (behavior) (Kluger & DeNisi, 1996). This works through a crowding-in effect which means that intrinsic motivation increases, when an external intervention emphasizes informing individuals as opposed to controlling them (Deci & Ryan, 1985a; Frey, 1997). This "informing" effectively strengthens one's perceived competence and feelings of control (Osterloh & Frey, 2000), two of the dimensions of psychological empowerment. Even if a lot of times, research on interventions – especially in clinical research – is at best inconclusive, "well-developed psychological, educational, and behavioral treatments [i.e., interventions] generally have meaningful positive effects on the intended outcome variables" (Lipsey & Wilson, 1993, p. 1199).

Again, based on the theoretical support towards motivational interventions, discussions with the academic experts mentioned above took place. These embraced the intervention approach as suitable for increasing levels of psychological empowerment. Agreement was reached that a tool should be used that is already sometimes employed during the early phases of new project: A *briefing* (Ericksen & Dyer, 2004).

4.2.4 Validation of new constructs with industry experts

During development, the constructs of psychological resources, tangible resources as well as briefing were also discussed with five industry experts. These were all working in R&D departments in different industries. This was an appropriate sample, since all participants were involved in project work either as a team leader or a team member, inferring that all had relevant experiences concerning the start of new projects. Also, projects are often important to project team members (Deci & Ryan, 2000b; Shepherd & Cardon, 2009; Shepherd et al., 2011) and high levels of motivation and commitment are an essential prerequisite for project (and thus organizational) success (Wolpert & Richards, 1997). Besides, “insights into understanding the management of technological innovation can be gained by the study of R&D professionals”, because managing R&D processes in a profitable manner is a desirable goal (Cardinal, 2001, p. 19). The industries covered by the interviews were Energy, IT Technology, Pharmaceutical Technology, Automotive, and Communication Technology, to reflect a broad range of industries. All interviewees were German, four out of five interviewees were male, three had a German University Diploma, one a PhD, and one was a professorial candi-

date ("Privatdozent"). Organizational tenure ranged from one to three years and relevant project experience from one up to 40 projects.

Interviews lasted between 10 and 25 minutes. They were semi-structured as described in Flick (2007) and Fontana and Frey (2008). The main advantage of semi-structured interviews is the ability to validate theories, while allowing the flexibility for exploratory findings. All of the interviews[23] started with a short overview of the whole interview, after which the interviewees were asked about their last project start, the performed activities, and accompanying feelings. The next question dealt with a "typical" project start in the interviewee's respective companies, followed by their idea of an "ideal" project start. If interviewees had difficulties to come up with a comprehensive explanation of project starts, they were triggered with the theorized factors of psychological and tangible resources as well as briefing. When elaborating on their experiences with project starts, the industry experts mostly elaborated on project briefings and associated procedures and content, as this was for them the most tangible topic. Yet, when triggered with the factors of psychological and tangible resources, they confirmed these as relevant or as one engineer from a large IT company said "you basically already have the relevant topics covered". The interviews were recorded and the transcripts totalled 15 pages. Further references to their statements will be made in the item generation section of this chapter.

4.3 Nomological network of the intervention

Having developed an initial idea about the relevant constructs for application at the start of a project, the next step was to theorize an initial nomological network to provide a basis for assessing construct validity (Clark & Watson, 1995). Figure 5 depicts a basic model summarizing how the three new constructs might be embedded in the existing nomological network of psychological empowerment (Seibert et al., 2011; Spreitzer, 1995a).

[23] As mentioned the interviews were part of a larger research project related to project transitions, so the project start was just part of the whole interview.

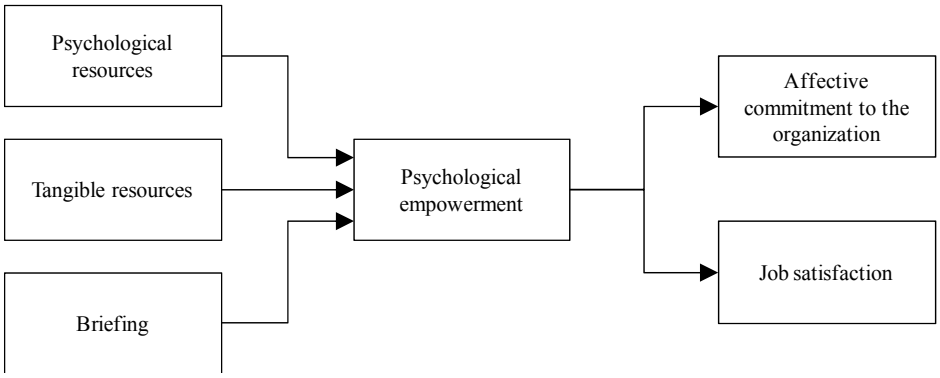

Figure 5: Model of the nomological network of start-of-project interventions

Although the three components should naturally be related – as they are all theorized to influence levels of psychological empowerment – for successful construct validation they need to reflect distinct components. So, discriminant validity between the measures needs to be established (Campbell & Fiske, 1959). Furthermore, Campbell and Fiske (1959) demand convergent validity for new measures. This implies that new measures are actually related to other measures with which they are theorized to be related. For each of the new constructs these are affective commitment to the organization and job satisfaction. But, since the interventions are set up so as to increase levels of psychological empowerment, this study theorizes that this mediates the relationship between the new constructs and the outcome variables. In the following sections, the definitions for the constructs of psychological and tangible resources as well as briefing will be derived, and the hypotheses towards the relationship within the existing nomological network of psychological empowerment will be put forward.

4.3.1 Psychological resources

The construct "psychological resources" is based on the perspective of self-determination theory (SDT), because SDT is a basic concept for human motivation, and "is concerned primarily with explicating the psychological processes that promote optimal functioning and health" (Deci & Ryan, 2000b, p. 262; Shepherd & Cardon, 2009). Through this mechanism it has been found to increase levels of job satisfaction (Ilardi, Leone, Kasser, & Ryan, 1993) and commitment (Sheldon & Bettencourt, 2002), as well as improve work-related outcomes (Baard, Deci, & Ryan, 2004), making it a plausible factor for affecting an individual's motivational process such as psychological empowerment (Conger & Kanungo, 1988).

There is general agreement in the literature that within SDT three basic needs can be distinguished: the need for autonomy, competence, and relatedness (Deci & Ryan, 2008). "First,

the need for autonomy represents individuals' inherent desire to feel volitional and to experience a sense of choice and psychological freedom when carrying out an activity" (van den Broeck, Vansteenkiste, Witte, Soenens, & Lens, 2010, p. 982). One can argue, that the perception that the need for autonomy will be satisfied has significant overlap with Spreitzer's (1995a) dimension of self-determination. As a reminder, self-determination represents "one's sense of autonomy or control over immediate work behaviors […]". Second, the need for competence is defined as individuals' inherent desire to feel effective in interacting with the environment" (van den Broeck et al., 2010, p. 982), compared to Spreitzer's dimension of competence, which refers to "the belief individuals hold regarding their capability to skillfully perform their work activities". This study argues that, if at the beginning of the new project employees perceive that they will be able to perform in the new project and thus be competent, they will experience higher levels of empowerment, because trust regarding their competences for the new project is established. Third, the need for relatedness is defined "as individuals' inherent propensity to feel connected to others, that is, to be a member of a group[24], to love and care and be loved and cared for" (van den Broeck et al., 2010, p. 982). For relatedness, the connection to psychological empowerment is not as compelling as for competence and autonomy. However, it has been theorized (Maynard et al., 2012) that the existence of fault lines might have a negative impact on team empowerment, which in turn influences individual psychological empowerment (Seibert et al., 2004; Seibert et al., 2011). Fault lines are hypothetical dividing lines that split a group into relatively homogenous subgroups. These subgroups might be potentially competing (Bezrukova, Jehn, Zanutto, & Thatcher, 2009), which could limit an employee's impact in his group. So it stands to reason, that a high satisfaction of the need for relatedness (i.e., the project team is connected and one 'group') hints at the absence of such fault lines which in turn might be an indicator of higher levels of empowerment.

Summarizing, for the present research investigating their effect on levels of psychological empowerment, psychological resources shall be defined as

[24] Following previous research on teams and small groups (Chen & Kanfer, 2006; Cohen & Bailey, 1997; Breugst, 2011) this thesis does not make an explicit distinction between teams and groups, but rather treats both terms as synonyms.

Psychological Resources: *The perception of employees at the start of a new project that this will satisfy their basic needs for autonomy, competence, and relatedness. This can be either achieved internally by getting satisfaction from project-related tasks or externally by receiving emotional support from others.*

As described above, the connection between psychological resources based on self-determination theory and the dimensions of psychological empowerment is strong. Thus,

Hypothesis 1: The higher the perceived level of psychological resources at the start of a project, the higher employees' level of psychological empowerment during that project.

In addition, self-determination theory proposes (Deci & Ryan, 2000b; Gagné & Deci, 2005; Vallerand, 2000) and has been found (see e.g., Ilardi et al., 1993; Sheldon & Bettencourt, 2002) to enhance affective outcomes such as affective commitment and job satisfaction. Thus,

Hypothesis 2a: The higher the perceived level of psychological resources at the start of a project, the higher employees' level of affective commitment to the organization during that project.

Hypothesis 2b: The higher the perceived level of psychological resources at the start of a project, the higher employees' level of job satisfaction during that project.

4.3.2 Tangible resources

The relevance of the construct "tangible resources" for affecting employees' levels of psychological empowerment can be directly deduced from Spreitzer's (1995a; 1996b) earlier works. There, access to (organizational) resources was found to have a positive effect on levels of psychological empowerment, which could be validated on multiple occasions (see Maynard et al., 2012; Seibert et al., 2011). The motivational aspects of organizational resources in the work place have also been in focus of research on work engagement (an affective state) and performance (Salanova et al., 2005) as well as flow experiences at work (Salanova, Bakker, & Llorens, 2006), providing justification for developing a construct around the concept of resources to affect psychological empowerment at the start of a new R&D project.

This notion of tangible resources and their effects on empowerment goes back on Kanter who argued that "[Access to organizational resources] means more general managers working through smaller business units; more project teams that have budgets; special resource pools of unallocated funds that people can tap to solve problems. In short, they make it easier for people to tap locally what they need to get things done" (1986, p. 6). Lacking those resources can lead to dependency (Homans, 1958) whereas having access leads to increased self-efficacy and perceptions of control over external contingencies (Bowen & Lawler, 1992; Gist & Mitchell, 1992). Moreover, job resources refer to those physical, psychological, social, or organizational aspects of the job that may do any of the following: (a) be functional in achieving work goals; (b) reduce job demands at the associated physiological and psychological costs; (c) stimulate personal growth and development" (Demerouti et al., 2001, p. 501), another hint at the positive influence on levels of psychological empowerment.

The importance of resources at the project start is further underlined by statements from the interviewed industry experts when asked about resource availability. For example, one (Communication technology industry) said that: "It could have been better" and that "the team didn't have enough experience and the resource of time was very scarce". In addition, one engineer of an automotive company generally emphasized the importance of resources by saying: "Although resources were provided, for such topics you can never have enough". Accordingly, in this study tangible resources shall be defined as

> ***Tangible resources:*** *The perceptions of employees at the project start of their access to all the resources necessary to fulfill their tasks and contribute to a successful project.*

Also, in light of the evidence of the positive effects of resources on psychological empowerment (Maynard et al., 2012; Spreitzer, 1996b) and affective states (Salanova et al., 2005; Seibert, Kraimer, & Liden, 2001), the following hypotheses towards the nomological network of the interventions are introduced:

> *Hypothesis 3: The higher the perceived level of tangible resources at the project start, the higher employees' level of psychological empowerment during that project.*

Hypothesis 4a: The higher the perceived level of tangible resources at the project start, the higher employees' level of affective commitment to the organization during that project.

Hypothesis 4b: The higher the perceived level of tangible resources at the project start, the higher employees' level of job satisfaction during that project.

4.3.3 Briefing

Project briefings and the briefing process remain a research gap in the literature. Many papers focus on construction projects[25], be it for hospitals (Chandra & Loosemoore, 2011), schools, offices, or retail centers (Barrett, Hudson, & Stanley, 1999). Those briefings, however, are described as "the process of identifying and articulating client requirements in the early design process of a construction project" (Yu, Shen, Kelly, & Hunter, 2007, p. 198). Although, this is relevant for the context of R&D projects as well, it does not fit the focus of an intervention for employees, which aims to increase their psychological empowerment.

Surveying the project management literature, the purpose of briefings has a two-fold explanation. First, it is described as a knowledge management concept (see e.g., Du Plessis, 2007; Hoegl & Schulze, 2005) wherein "experienced employees pass on their knowledge and experiences from prior projects to team members of the current project or the newly-begun project" (Hoegl & Schulze, 2005, p. 268). Second, a briefing's purpose is stated to be task-related, i.e., jointly (managers and employees) setting project goals and timelines (Barczak, McDonough, & Athanassiou, 2006). Neither of these briefings are relevant for the purpose of this study. In addition, knowledge-management did not fit the study's purpose, because psychological empowerment has been found to be an antecedent of it (Bhatt, 2001). Jointly performing activities and tasks did also not fit the aim of intervention context, since by doing so the manager or project leader effectively transfers authority and responsibility to employees which is categorized as structural and not psychological empowerment (Kanter, 1977 as cited in Maynard et al., 2012; Conger & Kanungo, 1988).

To date, the only research effort linking briefings to motivation is Harborne and Johne's (2003) study. In this study, product innovation projects in financial services businesses were

[25] For a more detailed overview, see Barrett, Hudson, and Stanley (1999) or Smith, Kenley, and Wyatt (1998)

analyzed with a focus on motivational factors distinguishing high performing from low performing projects. This approach best fits the psychological empowerment context as psychological empowerment is based on the motivational frameworks of the job characteristics model and self-efficacy (Bandura, 1982; Hackman, 1987; Hackman & Oldham, 1980). Harborne and Johne (2003) found that in successful projects, project leaders that performed briefings had an enabling style, and were described as facilitators. Besides, briefings were used to "buil[d] expectations and perceptions of the development team" (2003, p. 124). Concluding their study, Harborne and Johne (2003) promote the use of informal communication with project leaders and team members to form a clear vision. This (1) facilitates the clarification of the nature of work, (2) encourages team members to use their professional and team working skills, and (3) sets a clear focus on support and rewards towards the final goal of the project. This needs to be transferred to the dimensions of psychological empowerment. Clarification of the nature of work adds to the meaning dimension of psychological empowerment. Encouraging the employment of skills enhances feelings of competence, and establishing a focus on support heightens expectations of impact of the employee.

Indications of the positive effect of a briefing on employees' levels of psychological empowerment and its importance to R&D project professionals were further strengthened by expert interviews. For example, when asked about their project starts interviewees said: "More elaborate discussions would have been helpful" (IT engineer technological company), "the amount of help by management strongly depends on project size" (engineer pharmaceutical company), "I felt comfortable, I got the support I needed, and nobody exerted pressure on me. I hope it will be the same in my next project" (engineer pharmaceutical packaging") or "some colleagues take you by the hand, while others just dump some documents on you" (IT engineer technological company). Industry experts were asked if the project start they described was typical. The most striking answers were, "Yes, out of one project into the next and then eat or die" (engineer automotive) or "There is nothing worse than having the impression, that there exists information on project management level, that has not been forwarded to employees" (planning engineer energy). These statements all indicate that the idea of a thorough briefing is highly relevant and often underutilized. Thus, it appears that briefings are treated differently across companies, and even across managers or project leaders within the same company, although there is evidence that a well done briefing including motivational aspects has positive effects on employees and ultimately project outcomes. Consequently, for the course of this study a briefing shall be defined as:

Briefing: *The degree to which employees feel that their project leader or management at the start of a project enabled them to perform well and complete their tasks during the upcoming project.*

The definition of briefing is founded on Conger and Kanungo's (1988) line of thought. They argue that for organizational practices to be empowering, these must provide informational cues that enhance effort-performance expectancies (Lawler, 1973) or feelings of self-efficacy (Bandura, 1989). Looking at the linkages between briefings and psychological empowerment, Harborne and Johne (2003) additionally found that in more successful projects where briefings were utilized, employees had higher levels of empowerment. This leads to the next hypothesis.

Hypothesis 5: The higher the perceived level of briefing at the project start, the higher employees' level of psychological empowerment during that project.

Again, since research on briefings described in this fashion is scarce, the connection between briefing and affective commitment to the organization and job satisfaction is not clearly evident. However, Kooij et al. (2010) in a meta-analysis of high commitment HR practices found that based on theories of social exchange (Eisenberger, Huntington, Hutchison, & Sowa, 1986; Wayne, Shore, & Liden, 1997) and signaling (Casper & Harris, 2008) the practices of participation and information sharing are positively related to both affective states. Since information sharing and participation are both part of the briefing process as outlined above, one would expect a positive relationship between briefing and affective commitment and job satisfaction. This concurs with early conceptions of affective commitment, which theorized and found that employees' perceptions of role clarity and goal clarity, as well as management receptiveness to employee suggestions, were positively related to affective states (Allen & Meyer, 1990). Consequently,

Hypothesis 6a: The higher the perceived level of briefing at the project start, the higher employees' level of affective commitment to the organization during that project.

Hypothesis 6b: The higher the perceived level of briefing at the project start, the higher employees' level of job satisfaction during that project.

4.3.4 Psychological empowerment as a mediator

Following the definitions of the new constructs of psychological resources, tangible resources, and briefing and providing theoretical grounds towards their correlation with psychological empowerment; further hypotheses for testing convergent validity are provided. As can be seen in the nomological framework depicted in Figure 5, psychological empowerment is said to be related to affective commitment to the organization and job satisfaction. Both relationships have been proven many times over (see e.g., Avolio et al., 2004; Bogler & Somech, 2004 for commitment; Liden et al., 2000; Seibert et al., 2004 for job satisfaction). Thus,

Hypothesis 7a: The level of psychological empowerment is positively related to the level of affective commitment to the organization of an individual.

Hypothesis 7b: The level of psychological empowerment is positively related to the level of job satisfaction of an individual.

Previous research on psychological empowerment views it as a mechanism through which contextual factors influence employees' attitudes and behaviors (Conger & Kanungo, 1988; Spreitzer, 1995a). It is a set of cognitions that is formed by the work environment (Thomas & Velthouse, 1990). It is not an organizational intervention but a cognitive state (Maynard et al., 2012). This is a process in the organism which transforms stimuli into outputs (Baron & Kenny, 1986). Psychological empowerment is one such mediating process (Seibert et al., 2004). Moreover, psychological empowerment has been theorized and shown to act as a mediator on the outcome variables of affective commitment and job satisfaction (Laschinger, Finegan, Shamian, & Wilk, 2001; Spreitzer, 1995a). It should therefore mediate the direct relationships between the stimuli of psychological resources, tangible resources and briefing to the output variables of affective commitment to the organization and job satisfaction. Thus,

Hypothesis 8a/b: Psychological empowerment will (partially) mediate the relationship between psychological resources and affective commitment to the organization / job satisfaction.

Hypothesis 9a/b: Psychological empowerment will (partially) mediate the relationship between tangible resources and affective commitment to the organization / job satisfaction.

Hypothesis 10a/b: Psychological empowerment will (partially) mediate a direct relationship between briefing and affective commitment to the organization / job satisfaction.

These predictions represent an initial nomological network for the new constructs supporting the establishment of discriminant, convergent and criterion-related (or nomological) validity for the three new constructs (Clark & Watson, 1995; Hinkin, 1998; Smith & McCarthy, 1995). In Figure 6, an overview of the theorized hypotheses is provided. The left hand side depicts the direct relationships between the three new intervention constructs and both outcomes of affective organizational commitment and job satisfaction. The right hand side illustrates the final nomological net, where psychological empowerment is depicted as a mediator of the left-hand side relationships.

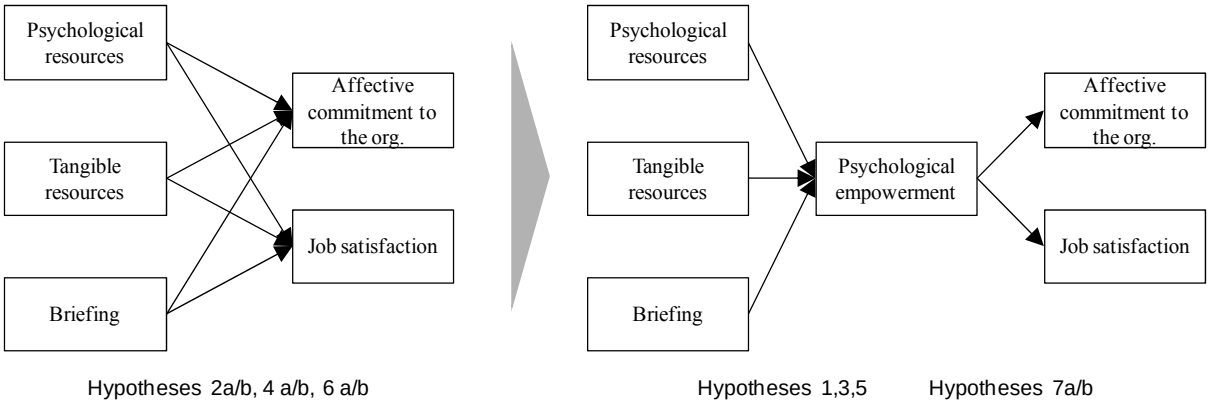

Figure 6: Overview of hypotheses

To clarify, the respective hypotheses are written below the arrows indicating them and the mediation hypotheses 8-10 are omitted.

To successfully provide evidence towards construct validity, later analysis will test two main suppositions: (1) Are the three intervention scales statistically significantly related to psychological empowerment? (2) Does psychological empowerment mediate the relationships between the three interventions and the two outcome variables? All of the hypothesized relationships are likely to involve reciprocal effects. This echoes Bandura's (1989) three-way

reciprocal determinism. In this study, external environment, cognitive factors, and behaviors are perceived to be mutually reinforcing. The nomological network in this study is set up so as to reflect the strongest causalities between the constructs, but future longitudinal research is needed to resolve the reciprocal relationships.

4.4 Scale development

4.4.1 Procedure

For the three new scales, the rigorous and much applied development process outlined in Churchill (1979), Hinkin (1998), and Netemeyer et al. (2003) was applied. For generation of all items extensive literature reviews were performed. If these reviews revealed items that could be employed for the new constructs, they were adopted to the context of the project start and industry R&D employees. If not, then the literature review served as the basis for discussion with one American and one German professor, who put forward their expert knowledge in the field. All items were set up in a seven-point Likert-type scale format with answers ranging from one "totally disagree" to seven "totally agree". After this initial effort there were 13 items for psychological resources, 13 items for tangible resources, and eight items for the briefing scale.

Thereafter, the initial items were discussed with the five industry experts[26] to explore relevance and understandability. They were also asked if they had any items to add to the existing list. The industry experts fully confirmed the theorized constructs as relevant in the context of a project start in a R&D environment, and additional items could be created from their experiences. Afterwards, the item lists and the corresponding definitions were distributed to a larger group of scientists. This consisted of two German and one American professor, two German professorial candidates as experts in innovation and psychology, and four German PhD students focusing their doctoral thesis on related topics. They reviewed the items in comparison to the theoretical definitions provided to determine their initial validity (Anderson & Gerbing, 1991). When additional clarification of a theoretical definition was needed (e.g., what is considered a psychological resource vs. a tangible resource), the issues were discussed in order to clarify the concepts or make a judgment on the items. The results of

[26] As described in 4.2.4

these discussions were then distributed to the other experts to incorporate in their judgment. The experts were instructed to keep only those items that they believed accurately and sufficiently tapped only the core construct to which they had been tentatively assigned. In addition, experts were asked to come up with additional items that they thought might be relevant for the construct. Throughout this process, minor changes were made to some of the items to better align phrasing within each of the theorized scales. At large, all items were deemed adequate for the construct they were intended to measure, and one single item was added to the psychological resources dimension. However, one can never be absolutely sure, if content validity is given, but all steps towards "content adequacy" as elaborated upon by Schriesheim et al. (1993) were strictly followed.

4.4.2 Item Generation

Following Clark and Watson's (1995) study, the initial item pool should be broader than one's own theoretical view of the target construct and should include content that will ultimately be shown to be tangential or even unrelated to the core construct. This was reflected in the item list used for pre-testing the new scales, which in the end comprised 41 items, 15 for psychological resources, 13 items for tangible resources and 13 items for briefing. All items of the three scales were anchored with "Please answer the following questions with respect to the transition from your last project to your current project" to ensure that participants answers reflect their feelings at the start of the project[27].

4.4.2.1 PSYCHOLOGICAL RESOURCES

For the scales measuring psychological resources, the perspective of self-determination theory (SDT) was adopted, because SDT "is concerned primarily with explicating the psychological processes that promote optimal functioning and health" (Deci & Ryan, 2000b, p. 262; Shepherd & Cardon, 2009). The items for psychological resources were derived from Vlachopoulos and Michailidou's (2006) "basic psychological needs in exercise scale" and van

[27] The anchor was chosen to reflect the overall research project of the "Project Success Panel", so as to include the whole transition period including the project end of the last project and the project start of the new project. The anchor was discussed with the two professors supporting the research project and reviewed by nine other researchers all having experience with psychometric scales. It was deemed adequate to reflect the project start for the purpose of this thesis.

den Broeck et al. (2010) "work-related basic need satisfaction scale". These scales were thoroughly reviewed for use in a start-of-project setting and adopted accordingly. Items were framed with "Management and/or organization make me feel,..." and exemplary items were "… that I will be able to execute the new project's tasks very effectively", "… that when working on this new project I will have the freedom to experiment", and "… that there will be open channels of communication between team members" respectively. Through this approach, 13 items were created for the psychological resources scale. Discussions with other researchers as well as the interviews with industry experts – as described earlier – each yielded one additional item, making up the total of 15 items for psychological resources used in the pre-test questionnaire. Table 7 provides an overview of all items for scale refinement and validation.

Scale	Item	Description
Psychological Resources[a]	P1	...that there will be open channels of communication between team members
	P2	...that I will be very much at ease with the other team members
	P3	...that I will become connected to the project team
	P4	...that I will become very comfortable with the other members of the new project team
	P5	…that I will make a substantial contribution towards progressing the new project
	P6	…that I will have the opportunity to make choices with respect to how the new project is undertaken
	P7	…that this type of project's tasks is one that I can do very well
	P8	…that I will learn new skills important for project success
	P9	…that I will have control over the direction of the new project
	P10	…that I will be able to execute the new project's tasks very effectively
	P11	...that when working on this new project I will have the freedom to experiment
	P12	…that my experiences with this new project will serve me well in the future
	P13	…that I will I have a say over the way that I perform my role in the new project
	P14	…that I will be able to apply my experiences from old projects in the new project
	P15	…that my organization – if necessary – will support me during the new project

[a] Item prefix is: "Management and/or organization makes me feel, …;
Note: Items P1-P13 were derived either directly from literature or from initial discussions based on literature; Item P14 was generated during academic item review with 9 academic experts; Item P15 was generated based on the interviews with industry experts

Table 7: Complete list of items of psychological resources scale before scale refinement and validation

4.4.2.2 TANGIBLE RESOURCES

Items for the tangible resources scale where mainly derived from two research streams. First, to expand the space of possible resources, Barney's (1991) resource-based view was taken into account. There, he conceptualizes three types of resources likely to create competitive advantage: physical capital resources, human capital resources and organizational capital resources – mentioning multiple examples per type of resource. In addition, Spreitzer's (1996) original examples of funds, material, space, and time were integrated into the scale development efforts. Both perspectives were carefully contrasted and adapted to the level of a

single project, and 13 items were created accordingly. Ultimately in the questionnaire, participants were asked, if their organization provided them with the resources they needed for the new project. Exemplary items were "There is considerable management support to give this project a strong chance of being successful" or "I feel that we have a team with the necessary experience to perform well at this project". No major revisions or additions to the 13 items making up the tangible resources scale were made by the academic experts. The industry experts that were interviewed had a similar opinion, as a successful project start should "ideally contain all things you already have in your questionnaire" (engineer IT company) as one of the experts said during the interview. Table 8 provides an overview of all items generated for the tangible resources scale for scale refinement and validation.

Scale	Item	Description
Tangible resources	T1	Management have assigned the "right" team members to the project to allow it perform well
	T2	I feel that we have a team with the necessary skills to perform well at this project
	T3	I feel that we have a team with the necessary experience to perform well at this project
	T4	I feel that we have a team with the necessary knowledge to perform well at this project
	T5	The team has the financial resources necessary to make the new project a success
	T6	There is considerable management support to give this project a strong chance of being successful
	T7	I feel that when additional resources are needed they will be provided
	T8	The team has access to all the resources it needs to make this project a success
	T9	I feel that that there is a strong network that the team can draw on to advance the project
	T10	Sufficient money has been allocated to pursue this project
	T11	I believe that this project is very important to management
	T12	I feel that we have had sufficient time to lay a solid foundation for the new project
	T13	We have the time necessary to make this project a success

Note: Items T1-T13 were derived either directly from literature or from initial discussions based on literature

Table 8: Complete list of items of tangible resources scale before scale refinement and validation

4.4.2.3 BRIEFING

In the scale assessing the briefing construct, participants were asked how their entry into the new project had been. These items are shown in Table 9.

Harborne and Johne (2003) explicitly pointed out how important a briefing is for explaining the type of tasks needed and instilling confidence in employees. Therefore, items were developed accordingly. An exemplary item was "After an exchange of ideas about the project with management, I felt I knew what was expected of me". The initial item pool for the briefing scale contained eight items, with the academic experts only having minor revisions regarding wording and clarity of the items. The industry experts felt – while completely agreeing with the existing items – that a good briefing should include aspects of information, documents, and an overview of the project environment as well as the discussion of success factors and relevant experiences from old projects. As such, five more items were added to fully reflect this, bringing the total to thirteen items for use in the pre-test questionnaire.

Scale	Item	Description
Briefing	B1	I had all important information to prepare myself for the new project
	B2	I feel that managers told me all I needed to know about my role in the new project
	B3	I felt that there was clear communication about the nature of the tasks required of me by the new project
	B4	After an exchange of ideas about the project with management (manager/supervisor), I felt I knew what was expected of me
	B5	Management has given me a good overview about the environment of the new project
	B6	There were meeting(s) amongst team members that discussed the transition "into" the new project
	B7	Managers discussed the reasons behind why people were selected for the current project
	B8	There were dedicated meetings to "set the scene" for the new project
	B9	There was an open discussion about the goals for the current project
	B10	There were meeting(s) to discuss the relevant experiences from old projects for the new project
	B11	The organization took formal steps to brief me about the project
	B12	I had all important documents to prepare myself for the new project
	B13	There were meeting(s) that discussed important success factors for the new project

Note: Items B1, B5, B10, B12, and B13 were generated based on the interviews with industry experts; All other items stem from literature or from initial discussions based on literature

Table 9: Complete list of items of briefing scale before scale refinement and validation

4.5 Samples used for scale refinement and validation

For this scale development effort both samples included in this thesis were used. For pretesting and initial refinement of the new scales, sample 1 containing the academic researchers of the Technische Universität München was used. For final refinement and validation this study drew upon the second sample containing R&D managers and employees. These samples were appropriate because all participants were involved in project work so could dwell on relevant experiences concerning the start of new projects. Also, the importance of these projects was given, and as already stated above, research into R&D processes supports a desirable goal (Cardinal, 2001). For information on both samples including their descriptive statistics please refer to chapter 3 of this thesis.

4.6 Results of scale development

4.6.1 Measurement model and fit of developed scales

Confirmatory factor analysis (CFA) was applied to confirm the validity of the measurement models of the newly to develop psychological resources, tangible resources, and briefing scales. An initial CFA was performed to reduce the number of items and examine the validity and a second one to finalize the new scales and confirm the results, thus following Hinkin's (1998) approach for measure development. For the initial CFA, the analysis was conducted with the sample of 274 university researchers to test the fit of the proposed models. This number exceeded the recommended required threshold of five to ten samples per item (Anderson & Gerbing, 1991; Hinkin, 1998). For all analysis concerning linear equation modeling (LEM), IBM SPSS Amos 20.0.0 (Amos) was used. Since results in scale development with Amos could potentially be slightly different compared to other LEM programs due to rounding (Clayton, 2008), one American assistant professor cross-validated the results using LISREL 8.80 (Jöreskog & Sörbom, 2006). Both programs yielded the same results. Amos was supplied with raw data as inputs and maximum likelihood as model estimation technique, because this holds a lot of advantages including only minimal requirements of distributional assumptions (Myung, 2003). Skewness for all items ranged from -1.228 to .112 for the university sample and from −1.289 to −.245 for the industry sample. For kurtosis the values were −1.153 to 1.425 and −.671 to 1.520 respectively, thus all values were lying within the acceptable range of −2 to +2 (as used e.g., by Shepherd et al., 2011). All skewness and kurtosis values of the final items are shown in Table 10.

First, using IBM SPSS 20 (SPSS) an exploratory factor analysis[28] (EFA) was conducted with principal component analysis and varimax rotation on the first sample (the university researchers) to confirm the three theorized factors. Although all items loaded on their respective factors, two items of the personal resources scale that had unacceptably high cross-loadings (above 0.4) were eliminated before further analysis. Afterwards a CFA using Amos was performed, with all items associated with one construct loading on that construct. In this process, items with the lowest completely standardized factor loads were step-wisely elimi-

[28] Note that the Kaiser-Meyer-Olkin measure of sampling adequacy was .939 and Bartlett's test of sphericity had a significance of .000 both indicating that an EFA would produce meaningful results.

nated, thus improving model fit. This procedure (following Hinkin, 1998) was thoroughly followed, until the number of items for each of the scales was reduced to six items. Although this did not satisfy all goodness-of-fit indices for the tangible resources scale, this approach was used to allow for further refinement with the industry sample and satisfy the minimum items-to-construct ratio of at least 3:1 (Anderson & Gerbing, 1991; Hinkin, 1998).

After collecting the results of the industry sample, a further CFA was done to finalize the new scales. Once more, the items with the lowest completely standardized factor loads were step-wisely eliminated, until a satisfactory model fit was reached. All constructs were modeled as first-order factor models with the items corresponding to each construct as reflective indicators. As illustrated in Table 10, both the psychological and the tangible resources scale each comprise four items whereas the briefing scale consists of five. For final confirmation, CFA's were performed with the final scales on both samples resulting in consistently high standardized factor loadings above 0.7 as proposed in the literature (Fornell & Larcker, 1981). The only exception is item P3, which has a standardized factor loading of only .69 for sample 1. It should be noted, however, that this increased to .83 for sample 2.

		Sample 1			Sample 2		
Dimension	Item	Skewness	Kurtosis	Factor Loading	Skewness	Kurtosis	Factor Loading
Psychological Resources	P1	-0.90	0.22	0.72	-1.25	1.52	0.76
	P2	-1.12	1.24	0.78	-0.96	0.61	0.85
	P3	-0.80	0.40	0.69	-0.75	-0.12	0.83
	P4	-0.61	0.29	0.81	-0.79	0.33	0.88
Tangible Resources	T1	-0.79	0.44	0,74	-1.07	1.16	0.80
	T2	-0.85	0.50	0,84	-0.99	0.67	0.76
	T3	-0.61	-0.09	0,86	-1.17	1.28	0.97
	T4	-0.86	0.62	0,91	-1.29	1.35	0.89
Briefing	B1	-0.47	-0.70	0.81	-0.40	-0.27	0.75
	B2	-0.55	-0.59	0.88	-0.69	-0.15	0.88
	B3	-0.34	-0.95	0.84	-0.47	-0.57	0.87
	B4	-0.69	-0.10	0.76	-0.83	0.54	0.87
	B5	-0.53	-0.63	0.74	-0.59	-0.34	0.76

Table 10: Skewness, kurtosis, and factor structures of new scales

In Table 11, the final scale dimensions including their items are listed. Internal consistency as approximated through Cronbach alpha reliabilities are all well above the 0.7 threshold for both samples (Cronbach, 1951), with all but the psychological resources scale (and this

only for the pre-test) being consistently in the 0.9 ranges, hinting at a high internal consistency of the scales (Nunnally & Bernstein, 1994). Values of this magnitude might also have been achieved, if items were duplicates of each other (Cortina, 1993; Streiner, 2003). However, since the scales underwent the rigorous process of review by academic and industry experts and also looking at the final items, this is highly unlikely. In fact, as can be seen in 4.4.2, more items were included in the surveys than were retained for the final scales. Clark and Watson (1995) and Hinkin (1998) argued that the initial item pool should include more items than will be retained for the final scales with Hinkin recommending, that "at least twice as many items as will be needed in the final scales should be generated to be administered in a survey questionnaire" (1998, p. 109).

Scale	Item	Description	Alpha Sample 1[b]	Alpha Sample 2[c]
Psychological Resources[a]	P1	...that there will be open channels of communication between team members	0.84	0.90
	P2	...that I will be very much at ease with the other team members		
	P3	...that I will become connected to the project team		
	P4	...that I will become very comfortable with the other members of the new project team		
Tangible Resources	T1	Management have assigned the "right" team members to the project to allow it perform well	0.90	0.92
	T2	I feel that we have a team with the necessary skills to perform well at this project		
	T3	I feel that we have a team with the necessary experience to perform well at this project		
	T4	I feel that we have a team with the necessary knowledge to perform well at this project		
Briefing	B1	I had all important information to prepare myself for the new project	0.90	0.92
	B2	I feel that managers told me all I needed to know about my role in the new project		
	B3	I felt that there was clear communication about the nature of the tasks required of me by the new project		
	B4	After an exchange of ideas about the project with management (manager/supervisor), I felt I knew what was expected of me		
	B5	Management has given me a good overview about the environment of the new project		

[a] Item prefix is: "Management makes me feel, …; [b] n=274; [c] n=152

Table 11: Final scale dimensions, items, and reliabilities

To further solidify the evidence towards the theorized and specified models, several fit indices were computed for both data sets. There has been a considerable amount of effort and discussion about the appropriate choice and cut-off values for fit indices (see e.g., Bollen, 1986; Fan, Thompson, & Wang, 1999; Hu & Bentler, 1999). Fit indices were selected to achieve a balance between parsimony and rigor, as including "every index included in the program's output […] will burden both a reader and a reviewer" (Hooper, Coughlan, & Mullen, 2008, p. 56). Chosen fit indices were the chi-square to degrees of freedom ratio (Wheaton, Muthen, Alwin, & Summers, 1977 as cited by Hooper et al., 2008), the standardized root mean square residual (SRMR)[29], the goodness-of-fit index (GFI; Jöreskog & Sörbom, 1986), the normed fit index (NFI) and non- normed fit index (NNFI; Bentler & Bonett, 1980), the comparative fit index (CFI) and the incremental fit index (IFI) both from Bentler (1990). As is good practice, cut-off values were chosen before doing the analysis and taken from the overview provided by Hooper et al. (2008). Thus, cut-off values were set to five for the chi-square to degrees of freedom ratio (Wheaton et al., 1977), 0.08 for the SRMR, and 0.95 for all other fit indices as recommended by the strict standards of Hu and Bentler (1999) in their rigorous analysis of the classical "rule of thumb" cut-off criteria.

As can be seen in Table 12, data from both samples strongly indicated that the models for both the psychological resources as well as the briefing scale showed an excellent fit, since all computed fit indices met or exceeded their cut-off values. Only the tangible resources scale failed to meet its cut-off for the chi-square to degrees of freedom ratio (6.5/6.09 for sample one and two with the cut-off at 5.00) and the NNFI (0.94 for sample 2 with a cut-off point of 0.95 but right on the cut-off for sample 1). This might provide a hint for model misspecification, since researches recommend the inclusion of multiple fit indices simultaneously (Crowley & Xitao Fan, 1997). However, the following reasons still indicate a reasonable, if not good model fit. First, Fan et al. (1999) analyzed the sensitivity of several fit indices to sample size and model misspecification and discovered the chi-square to degrees of freedom ratio, the NNFI, and the GFI are especially likely to reject true models for smaller samples[30] as seen in this study. Second, Hu and Bentler (1999) proposed and evaluated combinations of

[29] The SRMR is defined as the square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model.

[30] They defined small as being equal or below 500. In addition they found the GFI and NFI to be dependent on sample size, with CFI and IFI not susceptible to it.

fit indices and the associated likelihood of type I and type II error using a simulation approach. They found out that a combination of a CFI bigger than 0.96 and SRMR below 0.09 (0.99/0.98 and 0.02/0.3 for the tangible resources scale in sample one and two respectively) indicates that the sum of type I and II errors for simple models (as the first-order CFAs are) is only 2.0 percent[31]. So there is considerable evidence that the likelihood of misspecification of the tangible resources scale is small and that both indices that do not meet the stringent cut-off values yet, but should do so when applied to bigger samples in the future.

Variable	$\chi 2$	df	$\chi 2$/df	SRMR	GFI	NFI	NNFI	CFI	IFI
Psychological Resources									
Sample 1	0.92	2	0.46	0.01	1.00	1.00	1.01	1.00	0,97
Sample 2	3.88	2	1.94	0.02	0.99	0.99	0.98	1.00	0,96
Tangible Resources									
Sample 1	13.00	2	6.50	0.02	0.98	0.98	0.95	0.99	1,00
Sample 2	12.17	2	6.09	0.03	0.96	0.98	0.94	0.98	1,00
Briefing									
Sample 1	8.63	5	1.73	0.02	0.99	0.99	0.99	1.00	0,99
Sample 2	5.27	5	1.05	0.02	0.99	0.99	1.00	1.00	0,98
Cut-Off values			5.00	0.08	0.95	0.95	0.95	0.95	0.95

Table 12: Model fit indices including cut-off values

In summary, there is sufficient evidence that the theorized scales of psychological and tangible resources as well as briefing have a high internal validity, as examined by internal consistency via Cronbach alpha, as well as a more than solid model fit as determined by their consistently high factor loadings and model fit indices.

4.6.2 Convergent, criterion-related, and discriminant validity, and social desirability

Although the process of scale development, as described by Hinkin (1998), relatively assures content validity and internal consistency, he recommends additional statistical tests to ratify validity. To confirm convergent validity, the newly developed scales should be related to scales that were developed to measure similar perceptions (Mowday, Steers, & Porter, 1979). Since no similar or comparable measure for the three constructs of psychological re-

[31] This value was derived under robustness conditions, which means that the factors and errors and hence measured variables are multivariate normally distributed. The N in their simulation was 150. For further information see Hu and Bentler (1999)

sources, tangible resources, and briefing at project start existed, criterion-related validity was relied upon because "a necessary condition for a construct to be scientifically admissible is that it occur in a nomological net" (Cronbach & Meehl, 1955, p. 290). Thus, to establish criterion-related validity, the new scales should have a statistically significant correlation with the constructs they were designed to influence. These are – as hypothesized in 4.3 – affective commitment to the organization, job satisfaction, and psychological empowerment; the latter acting as a mediator between the three new constructs and the two attitudinal outcome variables.

Assessing sample one (see Table 13), the correlations of the three constructs with the affective commitment scale were all significant at the .01 level with correlations[32] being .35 for psychological resources, .25 for tangible resources and .37 for briefing, thus validating hypotheses 2a, 4a, and 6a. This could be further solidified when analyzing the correlations of the second sample as shown in Table 14. Here, again correlation with affective commitment was highly significant ($p < .01$) with correlation coefficients being .22 for psychological resources, .25 for tangible resources and .29 for briefing (again validating hypotheses 2a, 4a, and 6a). Although not as highly correlated, correlations with job satisfaction in sample one were satisfactory for psychological resources ($r_s = .15$; $p < .10$), tangible resources ($r_s = .33$; $p < .01$), and briefing ($r_s = .21$; $p < .05$), thus providing initial evidence for hypothesis 2b, 4b, and 6b. Next assessing sample two (see Table 14); for job satisfaction, the correlation with psychological resources is marginally significant ($r_s = .15$; $p < .10$), with tangible resources highly significant ($r_s = .33$; $p < .01$), and with briefing significant at the 5 percent level ($r_s = .21$; $p < .05$). Again employing sample two, the zero-order correlations provide evidence for the link between the new scales and psychological empowerment. All three correlations are highly significant ($p < .01$) with correlations being .30 for psychological resources, .24 for tangible resources and .36 for briefing, providing evidence for hypotheses 1, 3, and 5.

[32] $r_s =$ Spearman correlation coefficient

	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. % of project failures (comp.)	10.79	12.46														
2. # of projects	5.57	15.99	-0.11													
3. Affective commitment to the org.	4.68	0.99	-.16*	0.01												
4. Learning from failure	4.61	1.19	.15*	0.04	0.06											
5. Age (in years)	31.37	5.81	-0.05	.21**	.16**	0.10										
6. Gender	0.24	-	0.05	-0.06	-0.10	-.13*	-0.06									
7. Work experience (in years)	5.46	5.34	-0.09	.23**	.16**	0.06	.91**	-0.06								
8. Organization tenure	3.68	4.06	-0.06	.30**	.13*	0.08	.78**	-.12*	.80**							
9. Project duration (in weeks)	95.97	84.33	-0.08	-0.03	0.05	-0.02	-0.02	0.08	-0.04	-0.01						
10. Team size	4.92	6.56	0.03	-0.01	0.05	0.00	-0.03	-0.05	-0.04	-0.03	.14*					
11. Psychological resources	5.39	1.10	-0.11	0.02	.35**	-0.03	0.08	-0.02	0.10	0.02	0.03	0.08				
12. Tangible resources	5.28	1.16	-.20**	0.06	.25**	-0.01	0.10	-0.04	0.09	0.07	0.03	-0.04	.48**			
13. Briefing	4.69	1.46	-.19**	.13*	.37**	0.09	0.11	-0.10	.14*	0.04	-0.11	0.06	.53**	.51**		
14. Material values	3.08	0.57	0.10	-0.10	0.01	-0.02	-0.10	-.12*	-0.12	-0.03	0.07	0.06	-0.02	-0.08	-0.04	
15. Social desirability	4.65	0.56	-.20**	-0.01	.15*	0.06	0.02	0.08	0.03	-0.02	.14*	0.02	0.11	.13*	0.11	-.15*

* $p < .05$; ** $p < .01$; $n = 274$

Table 13: Descriptive statistics and two-tailed correlations of the sample 1 variables

	Mean	s.d.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. % of project failures (comp.)	13.75	14.41																	
2. # of projects	10.88	19.58	-0.02																
3. Performance goal orientation	4.78	0.79	-0.07	0.01															
4. Learning goal orientation	6.02	0.60	-0.15	-0.08	0.01														
5. Affective commitment to the org.	4.34	1.03	-0.04	-0.05	-0.04	0.09													
6. Psychological empowerment	5.52	0.76	0.10	0.03	-0.16	0.13	.41**												
7. Job Satisfaction	4.47	0.52	-.22**	-0.05	-0.10	.25**	.29**	.41**											
8. Age (in years)	40.96	9.98	-0.14	.23**	0.04	-0.09	-0.05	-0.10	0.09										
9. Gender	0.13	-	-0.11	0.07	0.03	-0.01	-0.05	-.20*	-.18*	0.05									
10. Project leader	0.55	-	.23**	.18*	-.17*	-0.13	0.12	.28**	0.09	0.14	0.06								
11. Project duration (in weeks)	147.23	84.47	0.11	-0.17	0.02	-0.04	0.04	0.04	-0.10	-0.13	-0.03	0.05							
12. Team size	16.51	13.81	-0.15	-0.05	0.05	0.08	-0.13	-0.06	0.10	-.18*	-0.07	-.46**	0.02						
13. Industry experience	11.76	9.83	-0.07	.31**	0.05	0.00	-0.03	0.04	0.06	.77**	-0.03	0.16	-0.11	-.17*					
14. Organization tenure	9.66	9.16	-0.08	.32**	0.10	-0.02	-0.01	0.10	0.10	.66**	-0.05	0.05	-0.08	-0.08	.83**				
15. Psychological resources	5.33	1.24	-0.01	-0.09	0.10	-0.09	.22**	.30**	0.15	-0.10	-0.02	0.01	0.06	0.04	-0.06	0.08			
16. Tangible resources	5.44	1.23	-0.15	-0.06	0.09	0.04	.26**	.24**	.33**	-0.12	-0.07	-0.13	0.17	.18*	-0.07	0.10	.49**		
17. Briefing	4.79	1.32	-0.11	-0.06	-0.12	-0.14	.29**	.36**	.21*	-0.03	-0.02	0.01	0.10	-0.06	-0.03	0.06	.43**	.50**	
18. Social desirability	4.92	0.66	-.17*	-0.11	0.04	0.08	0.11	-0.01	.20*	0.05	0.02	-0.10	0.05	0.16	-0.02	-0.07	0.05	.19*	0.00

* p < .05; ** p < .01; n = 152

Table 14: Descriptive statistics and two-tailed correlations of the sample 2 variables

As illustrated in Figure 5, the new constructs are theorized to affect the outcome variables through the mediating relationship with psychological empowerment (hypotheses 8 a/b, 9 a/b, and 10 a/b). "In general, a given variable may be said to function as a mediator to the extent that it accounts for the relation between the predictor and the criterion" (Baron & Kenny, 1986, p. 1176). More specifically, antecedent (X) influences some outcome variable (Y), through some mediating variable (M). In other words, a mediational design puts forward a theorized X → M → Y chain (Mathieu & Taylor, 2006). In this case, the antecedent variables are psychological resources, tangible resources and briefing respectively. The outcome variables are affective commitment to the organization and job satisfaction and the mediating variable is psychological empowerment. Mediation is present if the significant total relationship between the antecedent and outcome variable is accounted for by a mediator variable. If the mediator accounts only for a part of the relationship, one speaks of partial mediation. If the mediator completely accounts for the relationship, one speaks of full mediation (Mathieu & Taylor, 2006)

For initial testing, a partial correlation procedure was conducted with sample two, controlling for the effects of psychological empowerment (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Table 15 indicates the proposed mediations. All of the relevant correlations between the three new constructs, as well as both outcome variables, become smaller after controlling for the effects of empowerment. The correlation between psychological resources and affective commitment to the organization drops from .22 to .12 and with job satisfaction from .15 to .03. For tangible resources the correlation with affective commitment drops from .26 to .18 and with job satisfaction from .33 to .26. Lastly, the correlation of briefing with affective commitment is lowered from .29 to .16 and with job satisfaction from .21 to .07. As can be seen, two out of the six correlations become non-significant, while another two drop from a significance level of <.01 to only <.05, and one drops from <.10 to >.10. These changes provide an initial indication of the theorized (partial) mediation of the three constructs through psychological empowerment.

	1	2	3	4
1. Affective commitment to the org.				
2. Job satisfaction	.15 (.29**)			
3. Psychological resources	.12 (.22**)	.03 (.15†)		
4. Tangible resources	.18* (.26**)	.26** (.33**)	.45** (.49**)	
5. Briefing	.16* (.29**)	.07 (21*)	.36** (.43**)	.46** (.50**)

† p <.10; * p < .05; ** p < .01; n = 152
Zero-order two-tailed correlations and significance levels in parentheses

Table 15: Partial correlation controlling for psychological empowerment

As researchers hint at problems with using partial correlation procedures for mediation testing (James & Brett, 1984; MacKinnon et al., 2002), this method can only provide a starting point for further testing. Additional analysis employed Baron and Kenny's (1986) three-step approach (see also Judd & Kenny, 1981) is also required. This is the most popular approach for testing mediation (Preacher & Hayes, 2008). They define three criteria for mediation: (a) a variation in the level of the independent variable significantly accounts for a variation in the level of the dependent variable, (b) a variation in the level of the mediator significantly accounts for a variation in the level of the dependent variable, and (c) when (a) and (b) are controlled, a previously significant relation between independent and dependent variable is decreased (partial mediation) or zero (full mediation) (Baron & Kenny, 1986; Breugst, 2011). For testing, they recommend step-wise testing of three regression equations. Figure 7 illustrates these exemplary for the psychological resources (X) → psychological empowerment (M) → affective commitment (Y) chain. In step one, the independent variable is regressed on the mediator and the regression coefficient has to be significant (path a). For step two, the dependent variable is regressed on the independent variable. Again, the regression coefficient has to be significant (path c). And finally in step three, the dependent variable is regressed on both the mediator and the independent variable. Here, the mediator variable has to significantly affect the dependent variable (path b). Consequently in the last equation, the effect of the independent variable on the dependent variable has to be smaller than in the second equation (path c' is weaker than path c).

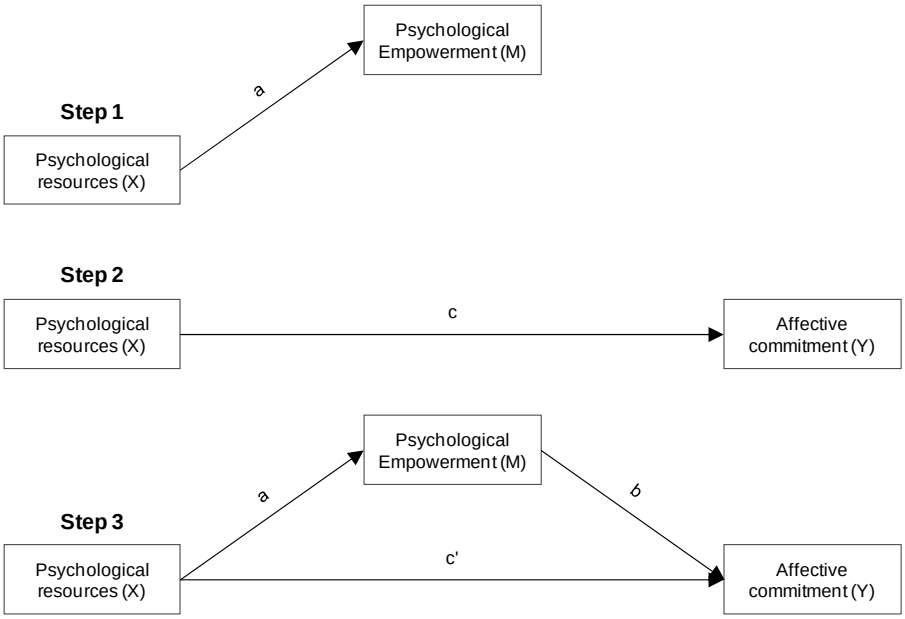

Figure 7: Own illustration of Baron and Kenny's (1986) three-step approach for testing mediation

Results of this three step test for mediation can be found in Table 10 and they support all mediation hypotheses 8 a/b, 9 a/b, and 10 a/b. All standardized regression coefficients in step one are significant at the .01 level between the three independent variables and the mediator. The correlation coefficients for psychological resources, tangible resources and briefing are .30, .24, and .36. For the second step, the coefficients between the independent and dependent variable have to be significant. This is fulfilled for all six regressions as well. The correlations between the three independent variables and affective commitment to the organization are all significant at the .01 level and the regression coefficients are .22 for psychological resources and .26 for tangible resources and briefing. The same could be found for job satisfaction. The correlation with psychological resources is significant at the .10 level (r_s = .15) and the correlations with tangible resources and briefing are significant at the .05 level (r_s = .31 for tangible resources and r_s = .21 for briefing). Finally for step three, in all six regression models the correlations between the hypothesized mediator psychological empowerment and affective commitment to the organization as well as job satisfaction are highly significant at the .01 level. Since, all three specified conditions for the mediation processes hold, all correlations between the independent and the dependent variables must be lower than in step two (Baron & Kenny, 1986). Consequently, Table 16 shows this.

In summary, this test procedure provided further evidence towards the mediational nature of psychological empowerment (Seibert et al., 2004). It presents clues that psychological em-

powerment fully or at least partially mediates the relationships between the three new constructs and job satisfaction as well as affective organizational commitment. Summing up, considering all of the evidence provided towards the hypotheses one-ten, the three new constructs seem to possess convergent and criterion-related validity.

	Dependent variables		
Independent Variables	**Psychological Empowerment**	**Affective commitment to the org.**	**Job satisfaction**
Step 1:			
(1) Psychological resources	.30**		
(2) Tangible resources	.24**		
(3) Briefing	.36**		
Step 2:			
(1) Psychological resources		.22**	.15†
(2) Tangible resources		.26**	.33*
(3) Briefing		.26**	.21*
Step 3:			
(1) Psychological resources		.11	.03
(1) Psychological empowerment		.37**	.40**
(2) Tangible resources		.17*	.24**
(2) Psychological empowerment		.36**	.35**
(3) Briefing		.16*	.07
(3) Psychological empowerment		.35**	.38**

Note: standardized regression coefficients are displayed; † p < .10; * p < .05; ** p < .01;
Results with same number in parentheses belong to the same mediation test step

Table 16: Results of three-step testing for mediation

Next in the development process for correctly specified measures is the analysis of discriminant validity (Smith & McCarthy, 1995), which demonstrates that the new measures do not show a correlation with measures with which they are theoretically unrelated (Bagozzi, Youjae Yi, & Phillips, 1991). To show this, the scales of material values (Richins & Dawson, 1992) in sample one and performance goal orientation and learning goal orientation (Button et al., 1996) in sample two were included. It is obvious why those three scales should be different from the three new constructs, as they measure perceptions of the quality of a project start compared to the individual need and desire (of material values), and individual goal orientations. The final data confirmed this notion with the correlations for material values being -.02 for psychological resources, -.08 for tangible resources and -.04 for briefing in sample 1 (all correlations are non-significant at the 5%-level). Similar results are obtained for sample

two. The correlations with performance goal orientation are .10 for psychological resources, .09 for tangible resources and -.12 for briefing respectively. With regard to learning goal orientation the respective values are -.09, .04, and -.14. Again none of the relationships achieves significance. Accordingly, one can assume discriminant validity (Campbell & Fiske, 1959; Liden & Maslyn, 1998).

Finally, it was checked if social desirability posed a threat to any of the new measures. Responding socially desirable "implies a need to be thought well of by others, a need for approval" (Crowne, 1991, p. 18 based on Crowne & Marlowe, 1964). For testing, Paulhus' (1984) impression management scale was employed. As confirmed in both samples, social desirability posed little threat to the psychological resources and briefing scale. However, it did show significance at the .05 level with the tangible resources scale in both samples, with correlations of .13 for the first sample and .19 for the second. Therefore, it could be suggested that social desirability might potentially be a threat to the tangible resources scale.

4.6.3 Common method and source error

Some theoretical arguments dispelling doubts towards potential common method and source/rater biases were previously presented in the method section in chapter 3 of this thesis. Additionally, Pelled et al. (1999) suggest that inter-correlations between independent variables only become problematic when they exceed .75. Furthermore, as proposed Podsakoff et al. (2003), a partial correlation procedure was conducted controlling for the social desirability factor (see Table 17).

	1	2	3	4	5
1. Affective comm. to the org.					
2. Job satisfaction	.28** (.29**)				
3. Psychological empowerment	.41** (.41**)	.42** (.41**)			
4. Psychological resources	.22** (.22**)	.14 (.15)	.30** (.30**)		
5. Tangible resources	.25** (.26**)	.30** (.33**)	.25** (.24**)	.49** (.49**)	
6. Briefing	.29* (.29**)	.21 (21*)	.36** (36**)	.43** (.43**)	.51** (.50**)

* p < .05; ** p < .01; Sample 2: n = 152
Zero-order two-tailed correlations and significance levels in parentheses

Table 17: Partial correlation controlling for social desirability

Since none of the correlations of interest changed its level of significance and deviations between correlations ranged between -.01 and +.01, common method and source error are likely not to affect the results of this study. In addition, it is interesting to note, that all corre-

lations involving the new tangible resources scale did not change the respective significance level either, indicating that the effect of social desirability towards this measure is probably negligible.

4.7 Revisiting construct definitions

Following rigorous scale development process, drawing on academic and industry experts, performing scale refinement and factor analysis techniques, as well as providing statistical validity towards the nomological net of the new measures, the final scales' definitions were revisited. This was done due to the exploratory nature of the research and to ensure that items matched construct definitions. Discussions were held with one German professor and one German post-doctoral research fellow who have expert knowledge in the field. During these discussions, the remaining scale items were reviewed for their match with the constructs they were designed to measure. Complete agreement was reached that all items still fully reflected their respective constructs, since they were reflective measures of these (Bollen & Lennox, 1991). In reflective models as employed for the psychological resources, tangible resources, and briefing scales, the latent constructs cause the observed variation in the measure and the construct possesses surplus meaning over its measures (Jarvis, MacKenzie, & Podsakoff, 2003).

However, when jointly examining the items for the three new constructs, agreement was reached, that two of the scales were also potentially able to measure more narrowly defined constructs. These were team relatedness for psychological resources and team competence for tangible resources. No other construct seemed plausible for the briefing scale and none was put forward during expert discussions. With regard to the two additional constructs, this respecification of a model is common during testing (Kelloway, 1995), but should only occur if underlying theory and content have been considered appropriately (Chin, 1998; Gerbing & Anderson, 1988; Kelloway, 1995). As such a different theory explaining the alternative constructs is proposed. The alternative nomological network is displayed in Figure 8.

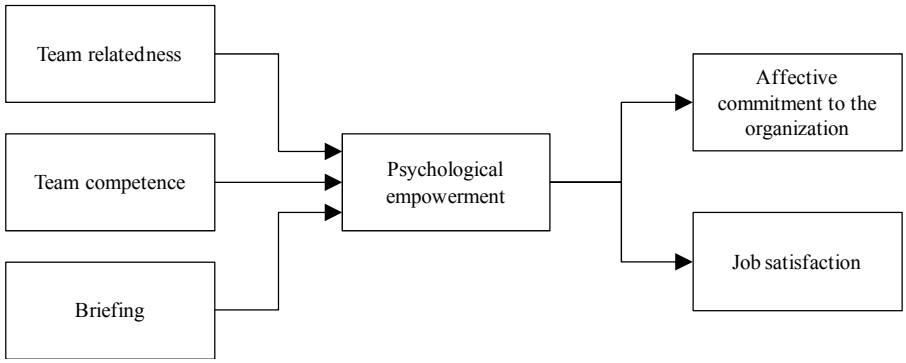

Figure 8: Alternative model of the nomological network

4.7.1 Team relatedness

First, re-examining the items of the psychological resources scale it becomes apparent that the items indeed refer to Ryan and Deci's (2000) need for relatedness which is part of self-determination theory. They define the need for relatedness as "the desire to feel connected to others – to love and care, and to be loved and cared for" (Deci & Ryan, 2000b, p. 231 building on earlier work of Harlow, 1958). Since the items in the psychological resources scale are concerned with "open channels of communication between team members", to be "very much at ease with the other team members", and to be become "connected" and "very comfortable" with the other team members, the experts deemed these items as adequate to measure team relatedness. Furthermore, merging SDT with the context-specificity of Vallerand's (2000) hierarchical model of intrinsic and extrinsic motivation, and contextualizing the need for relatedness to the start of a project, team relatedness can be defined

> ***Team relatedness:*** *The perception of employees at the start of a project that they will feel connected to their project team and that there will be a reciprocal caring relationship.*

The satisfaction of the need for relatedness is a nutriment for internalization processes to work optimally (Gagné & Deci, 2005). The psychological empowerment dimension of meaning corresponds to this internalization of values (Peccei & Rosenthal, 2001), so a higher level of satisfaction of the need for relatedness should lead to higher levels of psychological empowerment. Additionally, a high satisfaction of the need for relatedness has been found to be strongly associated with positive affective states (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), in a similar fashion to how affective commitment to the organization and job satisfaction are found in this study.

In conclusion, the items of the psychological resources scale should also be able to measure the construct of team relatedness as defined above and prior theory relates this to psychological empowerment and states of positive affect. Thus, there is reason to believe that the new scale also fits the nomological network evaluated in this study.

In the field of organizational psychology, one paper could be identified, that examined the topic of team relatedness (Schepers, Falk, Ruyter, Ad de Jong, & Hammerschmidt, 2012). However, their scale measures an individual's oppinion of his or her team's feelings of relatedness towards the organization. Other researchers efforts using a "team relatedness" construct, focus either on the similarity of team members' tasks (see e.g. Arthur, Edwards, Bell, Villado, & Bennett, 2005 for research in the field of ergonomics) or use scales that did not undergo sufficient validation procedures (see e.g. Reinboth & Duda, 2006 for research in the fiel of sport psychology). In summary, the construct of team relatedness as defined above and vigorously validated in this study does hold promise to advance theory in the field of organizational psychology.

4.7.2 Team competence

Second, considering the items of the tangible resources scale, team competence is an alternative concept to be measured against. According to theory, competence is "an underlying characteristic of an individual that is causally related to […] effective and/or superior performance in a job" (Spencer & Spencer, 1993, p. 9). When looking at competence, it is important to distinguish between functional competence and behavioral competence (Du Chatenier, Verstegen, Biemans, Mulder, & Omta, 2010; Le Deist & Winterton, 2005). The new scale focuses on the former. When comparing the individual items of the scale with existing literature on (functional) team competence, there is considerable overlap between the underlying dimensions of team competence in the literature and the items of the tangible resources scale. The dimensions most often mentioned in the literature are "knowledge" and "skills" (Cianni & Wnuck, 1997; Dooley & Fryxell, 1999; Du Chatenier et al., 2010; Kauffeld, 2006; Le Deist & Winterton, 2005), and those are derived from past "experiences" that contribute to higher levels of competence (Kor, 2003). All in all, team competence in R&D teams – or the "right team members" – are important for organizational effectiveness (Prahalad & Hamel, 1990), for example, through increased innovative activity (Ozkaya, 2010). Thus,

Team competence: *The perception at the start of a project that their prospective project team members have the "right" competences for advancing project success.*

Not only is there a strong link between the construct and its items, but there is also research that hints at the possibility that team competence – at least partly – affects outcome variables through psychological empowerment as a mediator. For example, it has been shown that the perception of another individual's competence leads to increased levels of cognitive-based trust (McAllister, 1995), which has been shown to positively affect psychological empowerment (Ergeneli, Arı, & Metin, 2007; Gomez & Rosen, 2001). The expectation of working with competent colleagues might lead to higher levels of psychological empowerment by enhancing feelings of competence in the individual. There has been a call for research to include employee human capital (knowledge, skills, and abilities) in studies concerning or related to empowerment (Maynard et al., 2012). This new scale can help to bring this effort forward.

When reviewing the literature for concepts of team competence, some studies approximate this with experience measured in years[33] (e.g. Kor, 2003), while others use a coding scheme for a "real-life" team-task (Kauffeld, 2006). The psychometric's scales' – as conceptualized and validated in this study – main advantage compared to the approximation via experience is it's specificity. Also, it is more convenient to use and adapt for specific contexts than designing, conducting and analysing experiments or tasks. So, developing and validating a psychometric scale for team competence seems to be a desirable task. One previous effort could be identified that employed a psychometric "team competence" scale building on similar theory as this study. However, Schepers et al. (2012) adopted their three items from Baard et al.'s (2004) original 8-item scale of individual competence and adopted them to the team level to arrive at "team competence". They provide fit indices arguing for good fit of their adapted scales. However, after altering already tested scales in this manner, a new scale validation would have been warranted. For example, it remains unclear, if the shortened version of the former 8-item scale would still fit the nomoligical network it was originally intended for by Baard et al. (2004). Furthermore, the three items do not reflect three different traits of the construct of competence as warranted for meaningful scales (Clark & Watson, 1995), but

[33] as measured in years active at a certain job level or vocation

uses synonymous[34] items and the resulting scale is therefore likely to suffer from an "attenuation paradox" (Loevinger, 1954). Concluding, the psychometric scale of team competence in this study holds benefits compared to other forms of measurement and provides researchers with a well-conceptualized and validated mean to measure "team competence" using questionnaires as a data gathering approach.

Additionaly, the construct of team competence is not to be confused with other measures of a team's competence such as collective-efficacy and team potency. Team potency, on the one hand, "refers to generalized beliefs about the capabilities of the team across tasks and contexts (i.e., our team will be successful no matter what the task)" (Gully, Joshi, Incalcaterra, & Beaubien, 2002, p. 820). This is distinguishable from team competence on the basis of task-specificity (compare Gibson, 1996). As an example, members of an R&D team might feel competent to design an axle for a new truck model, but they would not feel potent enough to design the whole truck. Collective-efficacy, on the other hand, is a group's "shared belief in its conjoint capabilities to organize and execute courses of action required to produce given levels of attainment (Bandura, 1997, p. 477). Some scholars have specified this group to be a team (e.g., Arnold, Barling, & Kelloway, 2001), thus arriving at team-efficacy. Team-efficacy and team competence are similar in that they are both more task-specific than team potency. Yet, they differ in the level of focus. Whereas team-efficacy is concerned with a team's "shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1997, p. 447), team competence is concerned with the individual's believe about the competence of the team. This is the appropriate level of analysis when trying to make inferences about outcomes important to the individual (Maynard et al., 2012). However, recent scholars have often deviated from Bandura's original definition and measured collective efficacy as individuals' beliefs (Stajkovic, Lee, & Nyberg, 2009). Items used to measure collective-efficacy are "My group can find solutions to problems with its performance" or "I believe that failure will make our group try harder". Team competence as defined in this study is therefore substantially different and more specific than collective/team-efficacy since it is focused on one specific task "advancing project success".

[34] Word used in the three items are the synonyms "competence", "capable" and "accomplishment"

4.8 Discussion

4.8.1 Summary of results

This study theoretically derived and statistically validated three scales to be employed at the start of a R&D or innovation project with a focus in alleviating employees' levels of psychological empowerment. The three constructs were psychological resources, tangible resources, and briefing. Scales to measure the constructs were derived from existing literature and underwent a rigorous process utilizing university and industry experts. Drawing on two samples of university researchers and R&D industry employees, all three new scales underwent factor analytical procedures, and all of them were embedded in their nomological network, providing evidence of convergent, discriminant, and criterion-related validity as well hinting at the absence of social desirability. The validated nomological network shows that all three new constructs positively influence employees' attitudes, such as affective commitment to the organization and job satisfaction through psychological empowerment acting as a mediator. Revisiting the construct definitions of psychological resources, tangible resources, and briefing, this study found that the two former constructs were also valid measures of team relatedness and team competence.

4.8.2 Discussion of findings and avenues for future research

Since this study is mainly concerned with construct development and scale generation and validation, it only provides little contribution to the literature. Yet, it might serve as an enabler. It strives to stimulate future research on psychological empowerment that can employ the constructs of team relatedness, team competence and briefing in different study designs. Also, they will directly be used in the next chapters of this thesis to contribute to research on psychological empowerment, goal orientations, meta-cognitive abilities, teams, as well as affective commitment.

That being said, the briefing scale could help future research on leaders' roles with respect to their subordinates. Multiple research streams have found positive effects in the leader employee relationship, such as leadership techniques (e.g., Hodgetts, 1968), leader-member-exchange (e.g., Chen, Lam, & Zhong, 2007b), the design of work teams (Hackman, 1987), transformational leadership (e.g., Podsakoff et al., 1990), and psychological empowerment itself (e.g., Arnold et al., 2000). Earlier research on techniques and tasks of "good" leaders is

either explorative (Hodgetts, 1968) or descriptive (Hackman, 1987) in nature without explicitly testing the effects on followers. Later research alleviates this weakness by integrating representations of leadership styles and techniques into quantitative models. However, much of the research focused on the leader-follower relationship in a trait-like manner. Leader-member exchange describes the quality of the exchange between leader and follower (Chen et al., 2007b). Transformational leadership summarizes six general key behaviors under its concept (Podsakoff et al., 1990) and Arnold et al. (2000) aggregate five general dimensions under their empowering leadership construct. These accounts of global assessments can be affected by cognitive and motivational biases (Ross, 1989). In his paper, Ross (1989) argues that the recall bias when answering a set of questions is bigger when the time span between event and recall of the event is longer and when the recalled memory is broad rather than small (e.g., a trait compared to a single event). While this research cannot influence the time span until recall in surveys of future studies, the briefing scale does provide an account of a single event. It describes the behavior of the leader at a certain point in time, rather than a set of behaviors this leader exhibits in general. Following Ross (1989), this should provide a less biased account of a leader's behavior and therefore likely provides less biased results when examining leader-follower relationships.

Another possible direction for future research could be advancing theory on the antecedents of psychological empowerment. Although, Seibert et al. (2011) did provide a comprehensive overview of antecedents in their meta-analysis on empowerment research, so far most studies have only looked into direct antecedents of psychological empowerment (compare chapter 2). There are only few exceptions to this finding (Gomez & Rosen, 2001; Liao, Toya, Lepak, & Hong, 2009). Liao et al. (2009) theorized that management-level high-performance work practices would be related to psychological empowerment through employee-level high-performance work practices, however their data did not provide support for their theory. Gomez and Rosen (2001) found that leader-member exchange mediated the relationship between trust in one's manager and psychological empowerment. However, researchers have repeatedly called for further research on relationships between different antecedents and psychological empowerment (Maynard et al., 2012; Spreitzer, 2008). Since there is evidence that single workplace events can affect broader constructs (Crede, Chernyshenko, Stark, Dalal, & Bashshur, 2007), future research could examine if a briefing as a workplace event has an impact on antecedents of psychological empowerment. This thesis will approach this research avenue in chapter five 5.

Another promising avenue for research is the topic of moderator analysis in the vicinity of psychological empowerment. This proposition is derived from two arguments: First, there has been little research on moderators of psychological empowerment (Maynard et al., 2012; see Chen et al., 2007a for an exception). Second, in the few studies that were conducted, evidence was found that contextual factors can act as moderators of psychological empowerment-outcome relationships (Jiang et al., 2011; Zhang & Bartol, 2010). For example, a well-made briefing could positively moderate the relationship between psychological empowerment and affective commitment to the organization, since the employee gets an increased feeling that the organization cares about him. On the other hand it is imaginable, that a well-made briefing negatively moderates this relationship. This could be explained using Vallerand's (2000) hierarchical model of motivation. He puts forward that an increased situational motivation (triggered through a briefing) can increase contextual motivation (e.g., project motivation) which influences levels of affect (e.g., affective commitment). He theorizes this as especially true when levels of contextual motivation are low, thus effectively influencing motivation "bottom-up". A similar argument is made by Deci and Ryan (2000) using their self-determination theory (SDT). This theory suggests the development of need substitutes (Deci & Ryan, 1980 as cited in Deci & Ryan, 2000b). As an example, if satisfaction of psychological empowerment is low, people look for substitutes to satisfy their needs, which could be the emotional support provided by a briefing with one's project leader or manager. This thesis will provide initial insights into this direction, by addressing the topic of moderator analysis in chapter 6.

Although there are vast accounts of research on empowerment – especially on psychological empowerment (Seibert et al., 2011) and the topic is viewed as "fab" by the majority of researchers (Maynard et al., 2012) – most of this research takes an angle on antecedents and outcomes of empowerment in a snapshot perspective. Ignoring whether the research is qualitative or quantitative, most researchers have so far "only" theorized the cause-effect relationships, while their data provides them with correlations that only enable a cross-sectional view on empowerment and their antecedents and outcomes generalizing this across contexts (Maynard et al., 2012; Spreitzer, 2008). Work closest to providing evidence for the effects caused by empowerment interventions are more story-telling in nature (Argyris, 1998). This study cannot provide support for researchers collecting a longitudinal data set, but it can help strengthen the inferences made from cross-sectional designs. Usual scales that are tested for their relationship with psychological empowerment are of an enduring nature as, for example,

transformational leadership (Avey et al., 2008), work characteristics and social exchanges (Chen & Klimoski, 2003), or empowerment climates (Wallace et al., 2011). However, one main characteristic of psychological empowerment is that it is not stable over time. Since the three new constructs are concerned with the project start, they provide a "timed" measure that can induce changes in employees' levels of psychological empowerment. This provides future researchers with tools to assess employees' levels of psychological empowerment for the last and the current project concurrently, and in addition include the three new scales to test, if they show a significant relationship with the change in levels of psychological empowerment. This change induced at the project start then allows to draw conclusions related to the target variables before and after the change (Leiter, Laschinger, Day, & Oore, 2011), thus allowing stronger causal conclusions concerning the cause-effect relationships (Bono & McNamara, 2011). Since the three new scales have shown excellent psychometric properties, and fit the already existing nomological network of psychological empowerment (see Seibert et al., 2011 for an overview of the network), they provide additional insights, in the absence of longitudinal data.

4.8.3 Limitations of this study

However along with the research possibilities this scales development effort enables, this study also has its limitations that should be kept in mind or ideally be addressed by future researchers.

Firstly, other researchers should incorporate the scales in their research addressing the limitations that could not be addressed during this scale development effort. For example, it would be very useful to expand the sample of participating companies in order to address the problem of a possible selection bias, like controlling for the effect of an overrepresented company or acquiring participants from companies that were not allowed to participate in the study because of workers council related reasons (although no such bias could be found in the data). It is conceivable that companies where the workers council did not permit participation, are in general not on good terms with the top management of the company because people feel more disempowered in general, thus giving very helpful insights in "low-performing" companies.

Also, the scale development and validation effort in this study was originally designed to test the validity of the constructs of psychological resources and tangible resources. Based on

the consideration of underlying theory and content (Chin, 1998; Gerbing & Anderson, 1988; Kelloway, 1995), as well as discussion with academic experts, these were re-specified to team relatedness and team competence. Although, this is common during testing (Kelloway, 1995), future research should re-examine the results of this thesis with respect to construct validation by including team relatedness and competence in studies that are tailored to them right from the outset.

As stated earlier, the new constructs and scales were developed to measure a change in the levels of psychological empowerment between two points in time. Due to the different project lengths in the sample ranging from three month to up to five years, there were not enough participants ready for inclusion in a second survey at the time of this thesis to perform a longitudinal study. Therefore future research should reap this opportunity. Furthermore, although the notion was put forth that the developed constructs work through psychological empowerment as a mediator and the results largely confirmed this assumption, further evidence, especially including a larger array of control variables, is called for. Additionally, some of the relationships only hinted towards a partial mediation, so it could be interesting to explore what magnitude of the effect can be attributed towards the path via empowerment and which further psychological processes might be at work through which the constructs affect the outcomes.

4.8.4 Conclusion

Psychological empowerment is a powerful motivational concept and much research has been and still is conducted to date on the antecedents and outcomes of it. However, this study found there is need for "tools" for increasing employees' levels of psychological empowerment at the start of a R&D project. Thus, this study developed and validated the three constructs of team relatedness, team competence, and briefing as measures in this meaningful setting. Furthermore, several research proposals are outlined for developing a deeper understanding of the impact that the new constructs can have on levels of psychological empowerment and its associated outcomes. Hopefully, the new constructs and their scales act as a stepping stone, enabling researchers to gain a deeper and more complete understanding on how levels of psychological empowerment can be influenced for the course of a single project and beyond.

5 STUDY 2: RESEARCH ON ANTECEDENTS OF PSYCHOLOGICAL EMPOWERMENT

5.1 Introduction

Previous research established the effect of psychological empowerment on employees' attitudes, such as affective commitment and job satisfaction, as well as on behaviors such as task performance, organizational citizenship behavior, and innovation[35]. This link of psychological empowerment to desired attitudes and behaviors triggered research on how different antecedents affect employees' levels of psychological empowerment. Although much research has already been conducted on possible antecedents, there still remains need for further research (Seibert et al., 2011; Spreitzer, 2008). Psychological empowerment is a motivational process (Conger & Kanungo, 1988). It is not as concerned with what organizational conditions are, but on how these conditions are perceived by employees (Bandura, 1977, Bandura, 1982). Thus, it is the perception of organizational conditions that affects employees' levels of psychological empowerment.

Spreitzer (1995), in her conceptualization of the psychological empowerment construct, explicitly emphasized that not only is the perception of contextual antecedents relevant for determining employee's levels of psychological empowerment, but individual characteristics are shown to be important as well[36]. In her initial nomological network, she theorized and found that an employee's self-esteem is significantly related to psychological empowerment. Consequently, antecedents of psychological empowerment can be grouped into contextual antecedents and individual characteristics (Seibert et al., 2011). However, in their meta-analysis, Seibert et al. (2011) only found nine studies that actually considered individual characteristics compared to 139 studies that considered the effect of contextual characteristics on psychological empowerment. One seldom exception is Jha and Nair's (2008)[37] work,

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[35] Since chapter 2 contains a broad literature overview of psychological empowerment, this introduction focuses only on the aspects relevant for this chapter. For a deeper theoretical background, please refer to chapter 2.

[36] Based on earlier conceptualizations Thomas and Velthouse (1990)

[37] Another example would be the study by Avey, Hughes, Norman, and Luthans (2008), who integrated individuals' positive psychological capital

which examined the relationship between locus of control conjointly with two contextual antecedents and psychological empowerment and found locus of control to be significantly related. While individual characteristics are seldom integrated in research on psychological empowerment, no existing study could be identified where the relationship between individual characteristics and contextual factors were analyzed in the context of psychological empowerment. So, this chapter follows the call for research to integrate individual characteristics and examine the relationships between different antecedents of psychological empowerment (Maynard et al., 2012; Seibert et al., 2011).

This chapter investigates how two antecedents of psychological empowerment develop: access to information and access to resources. These have already been integrated in Spreitzer's (1995a; 1996b) earlier works. Thus, other studies have underlined the importance of these two antecedents on individuals' levels of psychological empowerment (Kirkman & Rosen, 1999; Seibert et al., 2004; Seibert et al., 2011; Siegall & Gardner, 2000; Zimmerman, 1995). It is important to point out that *perceived* access to information and resources will be examined in this paper. To illustrate why this difference is important, Spreitzer (1996) explained that "resources may be decentralized in objective reality, but if employees are not informed that those resources are available for their use (a perceptual reality), then access to resources will have little influence on feelings of empowerment" (p. 486). Consequently, this study employs measures of perceived access to information and resources.

To close the research gaps described above this study tests its hypotheses on sample two described in chapter 3 of this thesis. This contains 152 R&D employees working in 23 companies. By analyzing this meaningful sample, this study aims to make three main contributions to the literature on psychological empowerment.

First, as explained above, it is to the best of my knowledge the first study to examine the relationships between individual characteristics and contextual antecedents of psychological empowerment. It therefore takes up earlier conceptualizations that individual characteristics are important for forming individuals' levels of psychological empowerment (Spreitzer, 1995a; Thomas & Velthouse, 1990). This idea has been neglected in earlier conceptualizations of empowerment (see e.g., Conger & Kanungo, 1988) and is still a shortcoming in most studies on psychological empowerment (see e.g., Ahearne et al., 2005b; Barroso Castro et al., 2008, Barroso Castro et al., 2008; Hempel et al., 2012; Laschinger et al., 2004; Seibert et al., 2004).

Second, this study is the first to integrate the individual characteristics of learning goal orientation, performance goal orientation and meta-cognitive monitoring in a study on antecedents of psychological empowerment. Goal orientations as motivational orientations influence how individuals perceive, interpret, and act in situations of achievement (Dweck & Leggett, 1988; Elliot & Church, 1997). Research on goal orientations in general focuses on two types of goals that people can adopt (Bunderson & Sutcliffe, 2003): learning goals (i.e., the development of skills, knowledge, and competence) and performance goals (i.e., demonstrating ability or avoiding failure). Both orientations are responsible for determining how much effort individuals invest in situations of achievement (Dweck & Leggett, 1988), which is an important predictor for information processing (Jansma, Ramsey, Zwart, van Gelderen, & Duyn, 2007). Meta-cognition as well as goal orientation are individual characteristics that are dependent on context (Allen & Armour-Thomas, 1993), thus making it likely to influence individuals' perceptions of their environment, like for example, the perceived access to information.

Third, this study contributes to the literature by broadening knowledge on how teams shape individuals' perceptions in the workplace. Only one study could be identified that examined the impact of individuals' relationships with their peers on psychological empowerment (see Liden et al., 2000). This study integrates team relatedness which is defined as "the perception of employees at the start of a project that they will feel connected to their project team and that there will be a reciprocal caring relationship". This builds on knowledge of trust and support which have been found important in the context of psychological empowerment, which has already been named as a research gap (Maynard et al., 2012; Seibert et al., 2011). This study also integrates team competence defined as "the perception at the start of a project that the prospective project team members have the 'right' competences for advancing project success". There are studies that examined the effects of team competence on team level or organizational level measures (e.g., Colombo & Grilli, 2005; Dooley & Fryxell, 1999; Kor, 2003; Ozkaya, 2010; Zarutskie, 2010) and studies that examined the effects of an individual's competence on the team (e.g., Du Chatenier et al., 2010). Research on collective efficacy has also investigated the role of a group's or team's competence on the individual employee especially with respect to its moderating influence on stressors in the workplace (Jex & Bliese, 1999; Jex & Gudanowski, 1992; Nielsen, Yarker, Randall, & Munir, 2009; Walumbwa, Wang, Lawler, & Shi, 2004). However, no study could be identified that integrated one's team's competence in the context of psychological empowerment. This study

examines the effects of team competence on an individual's level of perceived access to resources in the context of psychological empowerment, thereby following multiple calls for research (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008).

To summarize, this research effort aims to establish the link of two contextual team antecedents (team relatedness and team competence) and three individual characteristics (learning goal orientation, performance goal orientation and meta-cognitive monitoring) with psychological empowerment. Based on existing research, these antecedents will be integrated into the nomological net of psychological empowerment by theorizing and testing relationships with two already known antecedents of psychological empowerment: perceived access to information and perceived access to resources. While most of the proposed antecedents in this study are theorized as direct relationships, meta-cognitive monitoring will be theorized as a moderator working in the context of an intervention (i.e., a briefing at the start of a R&D project). Next, the hypotheses addressing the above described research gaps are derived from existing literature. Hierarchical regression analysis will be conducted on three dependent variables, which are access to information, access to resources, and ultimately psychological empowerment. Afterwards, the results will be discussed along with the limitations of this study.

5.2 Theory and hypotheses development

5.2.1 Psychological empowerment and access to information and resources

Two contextual antecedents that have been researched vigorously in the context of psychological empowerment are access to organizational information and access to organizational resources (Aryee & Chen, 2006; Cho, Laschinger, & Wong, 2006; Kirkman & Rosen, 1999; Laschinger et al., 2001; Laschinger et al., 2004; Seibert et al., 2001; Siegall & Gardner, 2000; Spreitzer, 1995a, Spreitzer, 1996b). Most of these studies relied on Kanter (1989), who argued that the organization or management had to make this information available (Laschinger et al., 2004; Spreitzer, 1995a). Others only mentioned that this information had to be communicated by the supervisor or outside consultants (Siegall & Gardner, 2000) or did not offer any argument where this information could come from and how perceptions about it would develop (Aryee & Chen, 2006). There are hints of possible antecedents of access to information and resources (Blau & Alba, 1982; Kanter, 1986; Mainiero, 1986; Nonaka, 1988;

Walton, 1985). Mainiero (1986), as way to enter the cycle of power, proposed that employees needed to act "assertively and aggressively to gain the information, resources, and support they needed" (1986, p. 637). Nonaka (1988) described the system of middle-up-down management at Honda. There, he found that Honda used irregular meetings to convey information to employees. Blau and Alba (1982) stressed the structure of the organizational system, work relations and associated communication as a means to distribute information and gain access to resources in an organizational context. Thus, there is reason to believe that individual characteristics, meetings and colleagues might be important for employees to gain access to information and resources. However, these studies were either of a conceptual nature or did not explicitly examine antecedents of employees' perceived access to information and resources and did not explore why some employees seem to have greater access than others.

In this study three different types of antecedents are theorized to influence an employee's perception towards access to organizational information and resources. It theorizes individual dispositions, a briefing, and an employee's team to influence the aforementioned outcome variables. These in turn increase employees' feelings of empowerment (i.e., psychological empowerment). Drawing on goal theory, this study tries to examine how different types of goal orientations lead to different levels of effort in the acquisition of information. It shows how an intervention at the start of a project can help to increase an employee's level of perceived access to information and that this effect is contingent on an employee's cognitive adaptability. Furthermore, it provides support for the positive effect of an intervention on an employee's sense-making processes by providing context and thereby increasing perceived access to resources. Finally, an individual's team is examined for its effect towards access to resources through two constructs: team relatedness and team competence. Figure 11 provides an overview of the hypotheses to be established and tested in this study, which will now be developed in detail.

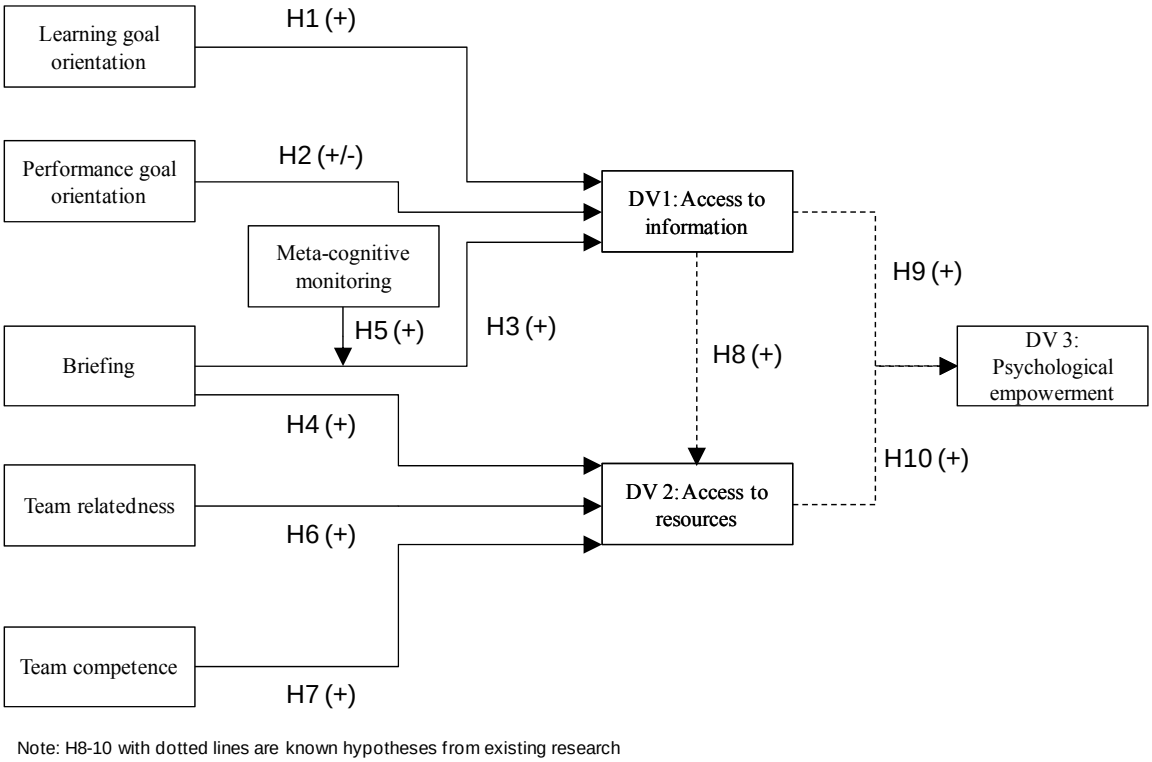

Figure 9: Overview of hypotheses

5.2.2 Access to organizational information and resources

5.2.2.1 Learning and performance goal orientation

Thomas and Velthouse (1990) particularly emphasized individual differences, interpretive styles, and global beliefs for the subjective assessment of empowerment perceptions. Spreitzer (e.g., 1995a; 1996b; 2008; 1997) also adopted an interactionist perspective in her definition of psychological empowerment, so that each individual perceives their task environment differently. In this sense, interactionist means that it is not contextual factors alone that influence the perception of the individual cognitive state of psychological empowerment. Instead, individuals perceive these contextual factors differently based on their individual characteristics. Meta-analyses even showed that individual traits such as the core self-evaluation trait (see e.g., Judge, Locke, & Durham, 1997; Srivastava, Locke, Judge, & Adams, 2010) have an effect size on individual psychological empowerment that is statistically not significantly distinguishable from the effect produced by contextual antecedents (Seibert et al., 2011). However, goal orientations have not yet been examined in the context of psychological empowerment (Maynard et al., 2012). Dweck and others (Dweck, 1989; Dweck & Leggett, 1988; Heyman & Dweck, 1992; Licht & Dweck, 1984) emphasized how individ-

uals' implicit theories orient them towards goals. These goals in turn create the framework for individuals, which they employ "to interpret and react to events" (Dweck & Leggett, 1988, p. 256). These frameworks are goal orientations which are individual dispositions that are stable traits that alter response patterns of individuals depending on the specific situation (King & Sorrentino, 1983), like for example, the start of a R&D project.

Button et al. (1996) introduced two goal orientations beneficial for research in organization settings: learning goal orientation and performance goal orientation. Individuals adopting a learning goal "try to understand sth. new or to increase the level of competence in the activity at hand" (Button et al., 1996, p. 26). Dweck and Leggett (1988) suggest that individuals with a high learning goal orientation generally have higher levels of internal locus of control, because such individuals believe that the skills and abilities responsible for outcomes can be enhanced by exhibiting greater effort. In general, a learning goal orientation will "lead to more task-focused, adaptive, mastery-oriented behaviors" (Bunderson & Sutcliffe, 2003, pp. 552–553). In other words, such individuals will show mastery-oriented responses (Diener & Dweck, 1980; Nicholls, 1978) with individuals seeking challenges and trying to strive under difficult conditions or in the face of obstacles. Failure, for individuals with a learning goal orientation, is useful feedback on which they can dwell and improve from. They respond with "solution-oriented self-instructions, as well as sustained or increased positive affect and sustained or improved performance" (Elliott & Dweck, 1988, p. 5). When obstacles are encountered, learning-oriented people tend to deal with these challenges by investing additional effort to develop and master new skills (VandeWalle, Cron, & Slocum Jr, 2001). This behavior increases people's willingness to solicit and use information to improve their skills (Hirst, van Knippenberg, & Zhou, 2009; Stevens & Gist, 1997), to actively seek information helping them to incrementally increase skills and abilities (Stevens & Gist, 1997) and enhance chances of future achievement situations (Elliot & Church, 1997). Since R&D and innovation environments are by their nature exposed to bigger risks, these environments pose more obstacles and are therefore more challenging (Herstatt et al., 2004), learning goal oriented employees should exhibit greater effort in them. This greater effort could involve more information seeking, leading to

H1: The higher the level of an employee's learning goal orientation, the higher his or her perceived level of access to information.

In contrast, people adopting a performance goal "attempt to demonstrate their competence by performing well at a certain task to gain a favorable judgment or try to avoid negative judgments of their competence" (Button et al., 1996, p. 26). This illustrates that performance goal oriented individuals tend to be extrinsically motivated – by gaining or avoiding judgment from others – compared to the intrinsically motivated learning oriented individuals (Button et al., 1996). Performance goal oriented individuals believe that outcomes are uncontrollable (Dweck & Leggett, 1988) thus adhere to an entity theory of ability. These individuals believe that ability is difficult to develop and innate, in contrast to learnable (Bunderson & Sutcliffe, 2003). In the face of obstacles or failure, a performance goal orientation can lead to a maladaptive "helpless" response pattern (Diener & Dweck, 1980; Nicholls, 1978), where individuals try to avoid challenges and perform worse. If performance oriented individuals experience failure, they will blame it on a lack of ability, experience and display negative affect or quit the activity to avoid negative feedback (Button et al., 1996). Such individuals will have a reluctance to increase personal goals across "performance episodes" (Button et al., 1996, p. 41).

So, compared to the effect of learning goal orientation on access to information, for performance goal orientation no such easy link can be established, since multiple researchers noted that it actually comprises two dimensions (Button et al., 1996; Elliot & Church, 1997; Hirst et al., 2009). First, an approach orientation that is concerned with high performance outcomes and outperforming others and second, an avoidance orientation that focuses on avoiding consequences of poor performance (Elliot, 1999). Both orientations are primarily concerned with external evaluations (Button et al., 1996), in other words, either gaining rewards or avoiding criticism. So, on the one hand, a performance goal orientation is concerned with positive external feedback, which might lead to increased effort in information seeking. But, on the other hand, such individuals try to avoid negative feedback, which can lead to withdrawal from the activity (Diener & Dweck, 1980; Elliot & Church, 1997). Therefore, this study refrains from theorizing the direction of the relationship between performance goal orientation and access to information, but offers two competing hypotheses. Thus,

H2a: The higher the level of an employee's performance goal orientation, the higher the level of perceived access to information of the employee.

H2b: The higher the level of an employee's performance goal orientation, the lower the level of perceived access to information of the employee.

5.2.2.2 BRIEFING

Opportunities that provide employees with the information necessary to become empowered can be formal (Shadur, Kienzle R., & Rodwell J. J., 1999), but have to be meaningful (Silver, Randolph, & Seibert, 2006). In high-empowerment organizations, this was observed to be achieved through regular meetings (Nonaka, 1988). In this type of organizations these meetings allow for open flow of information. An open flow of information comprises a bi-directional flow of information (Marchington, Parker, & Prestwich, 1989). For example, information about goals, responsibilities, strategic direction, and performance flows "downward" from management to employees, whereas information about employee attitudes and improvement ideas flows the other way around (Spreitzer, 2008).

It seems apparent that the type of information required necessary for empowering employees depends on the job profile of the employee (Combs, Yongmei, Hall, & Ketchen, 2006) and sometimes even on the tasks at hand. For example, a clerk working in an apparel retailer might need to know the future availability of cloth and the cloth that need to sell before the end of the season. In contrast, R&D employees might need to know the strategic considerations behind a product development effort, so they can incorporate the required features. A briefing defined as "the degree to which employees feel that their project leader or management at the start of a project enabled them to perform well and complete their tasks during the upcoming project" (see chapter 4) can achieve that. It is a formal way to offer, for example, information about goals, responsibilities, strategic direction, and performance (Marchington, Wilkinson, Ackers, & Goodman, 1993; Shadur et al., 1999; Spreitzer, 2008) and should significantly increase the amount of information received by employees (Marchington, Wilkinson, Ackers, & Goodman, 1994). This exchange of information in turn creates transparency for employees in an organizational setting (Gibson, Porath, Benson, & Lawler, 2007), helping employees to make more sense of the organizational information they already have, thus

H3: The higher the level of briefing an employee receives at the beginning of a project, the higher he or she perceives the level of access to information during that project.

A briefing as described in study one, includes discussions about the role of the employee. The role of an employee provides cues about the accountabilities associated with it (Roberts,

McNulty, & Stiles, 2005). This provides members with stringent expectations for resource utilization (Hall, Royle, Brymer, Perrewé, Ferris, & Hochwarter, 2006)[38]. This means that the clarification of an employee's role during a briefing might provide the information necessary to enhance an employee's perspective on the resources available, by providing cues about which resources will actually be needed. This reduces uncertainty, especially in an innovation context (Leiponen & Helfat, 2010). In addition, a briefing is one example for the concepts of high-performance work practices, employee involvement, and participative management which are believed to increase psychological empowerment through greater access to resources (Evans & Davis, 2005; Liao et al., 2009; Marchington et al., 1994). Thus,

H4: The higher the level of briefing an employee receives at the beginning of a project, the higher he or she perceives the level of access to resources during that project.

5.2.2.3 META-COGNITIVE MONITORING AS A MODERATOR

Hypothesis 3 postulates the positive influence of a contextual variable (briefing) on an organizational variable (perceived access to information). This raises questions as to whether some individuals are better at processing the information received during a briefing than others. In other words, is the relationship between the contextual factor and the organizational factor moderated by an individual factor? Strategy scholars propose that some individuals engage in a conscious process of reasoning to combine formerly unrelated skills and information which is essential for firm success (Ireland et al., 2003; Smith & Di Gregorio, 2002). Metacognition depicts such a cognitive process (Brown, 1987; Haynie & Shepherd, 2009). This study builds on Haynie and Shepherd's (2009) recent description of the meta-cognitive process. It leverages their work in an entrepreneurial setting and extends it to R&D projects in larger organizations which also face a highly uncertain environment (Herstatt et al., 2004) and are therefore comparable. Metacognition is described as organizing the knowledge and experiences that individuals have, and is effectively integrating new knowledge and experiences to learn from it in order to adapt an individual's cognitive functioning when facing complex and dynamic environments (Brown, 1987; Flavell, 1979; Flavell, 1987). In other words, meta-cognition is a higher-order cognitive process, which is often simplified as "thinking about thinking" (Livingston, 1997, p. 1), "knowing about knowing" (Metcalfe &

[38] Wallace, Johnson, Mathe, and Paul (2011) transferred Hall, Royle, Brymer, Perrewé, Ferris, and Hochwarter 's (2006) concept of personal resources to organizational resources.

Shimamura, 1996, p. 1) or "cognition about cognition" (Berk, 1983, p. 18) and is therefore different from other cognitive characteristics relevant for learning, as for example, intelligence (Haynie & Shepherd, 2009). To give an example, an employee in an R&D project gets the task of developing a part for a larger machine. An employee with high levels of cognitive skills, will dive into the task and develop the part. An employee who in addition has high metacognitive skills will first think about how to do it, that is, evaluate different strategies and then choose the best one.

Metacognitive monitoring defined as an "individual seeking and using feedback to reevaluate internal and external knowledge, idiosyncratic experiences, and accordingly adopting and choosing decision frameworks for the purpose of 'managing' a changing environment" (adopted from Haynie & Shepherd, 2009) is a central construct making up metacognition. In the work of Flavell (1979), metacognitive monitoring was the overarching construct comprising the different sub-dimensions of metacognition. In later conceptualizations, metacognitive monitoring is either set equal to metacognition (e.g., Ford, Smith, Weissbein, Gully, & Salas, 1998; Schraw & Dennison, 1994) or is the driver of all other dimensions (e.g., Haynie & Shepherd, 2009; Jost, Kruglanski, & Nelson, 1998).

Metacognitive monitoring occurs "both during and after the process of interpreting, planning, and implementing a response to a changed reality" (Haynie & Shepherd, 2009, p. 700). Specifically, individuals with higher meta-cognitive abilities are more open to external feedback, for example, from their project leaders and more likely to adapt (i.e., to learn) from this feedback and incorporate this into subsequent decision policies (Schraw & Dennison, 1994). Metacognitive monitoring triggers the reevaluation of external information (Haynie & Shepherd, 2009) and has been found positively correlated to knowledge and skill acquisition (Ford et al., 1998). This contributes to the positive effect of metacognitive abilities. On the other hand, Earley and Ang (2003) found that individuals with low metacognitive abilities have difficulty adapting when the decision context changes, in other words, when new information becomes available. As a reminder, a briefing at the start of a new project is set up to convey new information, thus providing a change in an employee's decision context. Hence, this study argues that employees with higher levels of metacognitive monitoring will profit more from a briefing, than employees with lower levels of this ability. Thus proposing,

H5: The higher the level of briefing an employee receives at the beginning of a project, the higher he or she perceives the level of access to information during that pro-

ject, but more so for employees with high metacognitive monitoring than for employees with low metacognitive monitoring.

In this study, meta-cognitive monitoring is theorized to moderate the effect of the briefing intervention on individuals' perceived levels of access to information. One could argue that it should be tested as a moderator on the two goal orientations as well. However, there is no theoretical base for a moderating effect on goal orientations, since meta-cognitive monitoring is theorized to be an antecedent of goal orientation (Haynie & Shepherd, 2009).[39]

5.2.2.4 TEAM RELATEDNESS

Many companies nowadays form teams to solve complex tasks and foster innovation (Chiaburu & Harrison, 2008; Gino, Argote, Miron-Spektor, & Todorova, 2010). Accordingly, many studies have been conducted to evaluate the interplay between the team and the individual – be it on motivation (e.g., Chen & Kanfer, 2006), knowledge integration (e.g., Gardner, Staats, & Gino, 2012), creativity (e.g., Hirst et al., 2009) or psychological empowerment (e.g., Chen et al., 2007a; Seibert et al., 2004). Considering these positive effects of teams on the individual, this study theorizes two team variables – team relatedness and team competence – to foster psychological empowerment within employees by providing them with perceived higher levels of access to resources.

Social exchange theory (Emerson, 1962) illustrates how power and influence between two or more employees is contingent on the number of employees from whom they can acquire resources (Sparrowe & Liden, 1997). While earlier research described resources as flowing down the lines of the organization (Cashman, Dansereau Jr, Graen, & Haga, 1976; Graen, Cashman, Ginsburg, & Schiemann, 1977), scholars argued that friendship networks within the organization are more than just linked friends. They are a means of mobilizing resources for work-related purposes (Lincoln & Miller, 1979). This might be explained with generalized norms of reciprocity, such that high-quality relationships are not concerned with the equality of exchanges (Blau & Alba, 1982; Emerson, 1976). These exchanges can include

[39] To provide robustness to the overall model, the antecedent relationship with the two goal orientations was tested and found statistically significant for learning goal orientation and non-significant for performance goal orientation.

both tangible and intangible resources and create feelings that exchange partners take care of each other (Cropanzano & Mitchell, 2005; Sluss, Klimchak, & Holmes, 2008).

Team relatedness (as theorized and validated in chapter 4) is defined as "the perception that one will feel connected to one's project team and that there will be a reciprocal caring relationship". The concept of such a relationship has already been integrated in earlier concepts of relational intimacy (e.g., Argyle & Henderson, 1984; Wish, Deutsch, & Kaplan, 1976). This concept acknowledges that individuals differentiate the relationships they hold with different people along a variety of dimensions, but ultimately establishes relationships along a continuum based on distance and intensity (Wish et al., 1976). Thus, the more related an individual feels to his or her team, the more intense or more intimate this relationship is. Roloff et al. (1988) found that a higher level of intimacy with a potential helper increases the obligation of this helper to grant a request for resources and the obligation to offer resources in a time of need. Moreover, the likelihood of asking for needed resources is higher the closer the relationship between help-seeker and help-provider is (DePaulo, 1978 as cited in Roloff et al., 1988). Consequently, the closer two individuals are, the more likely it is that a request for resources will be made, increasing the frequency of requests for resources, and ultimately increasing the amount of resources provided. Thus,

H6: High levels of perceived team relatedness lead to higher levels of perceived access to resources.

5.2.2.5 TEAM COMPETENCE

In a team setting, having the right human capital is crucial (Zarutskie, 2010). Human capital has been researched for quite some time (see e.g., Schultz, 1961) and is a significant driver for innovation and performance (e.g., Alpkan, Bulut, Gunday, Ulusoy, & Kilic, 2010; Bantel & Jackson, 1989; Edvinsson & Malone, 1997; Hitt, Biermant, Shimizu, & Kochhar, 2001; Hitt, Ireland, Camp, & Sexton, 2001; Skaggs & Youndt, 2004). The sum of human capital of individuals makes up the competence of teams or organizations (Pennings, Lee, & van

Witteloostuijn, 1998)[40]. In this study, team competence is defined as the "right" competences of the project team members to advance project success.

The "right" competence is a function of an individual's experience, expertise, skills, and knowledge (Davidsson & Honig, 2003; Joia, 2000; Kor, 2003). It is not just the result of one's education but is created on-the-job as well (Dakhli & Clercq, 2004). Higher levels of team competences should lead to higher levels of access to organizational resources for two reasons. First, project team members with a high level of competence can be a resource on their own (according to the resource-based view, (see e.g., Hitt et al., 2001; Wright, Dunford, & Snell, 2001). Human capital refers to employee knowledge, skills, and abilities that are valuable for the firm (Subramaniam & Youndt, 2005). It is as an intangible resource more likely to produce a competitive advantage because it is often rare and socially complex, thereby making it difficult to imitate (Barney, 1991; Black & Boal, 1994). Human capital is one of the few firm resources that has the potential to not become obsolete and can be applied across technologies, products, and markets which can make it hard to substitute (Wright, McMahan, & McWilliams, 1994). Second, those with higher competences are likely to have bigger networks inside the organization (a social support structure; Kirkman & Rosen, 1999), which provides them with more access to organizational resources (Brass, 1981, Brass, 1984; Dubini & Aldrich, 1991; Sparrowe, Liden, Wayne, & Kraimer, 2001), and resources are acquired through collaboration with others (Chetty & Wilson, 2003). Thus,

H7: Higher levels of perceived team competence lead to higher levels of perceived access to resources for an individual team member.

5.2.3 Excursus: Validation of established relationships

In the following section, additional hypotheses are generated. This shall provide validity towards the existing network circling psychological empowerment. By testing and validating these hypotheses, it shall provide further credibility for this study's findings. For this, the underlying mechanisms connecting access to information, access to resources, and psychologi-

[40] One has to be careful to distinguish the competence of employees, which is based on their human capital from the (core) competences of the organization. In the latter case, human capital is just one example for a specific competence the organization has (see e.g., Wright, Dunford, and Snell (2001).

cal empowerment are quickly described and stated as further hypotheses so that they can be tested and elaborated upon in the results section of this study.

A higher level of access to information allows employees to see their organization in a bigger picture, comprehend their role better and align themselves accordingly (Spreitzer, 1996b). This might help them to identify available resources (Callister, 2006). Furthermore, access to information can translate into power in an organizational setting (Kanter, 1977). Consequently, possessing information would give individuals a better overview of available resources within their organization and provide them with the means to acquire those resources. Thus,

H8: Higher levels of perceived access to information lead to higher levels of perceived access to resources.

The link between perceived access to information and resources and psychological empowerment has been described in chapter 2 of this thesis and at the beginning of this chapter. For the purpose of testing, the following two hypotheses are provided by leaning on previous research (see e.g., Cho et al., 2006; Siegall & Gardner, 2000; Spreitzer, 1995a; Spreitzer, 2008).

H9: Higher levels of perceived access to information lead to higher levels of psychological empowerment.

H10: Higher levels of perceived access to resources lead to higher levels of psychological empowerment.

5.3 Method

To test the hypothesized relationships, this study employs primary data obtained from employees working in R&D teams from multiple German companies. This is an appropriate sample because work in teams is often used by companies for increasing productivity and flexibility as well as employee motivation and morale (Abbott, Boyd, & Miles, 2006; Bishop, Scott, & Burroughs, 2000; Lawler, Mohrman, & Ledford, 1992). Additionally, projects are often important to project team members (Deci & Ryan, 2000b; Shepherd & Cardon, 2009; Shepherd et al., 2011) and empowerment of R&D employees is an increasing trend (Gassmann & Zedtwitz, 1998, Gassmann & Zedtwitz, 1999). For more information, including

the acquisition process and descriptive statistics of the sample, please refer to chapter 3 of this thesis.

5.4 Results

Table 18 presents descriptive statistics in the form of means and standard deviations as well as Cronbach Alphas (for psychometric scales only), and zero-order inter-item correlations. Hierarchical linear regression was used to test all hypotheses. Table 19 shows the results of the models for the dependent variables access to information (Hypotheses 1, 2, 3, and 5), access to resources (Hypotheses 4, 6, 7, and 8), and psychological empowerment (Hypotheses 9 and 10) respectively.

The hierarchical approach was deemed adequate, because its use is particularly recommended when analyzing potentially correlated independent variables or for multiplicative (moderation) terms (Cohen, 2003). In models 1-3 of Table 19, perceived access to information is the dependent variable. The base model including only the control variables explains 17 percent ($p < .01$) of the overall variance of access to information. Model 2 then includes the main effects (direct relationships) of learning goal orientation, performance goal orientation, briefing, and meta-cognitive monitoring. This model explains significantly more variance of the dependent variable over and above the base model ($\Delta R^2 = .06$; $p < .01$). Adding the interaction term in model 3, again significantly increases the variance explained in access to information ($R^2 = .26$; $p < .01$) over and above the main-effects model 2 ($\Delta R^2 = .03$; $p < .01$). Hypothesis 1 states that individuals with higher levels of a learning goal orientation will perceive higher levels of access to information. The data indicates that there is a significant, positive relationship ($\beta = .16$; $p < .05$) between learning goal orientation and perceived access to information in model 3. However, looking at model 2, the standardized regression coefficient is only .14 and not significant at the 5%-level. Thus, there is mixed evidence for hypothesis 1.

	Mean	s.d.	Alpha[e]	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Gender[a]	0.13	n/a	n/a															
2. Age[b]	40.96	9.98	n/a	0.05														
3. Industry Experience[b]	11.76	9.83	n/a	-0.03	.77**													
4. Project Leader[c]	0.55	n/a	n/a	0.06	0.14	0.16												
5. Performance of last project	4.81	1.32	0.84	-0.06	-0.02	-0.01	0.15											
6. Team size of current project	16.51	13.81	n/a	-0.07	-.18*	-.17*	-.46**	-0.12										
7. Company revenue 2011[d]	21.94	25.70	n/a	-0.08	-0.01	-0.01	-0.02	0.02	-0.06									
8. Performance goal orientation	4.78	0.79	0.70	0.03	0.04	0.05	-.17*	-.16*	0.05	0.08								
9. Learning goal orientation	6.02	0.60	0.80	-0.01	-0.09	0.00	-0.13	0.16	0.08	-0.11	0.01							
10. Meta-cognition	5.65	0.67	0.75	-.16*	-0.16	-0.07	0.07	.17*	0.05	0.00	-0.10	.32**						
11. Briefing	4.79	1.32	0.92	-0.02	-0.03	-0.03	0.01	.20*	-0.06	0.10	-0.12	-0.14	0.06					
12. Team relatedness	5.33	1.24	0.90	-0.02	-0.10	-0.06	0.01	.16*	0.04	0.08	0.10	-0.09	-0.04	.43**				
13. Team competence	5.44	1.23	0.92	-0.07	-0.12	-0.07	-0.13	0.09	.179*	-0.01	0.09	0.04	-0.01	.50**	.49**			
14. Access to information	4.47	1.56	0.86	-0.06	0.03	0.03	.30**	.27**	-.26**	0.09	-0.15	0.10	.16*	.24**	0.10	0.06		
15. Access to resources	4.35	1.31	0.88	-0.13	-0.06	0.03	-0.07	.24**	0.10	0.05	-0.06	.17*	.20*	.35**	0.06	.33**	.36**	
16. Psychological Empowerment	5.52	0.76	0.87	-.20*	-0.10	0.04	.28**	.18*	-0.06	0.04	-0.16	0.13	.21**	.36**	.30**	.24**	.40**	.37**

[a] Dummy: 1 = Female, 0 =male; [b] in years; [c] Dummy; [d] in €bn; n=152 (age=135); [e] Cronbach Alpha – n/a = not applicable for non-psychometric scales
* p < .05; ** p < .01

Table 18: Means, standard deviations, and two-tailed correlations of the study variables

Hypotheses 2a and 2b specify that people more oriented towards a performance goal might have either more or less perceived access to information. Results reveal that there is a slightly negative, but non-significant relationship (β = -.05; $p > .05$) between performance goal orientation and access to information; thus neither hypothesis 2a nor 2b are supported. Hypothesis 3 proposes that employees that perceive to receive a better briefing at the beginning of their project will perceive more access to information. The significant and positive relationship (β = .16; $p < .05$) between the variables of briefing and access to information supports hypothesis 3.

	Access to information			**Access to resources**		**Psychological Empowerment**	
Independent Variables	**Model 1**	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**
Controls							
Gender	-0.06	-0.05	-0.07	-0.09	-0.05	-.19*	-.15*
Age	0.00	0.04	0.08	-0.13	-0.13	-.23*	-.20*
Industry Experience	-0.03	-0.04	-0.06	0.14	0.16	0.17	0.14
Project Leader	.21*	.22*	.21*	-0.06	-0.10	.31**	.28**
Performance of last project	.21**	0.12	0.09	.25**	.15*	0.13	0.02
Team size of current project	-0.14	-0.14	-0.15	0.10	0.13	0.08	0.09
Company revenue 2011	0.07	0.07	0.07	0.05	0.02	0.03	0.00
Predictors							
Learning goal orientation		0.14	.16*				
Performance goal orientation		-0.06	-0.05				
Meta-cognitive monitoring		0.06	0.07				
Briefing		.21**	.16*		.21*		
Team relatedness					-.22**		
Team competence					.25**		
Access to information					.33**		.23**
Access to resources							.26**
Briefing x meta-cognitive monitoring			0.19*				
R^2	.17**	.23**	.26**	.10*	.33**	.18**	.32**
Adjusted R^2	.12**	.17**	.20**	.05*	.28**	.14**	.28**
ΔR^2	.17**	.06*	.03*	.10*	.24**	.18**	.15**

Note: standardized regression coefficients are displayed; Asterisks at $R^2/\Delta R^2$ indicate p-level of change in F

Table 19: Results of hypothesis testing using hierarchical regression analysis

The results of the full model provide support for hypothesis 5 which postulated that employees with higher meta-cognitive monitoring skills will benefit more from a briefing in terms of perceived access to information than will employees with low meta-cognitive monitoring skills. The interaction term (briefing x meta-cognitive monitoring) has a positive, sig-

nificant relationship ($\beta = .19$; $p < 0.05$) with access to information. To determine the nature of this interactive effect, "PROCESS Procedure for SPSS" (PROCESS; Hayes & Matthes, 2009) was used. First, the Johnson-Neyman technique (Bauer & Curran, 2005) was employed to determine the range of the moderator variable in which the interactive effect is significant. This was found for all values of the meta-cognitive monitoring variable that were above its mean value. For this mean value of meta-cognitive monitoring, the 95 % confidence interval (CI) for the effect of briefing on access to information only just included zero (effect = .16; t = 1.98; p = .05; CI [.00; .31]). This means that only for employees with at least average meta-cognitive monitoring skills will a briefing have a positive effect on their perceived levels of access to information. The relationship between briefing and access to information below mean values of meta-cognitive monitoring is not significant at the 5%-level. This means that for all employees with below average levels of meta-cognitive monitoring a briefing at the beginning of the project does not play an important role. To more easily interpret the effect of meta-cognitive skills and briefing on access to information, the effect was visualized using PROCESS. Since the moderation is non-significant at below average levels of meta-cognitive monitoring, the results are shown in Figure 10 only for high and average levels.

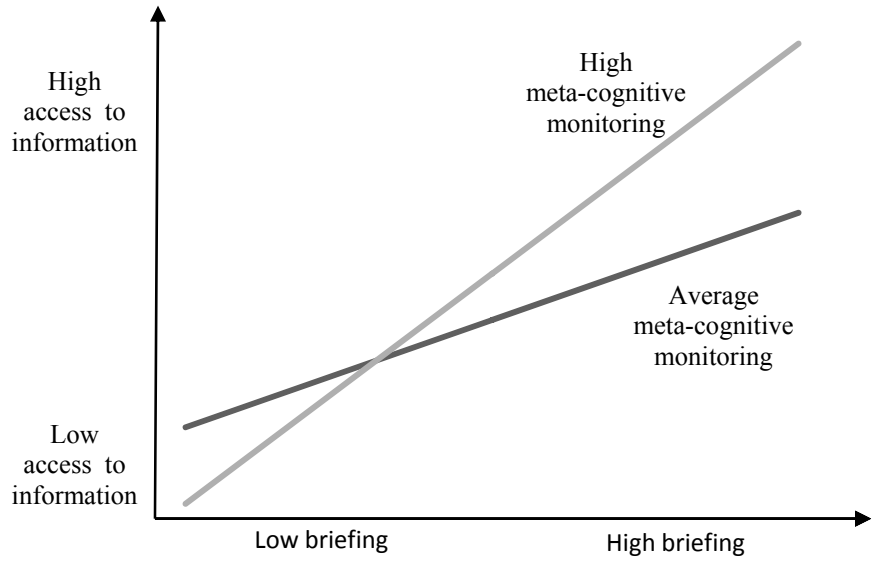

Figure 10: Moderating effect of meta-cognitive monitoring on briefing

Figure 10 provides further evidence towards hypothesis 5, such that individuals with higher abilities of meta-cognitive monitoring benefit more from a briefing (perceive higher access to information from a briefing) than do individuals with lower metacognitive abilities.

Access to resources is the dependent variable in models 4 and 5 of Table 19. Model 4 demonstrates that the control variables explain a significant amount of variance ($R^2 = .10$; $p < .05$). The inclusion of the briefing, team relatedness, team competence, and access to information variables in model 5 significantly increases R^2 over and above the effects of the controls-only model ($\Delta R^2 = .24$[41]; $p < .01$). Hypothesis 4 proposes that the better the briefing employees receive the more access to resources they perceive. This is supported by the results, since briefing is significantly, positively related ($\beta = .21$; $p < 0.05$) to access to resources. Hypothesis 6 puts forward that the more related individuals are with their project team, the more access to resources they perceive. This could not be validated in the results. There, team relatedness was significantly negatively related ($\beta = -.22$; $p < 0.01$) to access to resources, thus not only rejecting hypothesis 6, but indicating the opposite relationship. This finding will be elaborated on further in the discussion section. Hypothesis 7 theorized that a more competent team provides the individual with more perceived access to resources than a less competent team would. This could be found in the data, such that team competence was significantly, positively related to access to resources ($\beta = .25$; $p < 0.01$); thus hypothesis 7 is supported. Towards validating already known linkages in the nomological network of psychological empowerment, hypothesis 8 stated that more access to information will translate into more access to resources. This is confirmed by the significant, positive relationship between access to information and access to resources ($\beta = .33$; $p < 0.01$); thus validating hypothesis 8.

For embedding hypothesis 1 to 7 in the nomological network of psychological empowerment, models 6 and 7 of Table 19 have psychological empowerment as their dependent variable. Model 6 being the controls-only model already explains a significant amount of variance ($R^2 = .18$; $p < .01$) present in the dependent variable. Including access to information and access to resources leads to a significant increase in variance explained ($\Delta R^2 = .15$[42]; $p < .01$) over and above the controls-only model. Hypothesis 9 proposes that those with more perceived access to information should experience higher levels of psychological empowerment. This link is validated by the data, since the relationship between access to information and psychological empowerment is significant and positive ($\beta = .23$; $p < 0.01$); thus providing support for hypothesis 9. Finally, hypothesis 10 proposed that perceived access to re-

[41] Deviations due to rounding

[42] Deviations due to rounding

sources has a positive effect on an individual's level of psychological empowerment, thus the more resources one thinks one has, the more empowered one will feel. This is also validated by the results. The relationship between access to resources and an individual's psychological empowerment is significant and positive ($\beta = .26$; $p < 0.01$).

5.5 Discussion

5.5.1 Summary of results

Many different antecedents influencing employees' levels of psychological empowerment have been theorized and found by scholars (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008). Still, there is virtually no research answering the questions about how these antecedents develop in the context of psychological empowerment; and how they influence each other (Maynard et al., 2012; Spreitzer, 2008). This study built on two well-studied and established antecedents of psychological empowerment: Perceived access to information and perceived access to resources. Since the beginning of research into psychological empowerment, there has existed the notion that it is not only contextual factors which exert influence on it; but also employees' individual characteristics (Seibert et al., 2011; Spreitzer, 1995a; Spreitzer, 2008; Thomas & Velthouse, 1990). To date however, little research has examined if and how individual dispositions contribute to employees' levels of psychological empowerment (Maynard et al., 2012). This study has started to investigate the relationship between an individual's learning and performance goal orientation, and his or her level of perceived access to organizational information. While there was no evidence of any effect (positive or negative) of a performance goal orientation; the hierarchical regression analysis found some evidence for the positive effect of a learning goal orientation. Drawing on goal orientation theories, the positive effect of learning goal orientation might be attributable to the mastery oriented behavior such individuals exhibit (Bunderson & Sutcliffe, 2003).

Furthermore, it was established that a briefing designed towards providing information for an upcoming project can have a positive impact on levels of perceived access to information for employees (Marchington et al., 1989). Starting from there, this study found that employees possessing better meta-cognitive monitoring skills benefited more from this briefing than did employees possessing lower levels of these skills. The rationale behind this is that individuals with high meta-cognitive skills do more strongly relate to feedback they re-

ceive from their environment and adopt decision processes accordingly (Haynie & Shepherd, 2009); in other words, when they are taught, they learn more. The same briefing was found to increase an employee's levels of perceived access to resources which was theorized to work through role clarification during the briefing (Hall et al., 2006; Roberts et al., 2005). In addition, the impact of one's project team has been a neglected area of research in the context of psychological empowerment (Maynard et al., 2012) and with respect to their impact on employees' perceived access to resources. This study investigated this question by examining the impact of team relatedness and team competence on employees' perceived access to organizational resources. Team competence was theorized to work through the value of a competent team as a resource (as motivated by the resource-based view [Hitt et al., 2001]), and the social support structure a team provides through its network (Kirkman & Rosen, 1999). While it was found that team competence had a significant and positive effect, the opposite was found for team relatedness, which had a significant negative impact. Finally, this study embedded its hypotheses into the nomological net of psychological empowerment and confirmed the known linkages between access to information, access to resources, and psychological empowerment.

5.5.2 Contributions to the literature on psychological empowerment

First and foremost, this study provides important contributions to the literature on psychological empowerment. As becomes obvious when looking at the literature overview in chapter 2 of this thesis, many scholars have already investigated drivers (antecedents) of employees' levels of psychological empowerment. In their meta-analysis Seibert et al. (2011) could consider 262 different antecedent relationships with psychological empowerment. Despite the abundance of research on it, there are still some gaps that this study begins to close.

First, most existing studies have focused on contextual antecedents of psychological empowerment (Seibert et al., 2011). This seems sensible since the notion of empowerment originated from theories of employee involvement and participation (e.g., Lewin, 1947), and organizational change, affirmative action, and the quality of work life (e.g. Kanter, 1977). These are structural empowerment techniques concerned with a macro perspective of the organizational environment and adopting facets of the job, organizational arrangements, policies and processes (Eylon & Bamberger, 2000; Liden & Arad, 1996). Psychological empowerment however, views those techniques as necessary but not sufficient conditions (Kirkman

& Rosen, 1999; Seibert et al., 2004; Spreitzer, 1996b; Spreitzer, 2008), since it is concerned with the perception of the conditions created by structural empowerment (Bandura, 1977, Bandura, 1982) and thereby defines a motivational process (Conger & Kanungo, 1988). Since, psychological empowerment is defined as a cognitive state (Spreitzer, 1995a), early conceptualizations have already stressed the importance of differences between individuals and that those differences shape empowerment perceptions (Spreitzer, 1995a; Thomas & Velthouse, 1990). Yet, as was already pointed out in the introduction of this chapter, only a few researchers explicitly integrated individual characteristics in their models (see Avey et al., 2008 for an exception).

This study therefore followed the call for research (Maynard et al., 2012; Spreitzer, 2008) and began to shed light on this research avenue. It did so by examining two known and validated antecedents of psychological empowerment: perceived access to information and perceived access to resources. It examined the impact of three individual characteristics, those being: learning goal orientation, performance goal orientation and meta-cognitive monitoring. While no support could be found for any effect of performance goal orientation on employees' levels of perceived access to information, there was some support for a positive effect of an individual's learning goal orientation. In addition, it was theorized and the analysis confirmed this, that an individual's level of meta-cognitive abilities enhanced the positive effect of a briefing at the start of a project on levels of access to information. These findings emphasize the importance of individual characteristics for research in the context of psychological empowerment and other researchers should be encouraged to test additional individual characteristics in their research endeavors.

Second, this study contributes by examining the effect of teams in the context of psychological empowerment. There have only been a few studies focusing on the influence of teams on an individual's level of psychological empowerment (Maynard et al., 2012; Seibert et al., 2011), and most of them either only theorized an effect from organization or team empowerment to individual psychological empowerment (e.g., Chen et al., 2007a; Hempel et al., 2012; Seibert et al., 2004) or failed to include any control variables such as age, gender or job level into their analysis (e.g., Liden et al., 2000; Siegall & Gardner, 2000). This study theorized that team relatedness and team competence would have an effect on an important antecedent of psychological empowerment: perceived access to resources. Team competence was theorized and found to have a positive effect on levels of perceived access to resources as compe-

tence can be classified as a resource in the sense of the resource-based view (Barney, 1991; Wright et al., 2001). Furthermore, this was theorized to have an effect through mechanisms of social resources and networks (Brass, 1984; Kirkman & Rosen, 1999). Team relatedness proved to influence individuals' perceptions of access to resources as well, but this relationship, opposite to theory, was negative. Nevertheless, the presence of significant effects in the data warrants further research on the impact of one's team on individuals' perceptions of important antecedents to psychological empowerment. This has already been proposed as a fruitful research avenue (Maynard et al., 2012) and other researchers should be encouraged by the findings of this study to follow it.

Third, this study contributes by providing further empirical evidence for the positive and significant relationships between perceived access to information and resources and psychological empowerment. This has been found in several studies already (Aryee & Chen, 2006; Cho et al., 2006; Kirkman & Rosen, 1999; Laschinger et al., 2001; Laschinger et al., 2004; Seibert et al., 2001; Siegall & Gardner, 2000; Spreitzer, 1995a, Spreitzer, 1996b) and this study confirms their findings. Additionally, it is to best knowledge the first research effort to go one step down the chain of effects and investigates how antecedents of psychological empowerment develop and how these factors might be interrelated. This study endevours to stimulate future research in this area to gain a deeper understanding on how psychological empowerment develops.

5.5.3 Contribution to the literature on goal orientations

Although there was mixed evidence for the effect of individual goal orientations on perceived access to information, this study also makes a contribution to the literature on goal orientations. This study proposed that an individual's learning goal orientation would have a positive effect on individuals' levels of perceived access to information. It theorized that people adopting a learning goal orientation would show mastery oriented responses in the face of obstacles or challenges, or even actively seek them (Bunderson & Sutcliffe, 2003; Diener & Dweck, 1980; Nicholls, 1978). To master these challenges, individuals would invest additional effort and increase their willingness to seek and acquire additional information. This is consistent with previous research which found that people adopting a learning goal orientation are more intrinsically motivated and will show increased effort towards multiple outcomes (Ahearne, Lam, Mathieu, & Bolander, 2010a; Hirst et al., 2009; Stevens & Gist,

1997). Ahearne et al. (2010) theorized and validated that sales persons with higher learning orientations had a higher performance trajectory after a planned change intervention. Hirst et al. (2009) examined the effects of individual R&D employees' goal orientations and team goal orientations. Their data from 25 R&D teams did provide inconsistent results for the cross-level interactions of individual learning with team learning, but it also clearly showed that higher levels of individual learning orientation lead to higher levels of employees' creativity. It is also in line with the latest theorizing by Chadwick and Raver (2012), who proposed that an individual's mastery orientation influences the individual's learning process of intuition and interpretation. The data established at least some support for these arguments. It therefore provides further evidence towards the importance of an individual learning goal orientation on the learning and information assimilation process context in general and with respect to R&D employees in particular.

5.5.4 Contribution to the literature on meta-cognitive abilities

Furthermore, this study provided evidence towards the value of an individual's meta-cognitive abilities. Individuals possessing higher levels of meta-cognitive monitoring abilities benefited more from a briefing than did people with lower abilities. It seems that such individuals are more open to feedback from the outside and are more likely to learn from this feedback and that they more often reevaluate external feedback or information over time (Haynie & Shepherd, 2009; Haynie, Shepherd, & Patzelt, 2012). What is interesting in this context is that in the absence of an intervention providing information and feedback, there was no direct effect of meta-cognitive monitoring on perceived access to organizational information. This confirms the notion that meta-cognitive abilities are contingent on the information provided. They only enable individuals to organize, understand, and integrate 'new' knowledge to learn and adapt (Brown, 1987; Flavell, 1979; Flavell, 1987), when this 'new' knowledge is provided by the organization. This is in line with recent research (Haynie, Shepherd, Mosakowski, & Earley, 2010; Haynie et al., 2012). For example, Haynie et al. (2012) investigated the moderating effect of meta-cognitive knowledge and meta-cognitive experience on the relationship between feedback and the effectiveness with which entrepreneurs effectively adapted their decision policies. While they could not find a moderating effect for meta-cognitive experience, they did find a highly significant effect for individuals with high levels of meta-cognitive knowledge when those received cognitive-based feedback

as opposed to outcome-based feedback. Consequently, this study supports theory and evidence provided by scholars on the interactive nature of meta-cognitive abilities.

5.5.5 Contributions to the literature on teams

Furthermore, this study provides two contributions for the literature on teams. Many studies have examined the effects of a team's competence on organizational level or team level measures (e.g., Colombo & Grilli, 2005; Dooley & Fryxell, 1999; Kor, 2003; Ozkaya, 2010; Zarutskie, 2010) and the effect of a team's competence on the individual employee (e.g., Jex & Bliese, 1999). Zarutskie (2010) investigated the relationship between the top management team's human capital and venture capital fund performance. She found that the management team's human capital is indeed a strong predictor of fund performance, with the amount of task-specific human capital increasing chances of fund success. Dooley and Fryxell (1999) examined the relationship between team competence and decision commitment. They found that when a team has high levels of perceived competence, dissent during the strategic decision-making process was positively related to decision commitment. Jex and Bliese (1999), in their analysis of a sample of US army employees, found that their shared perceptive measure of collective efficacy negatively moderated the impact of a high work load on individuals' levels of job satisfaction and positively moderated the impact of high task significance on levels of affective organizational commitment. So, there has been evidence that high levels of team human capital or competence have a positive impact on a multitude of outcome measures. This study examined the effects of team competence on an individual's perceived access to resources. By establishing a positive and significant relationship between the two measures, this study contributes to the literature on teams by providing further evidence that a team has a significant impact on individual level constructs and work outcomes. This study therefore encourages scholars to use this study's findings for further explorations in this area.

5.5.6 Explanations for non-theorized findings

So, why did the constructs of performance goal orientation and team relatedness fail to confirm their theorized results? As already described, performance goal oriented people tend to be extrinsically motivated. To maximize or maintain extrinsic motivational triggers, they might adopt two behavioral patterns. When they are sufficiently sure of mastering the task at hand they will engage with maximum effort, while in the face of failure they will withdraw

from the activity (Hirst et al., 2009). This can lead to higher or lower levels of access to information, since performance oriented individuals might put effort into seeking information or not. It is possible that in the current sample those effects are both present and therefore cancel each other out. One possibility to confirm this explanation in future research is to employ the 3-factor instrument of goal orientation developed by Vandewalle (1997). He does split performance goal orientation into a proving (performance) goal orientation which is concerned with high performance and an avoidance (performance) goal orientation which leads to activity withdrawal.

For the unexpected negative effect of team relatedness two effects might be at play. First, when a request is made to an intimate, a positive response is expected. When such requests are rejected, expectations are disconfirmed (Bar-Tal, Bar-Zohar, Greenberg, & Hermon, 1977; Clark & Waddell, 1985; Roloff et al., 1988). High levels of team relatedness might lead to overly optimistic expectations of employees towards their colleagues. When those are not able to meet demands and thus satisfy these high expectations, this might lead to negative emotions in the form of disappointment and frustration. Future research could therefore include measures of expectations towards one's colleagues, to investigate if the negative relationship found in this study can be explained by this effect. A second explanation could be that the independent and dependent variables were attributed to different levels of analysis. While team relatedness was associated with the employee's project team, access to resources was concerned with resources on an organizational level (see definition of scale in chapter 3). So, high levels of team relatedness might indeed lead to higher levels of perceived resources, but this being team resources. At the same time, being more related to the team might also hint at a more distant relationship with the rest of the organization since relatedness can depend on context (Vallerand, 2000). This more distant 'relationship' with the organization might then lead to lower levels of perceived access to organizational resources. So, future researchers could decompose these relationships by aligning relatedness and access to resources to the same level of measurement.

5.5.7 Conclusion

Psychological empowerment is a powerful concept in organizational research. Increasing this motivation is an important undertaking for organizations in order to be successful, thus finding antecedents is an important area of research. Examining R&D employees in an organ-

izational setting, this study found that not only contextual factors influence levels of psychological empowerment, but that this is also dependent on individual factors, for example, individual goal orientations. Next, it was established that an intervention had a positive effect on an individual's perception of access to information (and this increased levels of psychological empowerment) and that this effect was stronger for those individuals possessing higher skills in meta-cognitive monitoring. Furthermore, theory suggested and the data confirmed that a more competent team heightens individual's perceptions of access to organizational resources (and this again, increased levels of psychological empowerment). Finally, this study was able to provide some valuable contributions in the areas of psychological empowerment, goal orientations, meta-cognitive abilities, and teams and thereby hopes to stimulate discussions and motivate future researchers to dive deeper into research on how psychological empowerment develops.

6 STUDY 3: RESEARCH ON OUTCOMES OF PSYCHOLOGICAL EMPOWERMENT

6.1 Introduction

An ever faster moving world with quick changes in technology, customer preferences and keen competition puts ever more pressure on companies' R&D functions (Kessler & Chakrabarti, 1996) and makes their tasks more uncertain and equivocal (Bodensteiner et al., 1991). The success of R&D functions largely depends on the intellectual and creative efforts of the knowledge workers in those functions (Chang & Choi, 2007) and thus motivating and retaining the best R&D employees is crucial (Farris & Cordero, 2002). Among the many success factors that are critical, commitment of R&D employees has been identified as important to ensure the success of R&D efforts (Lee, 2005).

Organizational commitment especially has been the focus of many researchers for quite some time, and consequently, its relationship with desirable intentions or behaviors in the workplace has largely been supported (Allen & Meyer, 1990; Becker, Billings, Eveleth, & Gilbert, 1996; Becker, Randall, & Riegel, 1995; Bishop et al., 2000; Gardner, Wright, & Moynihan, 2011; Herscovitch & Meyer, 2002; Hunter & Thatcher, 2007; Mathieu & Zajac, 1990; Meyer, Becker, & Vandenberghe, 2004; Meyer & Herscovitch, 2001; Meyer, Stanley, Herscovitch, & Topolnytsky, 2002; Riketta, 2002; Steers, 1977; Tett & Meyer, 1993; Vandenberghe, Bentein, & Stinglhamber, 2004). Organizational commitment is the relative strength of an individual's identification with, and involvement in, a particular organization (Allen & Meyer, 1990). It has been found to be a significant predictor of job performance (e.g., Hunter & Thatcher, 2007; Riketta, 2002), intent to quit (e.g., Bishop et al., 2000; Vandenberghe et al., 2004), turnover (e.g., Gardner et al., 2011), and organizational citizenship behavior (e.g., Bishop et al., 2000; Gregersen, 1993) and consequently studies were dedicated to finding possible antecedents of organizational commitment.

One variable that has consistently been linked to organizational commitment is psychological empowerment[43] (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 1995a). Psychological empowerment is a process of intrinsic task motivation comprising the four cognitions of meaning, competence, self-determination, and impact (Spreitzer, 1995a). However, there is reason to believe that the effect of employees' levels of psychological empowerment on outcomes might be contingent on employees' perceptions of contextual factors in the workplace (Ahearne et al., 2005b; Janssen, 2004). Ahearne et al. (2005) investigated the link between leadership empowering behavior and customer satisfaction and performance through the mediating factors of self-efficacy and adaptability. They theorized that employee empowerment readiness would positively moderate both direct relationships of leadership empowering behavior with the mediators. Empowerment readiness was defined as "the extent to which employees possess an array of task-relevant knowledge and experience that will enable them to benefit from, and to be successful in, an empowered environment" (p. 948). They based this argument on the assumption that more experienced and knowledgeable employees would be better suited to be empowered than would be less experienced and knowledgeable employees. However, they found that both moderating relationship were indeed negative. They concluded that there is no need to empower highly experienced and knowledgeable employees, because they have already enacted an effective role. However, empowering less experienced and knowledgeable employees seems to be a worthwhile task, because it serves as development of those employees.

In addition, some researchers have explicitly examined potential moderators of the relationship between psychological empowerment and organizational commitment (Hon & Rensvold, 2006; Janssen, 2004; Joo & Shim, 2010). Joo and Shim (2010) using a sample of 294 public sector employees theorized that an organizational learning culture would positively moderate the relationship between the four psychological empowerment dimensions and organizational commitment. They found that while organizational learning culture positively moderated the relationship between the competence dimension and organizational commitment, it was a negative moderator of the relationship between self-determination and organizational commitment. They conclude that in an environment with a low organizational learning culture, the feelings of employees that they are autonomous and can work inde-

[43] Since chapter 2 contains a broad literature overview of psychological empowerment, this introduction focuses only on the aspects relevant for this chapter. For a deeper theoretical background, please refer to chapter 2.

pendently seem more important for ensuring high levels of organizational commitment. Janssen (2004) specifically examined the influence of potential stressors to the empowerment-commitment relationship for individual employees. Employing a sample of 91 teachers from a secondary school in the Netherlands, he examined the "barrier effect" of conflict with the supervisor. They argue that conflict with the supervisor may reduce employees' ability to identify with and be involved in the organization (i.e. to be committed). They found the interaction term of psychological empowerment and supervisor conflict to be highly significant ($p < .001$) and negative in the relationship with organizational commitment.

So, there is some reason to believe that examining psychological empowerment with respect to its effect on outcomes and especially with respect to organizational commitment alone, might lead researchers to miss a part of the whole picture. There seem to be some boundary conditions that can enhance and impair the effect of psychological empowerment on relevant outcomes in the workplace. However, research in this area seems to be scarce and consequently several authors have made a call for research in this area (Aryee et al., 2012; Janssen, 2004; Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 1995a; Spreitzer, 2008).

This chapter investigates the potential contingencies of the relationship between employees' levels of psychological empowerment and their levels of affective commitment to the organization. The foundation for this direct relationship has already been laid in Spreitzer's (1995) construct and scale development effort of psychological empowerment. This has, thereafter, been investigated and validated in many studies (Avolio et al., 2004; Barroso Castro et al., 2008; Bogler & Somech, 2004; Butts, Vandenberg, DeJoy, Schaffer, & Wilson, 2009; Janssen, 2004; Liden et al., 2000; Raub & Robert, 2007; Seibert et al., 2011). Building on this well-established relationship, this study introduces the three contextual factors of briefing, team competence and team relatedness that were developed in chapter 4. Again, it is important to note that not the actual contextual factors are examined but employees' perceptions of those factors. But, as already argued in the last chapter, employees' perceptions of contextual factors are important to investigate in the context of psychological empowerment (Spreitzer, 1996b). The three variables are introduced and theorized as potential moderators of the psychological empowerment – outcome relationship. While briefing and team competence will be theorized to positively moderate the relationship between levels of psychological empowerment and affective organizational commitment, the direction of the moderating effect for team relatedness is ambiguous. The theorized effects will then be tested on sample

2 as described in chapter 3 of this thesis. This sample contains 152 R&D employees working in 23 companies. Based on the theory developed and tested on this meaningful sample, this study aims to make two main contributions.

First, this study contributes to the literature on psychological empowerment by examining potential moderators of the psychological empowerment – outcome relationship. As stated above, there is evidence that there is need for the examination of potential boundary conditions of this relationship and little research on this topic has been conducted to date (Ahearne et al., 2005b; Janssen, 2004; Joo & Shim, 2010). Consequently several researchers have argued that there is need for such an endeavor (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008) and this study will embark on it.

Another important contribution is provided to researchers focusing on affective commitment. Prior studies often focused on leadership as an important determinant of affective commitment (e.g., Avolio et al., 2004; Gerstner & Day, 1997; Raub & Robert, 2007; Zhang, Wang, & Shi, 2012). They examined the effect of leader-member exchange (Gerstner & Day, 1997; Zhang & Bartol, 2010), transformational leadership (Avolio et al., 2004) or empowering leadership (Raub & Robert, 2007). Raub and Robert (2007) examined culture as a moderator of the relationship between psychological empowerment and employee outcomes and showed that independent of culture (measured as conformity) the effect of empowering leadership behavior on organizational commitment was fully mediated by psychological empowerment. So, in their sample, psychological empowerment was a highly significant predictor of commitment independent of culture as moderator. This leads to the question, what might be possible moderators of antecedent – affective commitment relationships. Existing research has pointed out that leaders as well as one's team are important for determining employees' levels of job attitudes (Abbott et al., 2006; Bishop & Scott, 2000; Chiaburu & Harrison, 2008) and, especially, that the team is often neglected in research on commitment (Chiaburu & Harrison, 2008; Reichers, 1985). This study therefore aspires to contribute to research on affective commitment by integrating both types of relationships in the workplace as moderators of the psychological empowerment – affective commitment relationship.

In the remainder of this study, the state of research on the effects of affective organizational commitment on employees' intentions and behavior will be described followed by the theorized and empirically confirmed linkage to psychological empowerment. Afterwards, the

hypotheses for the three moderations will be developed and empirically tested. Finally, the contributions of this research will be outlined, before this study is concluded.

6.2 Theory and hypotheses development

6.2.1 Affective organizational commitment and psychological empowerment

Commitment in general "is a force that binds an individual to a course of action that is of relevance to a particular target" (Meyer & Herscovitch, 2001, p. 301). Organizational commitment in particular is defined as “the strength of an individual’s identification with and involvement in a particular organization” (Porter, Steers, Mowday, & Boulian, 1974, p. 604). Since Allen and Meyer's (1990) conceptualization of organizational commitment there exist three different forms; these are affective, normative, and continuance commitment. This model has been the subject of many empirical research efforts and has most likely received the greatest support (see Meyer et al., 2002 for a review). First, employees who are affectively committed align with the goals and values of the organization, are intrinsically motivated, and want to perform tasks accordingly. Second, employees who are normatively committed feel obligated towards the organization and therefore think they ought to do the respective tasks. And third, continuance committed employees perceive costs of not doing something and therefore think they have to do their tasks (for reference compare Allen & Meyer, 1990; Meyer et al., 2004; Meyer & Herscovitch, 2001; Meyer et al., 2002). Recently however, Solinger et al. (2008) noted that normative and continuance commitment were good predictors of turnover. Affective commitment on the other hand, is best understood as an attitude towards the organization and therefore the best predictor of behavior in an organizational or work context (see also Meyer et al., 2002). Research has shown that it is indeed the form of commitment that exhibits the strongest positive correlation with job performance, organizational citizenship behavior, and attendance (Meyer et al., 2004). Hence in this study, affective organizational commitment will be employed for theorizing and analysis.

The empirical evidence for the positive relationship between psychological empowerment and organizational commitment is strong. As an example, Kraimer et al. (1999) examined the mediating effect of the psychological empowerment dimensions between job meaningfulness, job autonomy, and task feedback and the outcomes of career intentions as well as organizational commitment. They found that the self-determination and impact factors of psychologi-

cal empowerment mediated the effect of job autonomy and task feedback on organizational commitment. According to most researchers, the main theoretical argument for the relationship between psychological empowerment and organizational commitment is based on the meaning dimension of psychological empowerment. This dimension assesses the fit between employees' work roles and their needs and values (Kristof-Brown, Zimmerman, & Johnson, 2005; Spreitzer, 1995a). If there is a fit, this should invoke feelings of commitment to the organization which provides these work roles. This is also consistent with theories of social exchange (Emerson, 1976) and norms of reciprocity (Gouldner, 1960 as stated by Crede et al., 2007), because the process leading to enhanced commitment is expected to work through a process of reciprocation (Liden et al., 2000). Employees who believe that they can attribute meaning to their work, feel competent and self-determined in their tasks, and think that they can have impact with what they do; will consequently feel psychologically empowered (Spreitzer, 1995a). They will behave appreciatively to the organization that provides them with the opportunity to feel empowered and reciprocate with enhanced feelings of commitment to the organization (Eisenberger, Fasolo, & Davis-LaMastro, 1990; Kraimer et al., 1999). In their meta-analysis, Seibert et al. (2011) were able to examine 31 different empirical studies that had investigated the link between psychological empowerment and affective organizational commitment and found a mean corrected correlation coefficient of .63. Building on this well-established link, the base hypothesis for this study is put forward.

H1: The higher an employee's level of psychological empowerment, the higher is his or her level of affective commitment to the organization.

Based on the findings from other researchers that contextual factors should not be neglected when examining the above described relationship, this study introduces three additional factors as moderators. The full model is depicted in Figure 11. As can be seen a briefing, team competence and team relatedness will be theorized as potential moderators of the empowerment – commitment relationship.

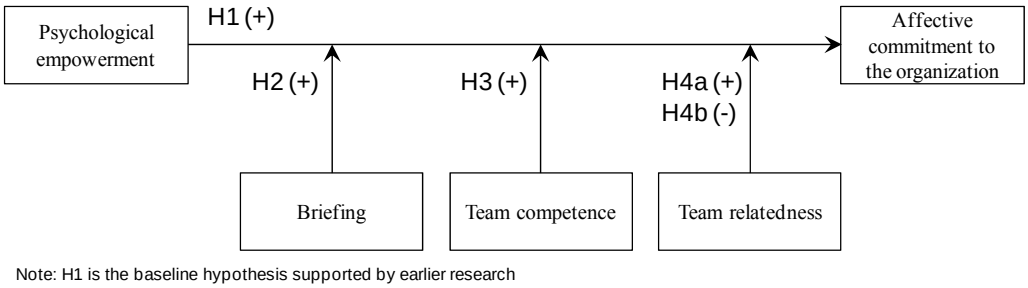

Figure 11: Overview of hypotheses

6.2.2 Moderators of the empowerment – commitment relationship

6.2.2.1 BRIEFING

Settoon et al. (1996) state that "commitment with the organization as a focus should be more highly related to positive discretionary actions on the part of the organization" (p. 220) and that this relationship may depend on the frequency of the exchange. A briefing defined as "the degree to which employees feel that their project leader or management at the start of a project enabled them to perform well and complete their tasks during the upcoming project"[44] is a discretionary positive action performed by the leader who acts as a representative of the organization (compare Eisenberger, Cummings, Armeli, & Lynch, 1997; Eisenberger, Stinglhamber, Vandenberghe, Sucharski, & Rhoades, 2002). This should enhance the positive effect of psychological empowerment on affective organizational commitment, since it increases the frequency of the employer – employee relationship on which the employee should respond with increased reciprocation behavior (Gouldner, 1960).

Additionally, supervisor commitment is one example which is distinct from, but related to organizational commitment (Clugston, Howell, & Dorfman, 2000; Vandenberghe et al., 2004). Taking up the cues from above, a briefing is an indicator of the good exchange quality between follower and leader, because it is an opportunity to provide support and resources beyond the ones necessary by the employment contract (Wayne et al., 1997). These result in increased satisfaction with and commitment to the supervisor (compare Gerstner & Day, 1997). Since the leader or supervisor is usually seen as a representative of the organization (Eisenberger et al., 2002), commitment to the supervisor exerts a positive influence on commitment to the organization (Vandenberghe et al., 2004). Consequently, a briefing should

[44] compare chapter 4

amplify the positive effect of psychological empowerment, which is the perception of structural job characteristics provided by the organization. Logan and Ganster (2007) found some support for this argument. They examined the effect of perceived supervisor support on the relationship between empowerment and job satisfaction and affective organizational commitment. They found the effect for both interaction terms significant and of the same magnitude.

Another argument for the moderating effect of briefing on the empowerment – commitment relationship can be drawn from previous work on stress on this relationship (Janssen, 2004). Janssen (2004) argues a negative moderating effect based on Fiske's (1992) general theory of social relations. This states that supervisors and employees act according to the social model of authority ranking. In this social model, employees identify with the goals and values of the organization (a factor of commitment according to Mowday, Porter, & Steers, 1982), if they identify with the goals and values of their supervisor. Janssen argues that if employees are in conflict with their supervisor, this will restrict their ability to develop feelings of commitment towards their organization based on their feelings of psychological empowerment. This study reverses his argument. If employees experience high levels of briefing, this aligns them with the goals and values of their supervisor, which enables them to align with the values and goals of the organization. This should therefore enable them to more effectively translate their feelings of psychological empowerment into feelings of affective organizational commitment.

Furthermore, Butts et al. (2009) provided a compelling argument for the moderating effect of perceived organizational support on the psychological empowerment-attitudinal outcome relationship. This argument will be applied to a briefing, since this is a supportive intervention conducted by the project leader at the start of a project (compare chapter 4 of this thesis) as a representative and on behalf of the organization (Eisenberger et al., 2002). Perceived organizational support is "the extent to which the organization values their contributions and cares about their well-being" (Eisenberger et al., 1986, p. 501), which scholars recently started to specify in an interactive manner (Logan & Ganster, 2007; Stamper & Johlke, 2003). Butts et al. (2009) argue that any attempt of organizational support by the organization (or the leader as their representative) could be viewed as beneficial or manipulative by individuals. Thus, the effect of psychological empowerment on outcomes depends on individuals' evaluations of their employer's motivation for increasing psychological empowerment to em-

ployees. This motivation can either be employee welfare or self-interest of the company. In this line of thought, Butts et al.(2009) theorized perceived organizational support to moderate the effect of psychological empowerment on job satisfaction and affective organizational commitment. While they did find evidence for a moderating effect on affective organizational commitment, they could not validate this for job satisfaction. Again, since a briefing is an action performed by the project leader who acts on behalf of the organization, this moderating effect should also hold for a briefing.

Considering that there is theoretical reasoning for the moderating effect of a briefing, the following hypothesis will be put forward,

H2: The positive effect of psychological empowerment on affective organizational commitment will be stronger for individuals who perceive high levels of briefing at the beginning of a project than for those who perceive low levels of briefing.

6.2.2.2 TEAM COMPETENCE

A moderator variable that has extensively been examined in organizational research is self-efficacy (Ellis, Ganzach, Castle, & Sekely, 2010; Jex & Gudanowski, 1992; Jones, 1986; Saks, 1995; Silver, Mitchell, & Gist, 1995; Speier & Frese, 1997). Individual self-efficacy is the self-judgment of how well one can execute courses of action required to deal with prospective situations (Bandura, 1982, Bandura, 1997). It has been found to be an important moderator for organizational socialization tactics on role orientation (Jones, 1986) or for the past performance on personal attribution behavior (Silver et al., 1995). Furthermore, it has been found to be a moderator of the relationship between trainings and the intention to quit one's profession and job performance (Saks, 1995) and the effect of control at work on personal initiative (Speier & Frese, 1997). Several researchers have proposed to transfer this concept to groups or teams, thus arriving at collective-efficacy (e.g., Bandura, 1982; Gist, 1987). This is, in general, group members' collective beliefs regarding the capability of the group as a whole (Bandura, 1997).

Team competence is individuals' believe that their group can perform well at the upcoming project. Team competence is thus related but distinct from collective-efficacy, because it measures individuals' perceptions about their teams competence with respect to a specific goal – a project (compare chapter 4). Evidence from collective-efficacy is drawn upon to es-

tablish the link between team competence and affective organizational commitment. Bandura (2007) argued that efficacy beliefs influence what people choose to do as a group, how much effort they put into it and their staying power when collective efforts fail to produce results. On the other hand, employees with higher levels of self-efficacy exhibit fewer withdrawal behaviors, and show more persistence (Bandura, 1986). This notion has received support from several researchers. For example, Hochwarter et al. (2003) found that individuals with low perceived collective efficacy were less satisfied with their jobs when levels of 'go-along-to-get-along' politics increased. Jex and Gudanowski (1992) examined the moderating effects of collective efficacy beliefs measured at the individual level about an individual's department[45]. They found that this measure of collective efficacy moderated the relationship between long working hours and job satisfaction. They argue that employees view organizational stressors as more threatening when employees are not confident that their department can master the task (low collective self-efficacy), and thus respond with lower levels of job satisfaction. Jex and Bliese (1999) replicated and extended those previous findings in a meaningful sample of employees of US army companies. They found that their shared perceptive measure of collective efficacy negatively moderated the impact of a high work load on individuals' levels of job satisfaction and positively moderated the impact of high task significance on levels of affective organizational commitment. In short, if the group thought they were able to successfully perform their current job, the effect of stressors on job satisfaction and affective organizational commitment was buffered. This provides evidence that employees may react negatively when they think that they and their workgroup are not capable of performing their tasks.

These studies on collective efficacy provide support for a moderating effect of the team competence variable employed in this study. This study extends the above described theories and findings for the negative moderation of stressor-outcome relationships. It theorizes team competence (a start-of-project individual level measure of a team's efficacy) as a moderator of the positive association of an intrinsic task engagement process (i.e., psychological empowerment [Spreitzer, 1995a]) to affective organizational commitment. Following a similar line of thought, when employees feel psychologically empowered, they attribute meaning to

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[45] Analogous to team competence, Jex and Gudanowski (1992) measured collective efficacy at the individual level. However, as other researchers have already argued, they missed to establish, if their sample even belonged to meaningful groups (Jex & Bliese, 1999)

their task, feel competent and autonomous and think they can have an impact (Spreitzer, 1995a). So, when they believe that their team is not competent with respect to the task at hand – that is, the upcoming project – their feelings of psychological empowerment might not lead to increased levels of affective organizational commitment. On the other hand, since the organization is responsible for allocating employees in their team, based on social exchange theory, the employee will experience gratitude for being able to work in this team and hence amplify the positive effect of psychological empowerment on levels of affective organizational commitment (Eisenberger et al., 1986; Emerson, 1976; Wayne et al., 1997). Thus,

H3: The positive effect of psychological empowerment on affective organizational commitment will be stronger for individuals who perceive high levels of team competence than for those who perceive low levels of team competence.

6.2.2.3 TEAM RELATEDNESS

Allen and Meyer (1990) pointed out that for affective commitment to develop, employees' work experiences are crucial. More specifically, it requires experiences that fulfill employees' psychological need to feel comfortable with their organization. Deci and Ryan's (2000) self-determination theory encompasses the three innate psychological needs of autonomy, competence and relatedness. They propose that the satisfaction of these needs is a necessary condition for individuals' psychological growth, integrity, and well-being (Deci & Ryan, 1985a). Opportunities to satisfy those needs will facilitate self-motivation and effective functioning because they facilitate the internalization of values and regulatory processes (Ryan, 1995).

Consequently, researchers have argued (Greguras & Diefendorff, 2009; van den Broeck et al., 2010), that organizations that are able to satisfy the above mentioned needs of employees are able to increase the commitment of those employees. For example, Greguras and Diefendorff (2009) examined the mediating effect of the three needs on the relationship between three different types of fit and affective organizational commitment and job performance. They found that person-organization fit as well as person-group fit were both significantly related to relatedness need satisfaction and that this mediated the relationship between both fits and affective organizational commitment. Other research (van den Broeck et al., 2010) confirmed this relationship between the satisfaction of the need for relatedness and affective organizational commitment.

Yet, these studies only examined the direct relationship between need satisfaction and commitment. However, the satisfaction of the need for relatedness (the same is true for autonomy and competence) is a nutriment for intrinsic motivation and internalization processes to work optimally (Gagné & Deci, 2005). As mentioned above, for employees to become affectively committed, they need to be involved in and identify with the organization. This has been argued to happen (among others) through a process of goal and value internalization (compare e.g., Allen & Meyer, 1990; Becker, 1992; Becker et al., 1996; Eisenberger et al., 1990). Thus, satisfying employees' needs for relatedness should support processes that enable the development of commitment. This study therefore argues that the satisfaction of the need for relatedness should more appropriately be specified as a moderator of antecedent-commitment relationships, since this is needed as the nutriment for the process leading to commitment to function. Team relatedness is the perception of employees at the start of a project that they will feel connected to their project team and that there will be a reciprocal caring relationship (compare chapter 4). "Employees who feel part of a team and feel free to express their work-related and personal troubles are more likely to have their need for [relatedness][46] fulfilled than employees who feel lonely and lack confidants at work" (van den Broeck, Vansteenkiste, Witte, & Lens, 2008, p. 280). Consequently, employees who feel their need for relatedness satisfied by experiencing high-levels of team relatedness are equipped with the nutriments to translate increases in their feelings of psychological empowerment into increases in levels of affective organizational commitment. Thus,

H4a: The positive effect of psychological empowerment on affective organizational commitment will be stronger for individuals who perceive high levels of team relatedness than for those who perceive low levels of team relatedness.

Yet, there is also prior theory that does allow the opposite conclusion. Becker et al. (1996) argued that local foci are more psychologically proximal than global foci and that team members can develop high levels of commitment to close foci, without improving commitment to more distant foci (Schuster, Clark, & Rogers, 1971). This is consistent with Lawler's (1992) choice-process theory. This theory proposes that (1) employees feel increased affective attachment to the entity responsible for increased well-being and (2) at-

[46] van den Broeck, Vansteenkiste, Witte, and Lens (2008) used relatedness and belongingness as synonyms in their study.

tachment will be higher for more proximal subgroups of the same entity (Lawler, 1992; Vandenberghe et al., 2004). On top, an individual's cognitive and emotional resources are limited (e.g., Kanfer & Ackerman, 1989; Xanthopoulou, Bakker, & Fischbach, 2013) and some foci are more salient than others depending on the frequency of interactions (Lewin, 1947).

Following choice-process theory, high feelings of team relatedness will more likely be attributed to the team – as the more proximal entity compared to the organization – leading to more commitment to this team. The limit on an employee's emotional resources will induce that the organization as a focus of commitment becomes less salient, thus hindering psychological processes that lead to higher levels of affective organizational commitment. Thus,

H4b: The positive effect of psychological empowerment on affective organizational commitment will be stronger for individuals who perceive low levels of team relatedness than for those who perceive high levels of team relatedness.

6.3 Method

To test the hypothesized relationships, this thesis employs primary data obtained from employees working in R&D teams from multiple German companies (see sample of chapter 3). This is an appropriate sample because work in teams is often-used by companies for increasing productivity and flexibility as well as employee motivation and morale (Abbott et al., 2006; Bishop et al., 2000; Lawler et al., 1992) and are common in an R&D setting (Katz, 1982). Additionally, projects are often important to project team members (Deci & Ryan, 2000b; Shepherd & Cardon, 2009; Shepherd et al., 2011) and high levels of motivation and commitment are an essential prerequisite for project (and thus organizational) success (Wolpert & Richards, 1997). Moreover, co-worker variables have been found to be linked to employee attitudes in jobs in which the tasks are more dependent on others and hence require more social interactions as is the case in multi-disciplinary teams (Chiaburu & Harrison, 2008; Oosterhof, van der Vegt, van de Vliert, & Sanders, 2009).

6.4 Results

Table 20 presents descriptive statistics in the form of means and standard deviations as well as Cronbach Alpha's (for psychometric scales only) and zero-order inter-item correla-

tions. Hierarchical linear regression was used to test all hypotheses. The hierarchical approach was deemed adequate, because its use is particularly recommended when analyzing potentially correlated independent variables or for multiplicative (moderation) terms (Cohen, 2003).

Table 21 shows results of the models with affective organizational commitment being the dependent variable. Model 1, including only the control variables does not explain a significant amount of variance ($R^2 = .07$; $p > .05$) in the dependent variable. The inclusion of psychological empowerment, briefing, team competence, and team relatedness in model 2 significantly increases R^2 ($\Delta R^2 = .17$; $p < .01$). Hypothesis 1 proposes that employees experiencing higher levels of psychological empowerment also feel more committed towards their organization. This could be validated in the sample, since psychological empowerment is significantly and positively related to affective commitment to the organization ($\beta = .34$; $p < 0.01$). The three variables of briefing, team competence, and team relatedness show no significant direct effect on affective organizational commitment at the 5 percent level.

Adding the interaction terms in model 3, again, significantly increases the variance explained in affective commitment to the organization ($R^2 = .27$; $p < .01$) over and above the main-effects model ($\Delta R^2 = .04$; $p < .10$). The interaction term of psychological empowerment and briefing has a positive, significant relationship ($\beta = .21$; $p < 0.05$) with affective commitment to the organization. Thus, hypothesis 2 is supported.

	Mean	s.d.	Alpha[e]	1	2	3	4	5	6	7	8	9	10	11
1. Gender[a]	0.13	-	n/a											
2. Age[b]	40.96	9.98	n/a	0.05										
3. Industry Experience[b]	11.76	9.83	n/a	-0.03	.77**									
4. Project Leader[c]	0.55	-	n/a	0.06	0.14	0.16								
5. Performance of last project	4.81	1.32	0.84	-0.06	-0.02	-0.01	0.15							
6. Team size of current project	16.51	13.81	n/a	-0.07	-.18*	-.17*	-.46**	-0.12						
7. Company revenue 2011[d]	21.94	25.70	n/a	-0.08	-0.01	-0.01	-0.02	0.02	-0.06					
8. Psychological empowerment	5.52	0.76	0.87	-.20*	-0.10	0.04	.28**	.18*	-0.06	0.04				
9. Briefing	4.79	1.32	0.92	-0.02	-0.03	-0.03	0.01	.20*	-0.06	0.10	.36**			
10. Team relatedness	5.33	1.24	0.90	-0.02	-0.10	-0.06	0.01	.16*	0.04	0.08	.30**	.43**		
11. Team competence	5.44	1.23	0.92	-0.07	-0.12	-0.07	-0.13	0.09	.18*	-0.01	.24**	.50**	.49**	
12. Affective org. commitment	4.34	1.03	0.85	-0.05	-0.05	-0.03	0.12	.23**	-0.13	0.06	.41**	.29**	.22**	.26**

[a] Dummy – 1 = Female; [b] in years; [c] Dummy; [d] in € bn; n=152 (age=135); [e] Cronbach Alpha – n/a = not applicable for non-psychometric scales
* p < .05; ** p < .01

Table 20: Means, standard deviations, and two-tailed correlations of the study variables

	Affective commitment to the organization		
Independent Variables	**Model 1**	**Model 2**	**Model 3**
Controls			
Gender	-0.04	0.03	0.01
Age	-0.06	0.04	0.11
Industry Experience	-0.01	-0.07	-0.13
Project Leader	0.06	-0.03	-0.07
Performance of last project	.20*	.13†	.16*
Team size of current project	-0.08	-0.14	-.16†
Company revenue 2011	0.04	0.03	0.05
Predictors			
Psychological Empowerment (PE)		.34**	.31**
Briefing		0.04	0.04
Team competence		.17†	0.14
Team relatedness		0.00	0.00
PE X Briefing			.21*
PE X Team competence			-0.05
PE X Team relatedness			-.21*
R^2	.07	.24**	.27**
Adjusted R^2	.03	.18**	.20**
ΔR^2	.07	.17**	.04†[47]

Note: standardized regression coefficients are displayed;
Asterisks at $R^2/\Delta R^2$ indicate p-level of change in F; † $p < .10$; * $p < .05$; ** $p < .01$;

Table 21: Results of hypothesis testing using hierarchical regression analysis

To determine the nature of this interactive effect, "PROCESS Procedure for SPSS" (PROCESS; Hayes & Matthes, 2009) was used. First, the Johnson-Neyman technique (Bauer & Curran, 2005) was employed to determine the range of the moderator variable in which the interactive effect is significant. Figure 12 shows the 95% confidence interval band for the effect (standardized regression weights) of psychological empowerment on affective com-

[47] The F-statistic for the R-square change from model 2 to model 3 is only significant at $p < .10$. However, this is only due to the effect of the non-significant interaction term of team competence. A separate analysis without the non-significant interaction term revealed that the two significant interactions produced a change in R-square of 0.04 with the F-statistic being significant at $p < .05$, providing additional evidence towards the moderating effects.

mitment for values above and below one standard deviation around the mean of the moderator briefing.

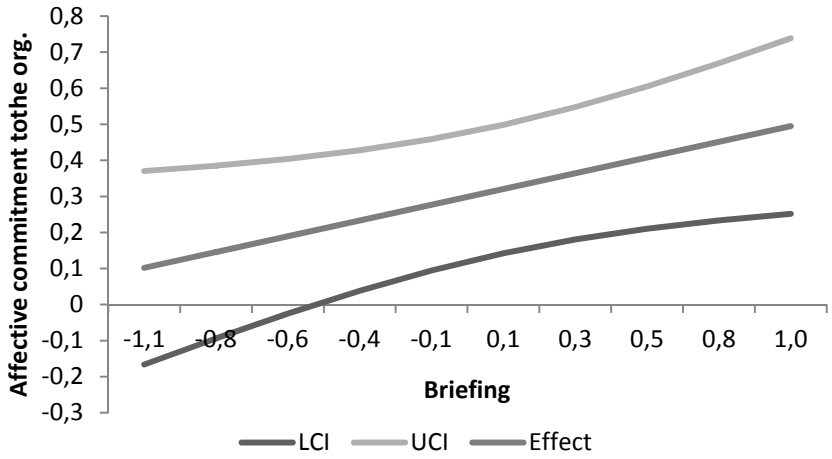

Figure 12: 95%-confidence interval bands for the effect of psychological empowerment on affective commitment as moderated by briefing

Thus, if at a given value of briefing the confidence interval (LCI = Lower confidence interval; UCI = Upper confidence interval) does not include zero, one can be 95% sure that psychological empowerment has a significant effect on affective commitment[48]. As can be seen, this is true for all values of briefing above roughly one half standard deviation below the sample mean (effect = .21; t = 1.9774; p = .05; CI [.00;.41]). This means that for all employees who receive at least a bare minimum of a briefing (not a really bad one or none at all), conditions leading to psychological empowerment lead to increased affective commitment to the organization. This effect increases the better the briefing the employees receive at the beginning of a project. This is visualized in Figure 13, which shows for low and high levels of briefing that with better briefings higher levels of psychological empowerment lead to higher levels of affective commitment to the organization.

[48] This corresponds to a significance level of $p < .05$

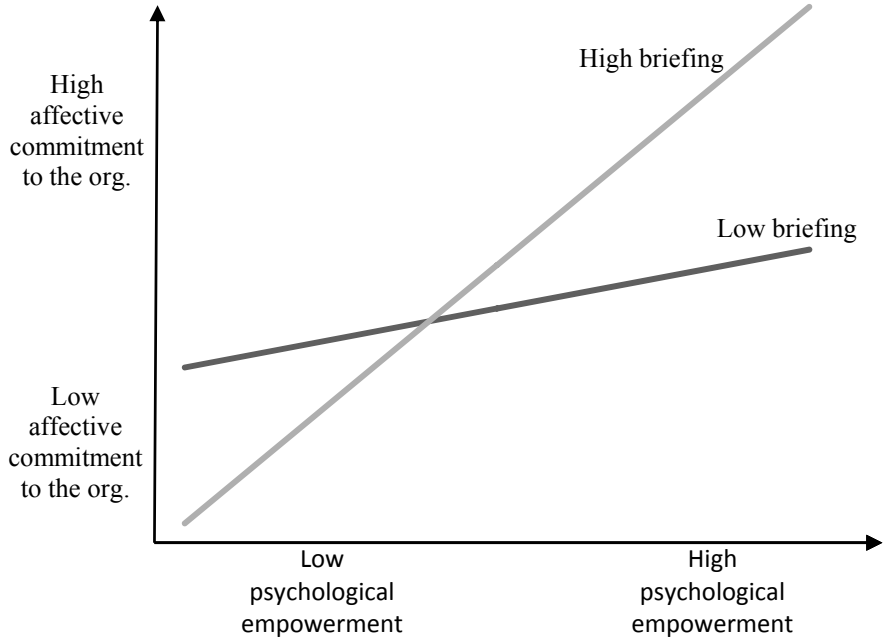

Figure 13: Moderating effect of briefing on psychological empowerment[49]

The interaction term of team competence with psychological empowerment does not provide support for hypothesis 3. The interaction term is slightly negative and non-significant ($\beta = -.05$; $p > 0.05$).

Looking at team relatedness in model 3 confirms the hypothesis that team relatedness negatively moderates the effect of psychological empowerment on affective commitment (rejecting H4a and supporting H4b). The interaction term of psychological empowerment and team relatedness has a negative, significant relationship ($\beta = -.21$; $p < 0.05$) with affective commitment to the organization. Again, PROCESS was used to further analyze this interaction effect. First, the Johnson-Neyman technique (Bauer & Curran, 2005) was employed to determine the range of the moderator variable in which the interactive effect is significant. Figure 14 shows the 95% confidence interval band of the standardized regression weights of psychological empowerment on affective commitment for values above and below one standard deviation around the mean of the moderator team relatedness.

Interpreting Figure 14, the positive beta between psychological empowerment and affective commitment becomes weaker the higher the level of team relatedness for a given indi-

[49] All values for psychological empowerment are +/-1 standard deviations around their sample mean

vidual. For all values above roughly one half standard deviation above the sample mean of team relatedness, the effect of psychological empowerment on affective commitment becomes non-significant (effect = .21; t = 1.98; p = .05; CI [.00;.42]).

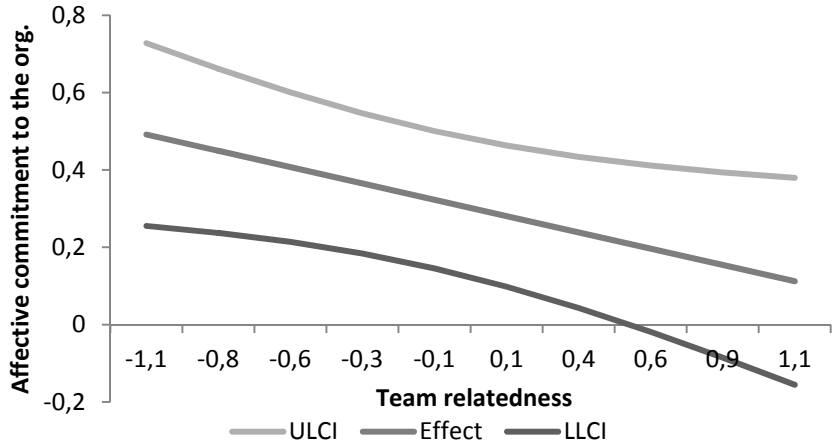

Figure 14: 95%-confidence interval bands for the effect of psychological empowerment on affective commitment as moderated by team relatedness

Figure 15 visualizes this effect for low and high levels of team relatedness. The declining slope for the relationship between psychological empowerment and affective commitment asserts the "dampening" effect of team relatedness. The lower the level of team relatedness the higher is the positive effect of psychological empowerment on affective commitment to the organization. If as theorized, individuals relate stronger to their team (they experience high levels of team relatedness), the effect of psychological empowerment on their feelings of commitment to the organization gets weaker. This supports the notion that such employees probably emphasize the team as a reference point for their feelings instead of the organization.

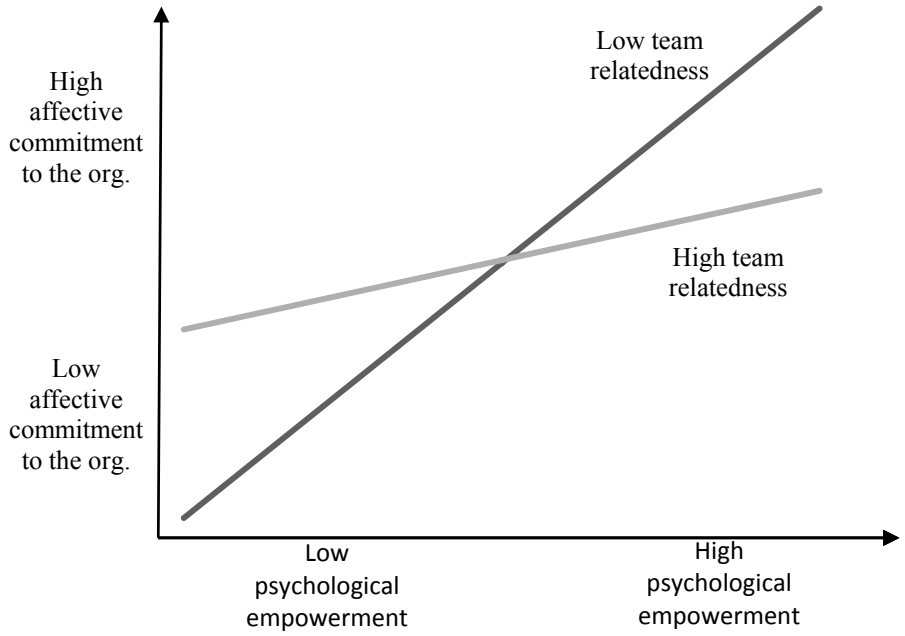

Figure 15: Moderating effect of team relatedness on psychological empowerment[50]

6.5 Discussion

6.5.1 Summary of results

This study extends knowledge on one of the most popular and heavily studied areas in organizational psychology: psychological empowerment (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008). It examined the effects of a briefing (i.e., an intervention at the start of a project conducted by an employee's leader) and two team variables in the form of team competence and team relatedness on the relationship between psychological empowerment and affective organizational commitment. It laid the foundation by explaining and testing the known effect of psychological empowerment on employees' levels of affective commitment to the organization. This had already been proven in previous studies (compare Maynard et al., 2012; Seibert et al., 2011) and was also found in this one. Starting from there, this study followed multiple research calls (Aryee et al., 2012; Janssen, 2004; Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 1995a; Spreitzer, 2008) and examined potential contingencies of this relationship. It theorized and tested the moderating effect of employees' perception of a briefing at the beginning of a project as well as employees' perceptions of team competence

[50] All values for psychological empowerment are +/-1 standard deviations around their sample mean

and team relatedness. It did find evidence for two moderating relationships. First, a briefing showed a significant and positive moderating effect. This was argued to be based on the increased frequency of the exchange between leader and subordinate which leads to increased reciprocation behavior (Gouldner, 1960; Settoon et al., 1996) and on Fiske's (1992) general theory of social relations. This states that a supervisor (during a briefing) helps employees to align with the goals and values of the organization which enables psychological processes leading to increased affective organizational commitment.

Contrary to this effect, this study found, that higher levels of team relatedness significantly and negatively moderate the empowerment – commitment relationship. Choice-process theory (Lawler, 1992) indicates that commitment for more proximal sub-groups is bigger than for more distal ones, and researchers argue that an employee's resources are limited (Kanfer & Ackerman, 1989; Xanthopoulou et al., 2013). This means, when an employee is already highly committed to one entity, he or she cannot attribute that much commitment to another one. This is in line with previous findings of Schuster et al. (1993), who – using cluster analysis – found that there exist differential groups of globally (organization) and locally (team) committed employees.

6.5.2 Contribution to the literature on psychological empowerment

This study provides an important contribution to the literature on psychological empowerment. Despite the abundance of research done in the area – especially since Spreitzer's (1995) generation and validation of a comprehensive scale – little is known about the factors on which empowerment-outcome relationships are contingent (Maynard et al., 2012). Some researchers investigated this topic, but were concerned with psychological empowerment as a moderator (e.g., Erdogan & Bauer, 2009) or the moderating effect of team empowerment (e.g., Chen et al., 2007a) or potential moderators of behavioral outcomes of psychological empowerment (e.g., Ahearne et al., 2005b; Aryee et al., 2012). Only two prior research efforts could be identified that were concerned with moderators of the psychological empowerment – organizational commitment relationship (see Janssen, 2004; Joo & Shim, 2010). This study made an attempt to extend knowledge on this research path by investigating the potential moderating role of three variables: a briefing, team competence and team relatedness. No empirical support was found for the moderating effect of individuals' perceptions of the competence of their project team which should have emphasized the role of efficacy be-

liefs. Nonetheless, the other two variables provided significant support for the notion that the relationship of psychological empowerment on outcomes is contingent on contextual factors. It was found that a briefing acted as a positive moderator of the relationship between psychological empowerment and affective organizational commitment. For team relatedness the moderating effect supported by the empirical analysis was negative. This allows the drawing of two conclusions that future researchers should keep in mind, when examining the relationship of psychological empowerment with theorized individual attitudinal outcomes in the workplace. First, potential enablers might be required – in this study, a briefing – for the psychological processes leading to increased levels of commitment to unfold. And second, depending on the research setting, certain foci might be more salient for employees (e.g., the team), so that the desired increase in employees' attitudes (e.g., commitment) does not materialize in the data analyzed.

6.5.3 Contribution to the literature on supervisor support

Another contribution made by this study is to highlight the importance of the leader and their effects on their followers. This study argued for a positive moderating effect of a briefing performed by the project leader at the beginning of a project on several theoretical arguments. First, the supervisor is the main individual in charge of the exchange relationship between the organization and the employee and can utilize the briefing as one possible positive discretionary action on behalf of the organization (Eisenberger et al., 1997; Settoon et al., 1996). Second, the quality of a briefing is an indicator of the quality of the exchange relationship between the leader and his or her followers, because it is an opportunity to provide resources and support beyond the ones specified in the employment contract (Wayne et al., 1997). And third, this study provided support for Fiske's (1999) general theory of social relations. By employing his psychological model of authority ranking, this study argues that employees identify with the goals and values of the organization by identifying with the goals and values of their superiors, if there is a "good" relationship between the two. The quantitative analysis conducted supported this set of arguments. This positive moderating effect of leaders is in line with existing research. Logan and Ganster (2007), in a randomized field experiment, examined the impact of an empowerment intervention on unit managers of a trucking company. They split their sample in an intervention (n=38) and a control (n=30) group to test for any effects the intervention might have. After a four month period, they measured changes in both groups' levels of job satisfaction and commitment. They found that

the intervention alone reduced both levels of job satisfaction and commitment. Yet, when entering perceived supervisory social support as a moderator in the regression equation, this alleviated the negative effects of the intervention on job attitudes. So, the findings of this study are in line, in so far as the perceived supervisory support through a briefing amplifies the effect of an increase in levels of psychological empowerment on levels of affective organizational commitment.

6.5.4 Contribution to the literature on teams

This study also extends research on the effects of the team on the individual. The notion that team-level variables can have an impact on individual-level variables is uncontested. However, there has only been some research on the moderating effect of team-level variables on the relationship between variables on an individual level (see e.g. Chen et al., 2007a; Jex & Bliese, 1999; Jex & Gudanowski, 1992; Magni, Proserpio, Hoegl, & Provera, 2009; Tasa, Sears, & Schat, 2011). This study examined the possible moderating effect of individuals' perceptions of their team's competence and their perceptions concerned of relatedness with their team on the upcoming project. Previous researchers had examined the moderating effect of collective efficacy (which is related to but distinct from team competence) as a buffer between stressors in the work place and an individual's attitudes. They found support for theory that argued that collective efficacy buffered the effect of stressors on employees' levels of satisfaction (Hochwarter et al., 2003; Jex & Gudanowski, 1992; Tucker, Jimmieson, & Oei, 2013) or organizational commitment (Jex & Bliese, 1999). This study took a positive stance and theorized that team competence would enhance the positive relationship between psychological empowerment and affective organizational commitment of employees. However, the data did not provide support for this notion, indicating that the competence of one's team is more likely to be interpreted as a "buffer" instead of an "amplifier".

Moreover, this study theorized competing moderation hypothesis for the effect of individuals' perceptions about their degree of relatedness to their project team during the upcoming project. While it could be argued that high levels of team relatedness would provide the nutriments to employees that would enhance the effect of psychological empowerment on employees levels of affective organizational commitment, the opposite was found. So, contrary to the general assumption that low levels of relationship conflict are beneficial for employees' attitudes (Dreu & Weingart, 2003), this study revealed that there might also be some det-

rimental effects that can arise from "good" relationships with one's coworkers. Other researchers are called upon to investigate this effect further.

6.5.5 Contribution to the literature on affective commitment

This study also extends and supports research on affective commitment by jointly examining the moderating effects of the supervisor (through a briefing) and the team (through team competence and team relatedness) on employees' levels of affective commitment. Many authors focused their research on how affective commitment develops through employees' relationships with their leader, either in the form of leader-member exchange (e.g., Gerstner & Day, 1997; Zhang et al., 2012) or transformational leadership (e.g., Avolio et al., 2004). Zhang et al. (2012) examined how the congruence in proactive personality between leader and followers contributed to employees' perceived levels of leader-member exchange and how this in turn influenced employees' levels of job satisfaction, job performance and affective organizational commitment. In a longitudinal analysis, they found that when leaders and followers shared the same type of personality, employees would experience higher levels of leader-member exchange. Furthermore, they found that this congruence match had a direct positive effect on the outcome variables as well as an indirect effect through leader-member exchange. Avolio et al. (2004) examined the relationship between transformational leadership, psychological empowerment and their effect on levels of affective commitment. Analyzing a sample of 520 Singaporean nurses, they found that transformational leadership had both a direct effect on affective commitment – which was moderated by structural distance – as well as an indirect effect through psychological empowerment.

However, many authors have also underlined the importance of the team in forming employees' attitudes and that indeed both types of relationships (to the team and the supervisor) are important for determining employees' levels of job attitudes (Abbott et al., 2006; Bishop & Scott, 2000; Chiaburu & Harrison, 2008). For example, Chiaburu and Harrison (2008) conducted a meta-analysis to review if lateral relationships – namely coworker support and coworker antagonism – are linked to important employee outcomes. They did find support for the positive effect of coworker support and the negative effect of coworker antagonism on employees' levels of organizational commitment. Moreover, integrating results from a leadership meta-analysis revealed that the effect sizes of team variables (.34 coworker support; -.25 coworker antagonism) are of the same magnitude as for leadership (.29). On a related note,

Bishop and Scott (2000) hypothesized differential relationships for the formation of organizational and team commitment and tested their hypotheses on a sample of 485 members of sewing teams. They found that, among others, satisfaction with the supervisor as well as satisfaction with coworkers both predicted employees' levels of organizational commitment.

Yet, despite these findings pointing to the importance of both types of relationships, coworkers as a source of commitment were often neglected (Chiaburu & Harrison, 2008; Reichers, 1985). This study is to best knowledge the first to integrate both types of relationships as moderators of an important source of affective commitment – psychological empowerment. While there was no support for the moderating effect of team competence, opposing effects were found for briefing and team relatedness. A briefing and the associated supervisor support on behalf of the organization (see above) was beneficial for employees levels of affective organizational commitment in that it enhanced the relationship with psychological empowerment. On the other hand, although there was also theory to support a positive effect, this study revealed that high levels of team relatedness – that is the personal relationship between coworkers – negatively moderates the positive direct effect of psychological empowerment on affective organizational commitment. This supports Lawler's (1992) choice-process theory which argues that individuals engage more easily with subgroups that are more proximal, since the team is a subgroup of the organization with which the employee interacts more often. The findings are also supported by rules of reciprocity since stronger relationships develop between individuals that interact more often (Granovetter, 1973). Additionally, this finding that close relations to a subgroup (the team) within one entity – contrary to intuitive belief – actually hinders individuals to develop higher levels of commitment to another entity, backs up claims that individuals only have limited socio-emotional and cognitive resources (Kanfer & Ackerman, 1989; Xanthopoulou et al., 2013) that they can commit to different entities in the workplace. This is consistent with Vandenberghe et al.'s (2004) findings. They revealed that while work group cohesiveness had a significant and positive relationship with affective commitment to the team, it had no significant impact on organizational commitment.[51] The finding of two opposing moderating relationships in this study provide some support for researchers arguing for examining multiple foci of commitment concurrently (Becker et al., 1996; Judge & Kammeyer-Mueller, 2012; Riketta & van Dick, 2005). It has especially been pointed out, that different foci of commitment moderate each

[51] The moderating effect was not tested in their study.

other (Judge & Kammeyer-Mueller, 2012). Since, in this study a supervisor and a team variable moderated the effect of psychological empowerment on affective organizational commitment, more research in this area seems warranted.

6.5.6 Conclusion

Research on affective organizational commitment has a long standing tradition in organizational research focusing on employees. It shows good predictive power for a multitude of desirable workplace behaviors, and therefore seems a relevant topic to dive into. This study examined three possible contingencies in the process of forming employees' levels of affective organizational commitment from their feelings of psychological empowerment. Following calls for research from empowerment and commitment scholars, the variables of briefing, team relatedness and team competence were introduced as possible moderators of this relationship. While the data did not reveal a moderating effect for team competence, it did for the other two variables. A briefing emphasized the beneficial effect of positive actions by leaders who act on behalf of their organization and consequently was found to be a positive moderator. While existing theory allowed for ambiguous predictions with respect to team relatedness, the data revealed a negative moderation effect. This provides support for choice-process theory and researchers arguing that an individual's emotional resources are limited. This study therefore hopes to provide a possible explanation for researchers who fail to establish the empowerment – commitment relationship in their data. On a related vein, it hopes to stimulate further research on possible contingencies of empowerment – outcome relationships.

7 DISCUSSION OF THIS THESIS

7.1 Summary of major results and contributions

This thesis focused on the individual cognitive state of psychological empowerment and conducted research shedding further light on the topic. In chapter 1, the importance of research on psychological empowerment was explained and the main research questions of this thesis were derived. Chapter 2 provided a brief overview of the historical roots of psychological empowerment, an in-depth description of the concept as it is still applied in research today as well the state of the research in this area of organizational psychology. Then, chapter 3 laid the foundation for the empirical studies of this thesis. It provided a brief description of the overall research project along with a report on the work done for this thesis. Furthermore, it includes descriptions on both samples – university researchers and industry R&D employees – that were employed for scale generation and validation as well as hypothesis testing in the course of this thesis. This chapter did also provide an overview of all variables employed in this thesis along with methodical considerations and statistical tests that provided some evidence towards the absence of potential biases in the data.

Study 1, the first of the empirical chapters, was concerned with the development of constructs that would affect employees' levels of psychological empowerment at the start of a new R&D project. Since, no foundation for such an endeavor could be readily identified in the literature, this study followed Hinkin's (1998) inductive approach for construct development. This involved the derivation of the initial constructs from existing literature, followed by discussions with academic and industry experts to fine-tune construct definitions and develop items for measurement scales. Since previous researchers emphasized the importance of resources on motivational processes (Demerouti et al., 2001; Hackman & Oldham, 1980; Hobfoll, 2002; Homans, 1958; Kanter, 1986; Salanova et al., 2005; Schaufeli & Bakker, 2004), the constructs of psychological and tangible resources were defined to undergo further scrutiny in construct and scale development. Furthermore, drawing on research concerned with individual-level motivational interventions in an organizational context (Guzzo et al., 1985; Kluger & DeNisi, 1996) the notion of a briefing conducted by the project leader towards the employee was put forward. This study hopes to enable further research concerning the start of a project, since this is seen as a key phase during projects (Besner & Hobbs, 2006)

which warrants further research (Ericksen & Dyer, 2004). The three final scales of briefing, team relatedness and team competence that emerged after scale refinement and validation, and subsequent review by academic experts, showed excellent psychometric properties to vindicate this idea. Additionally, the new scales fit the existing nomological network of psychological empowerment (compare Seibert et al., 2011; Spreitzer, 1995a). They affected employees' levels of affective commitment and job satisfaction through psychological empowerment as a mediator. This further solidifies the role of psychological empowerment which acts as a psychological mediating process between contextual antecedents and attitudinal as well as behavioral outcomes. Furthermore, these three new scales functioned as enablers for studies 2 and 3 of this thesis.

The scope of study 2 was to develop and empirically test theory on psychological empowerment. Three individual characteristics of employees along with the three perceptive measures of contextual factors developed in study 1 were integrated as antecedents in the context of psychological empowerment. The aim of the study was to investigate how perceptions of known contextual antecedents of psychological empowerment develop, which had been proposed as a research gap (Maynard et al., 2012; Spreitzer, 2008). More specifically, it was examined, if and how employees' individual characteristics would affect employees' perceptions of their access to information. This has already been integrated in early conceptualizations of psychological empowerment (Spreitzer, 1995a; Thomas & Velthouse, 1990), but mostly been neglected in research to date (Maynard et al., 2012; Seibert et al., 2011). Although, no effect could be found for an individual's performance goal orientation, there was some evidence that individuals with higher levels of a learning goal orientation would have higher perceived access to information. This supports other researchers' findings that a learning goal orientation is important in a learning and information assimilation context (Chadwick & Raver, 2012; Hirst et al., 2009). In addition, this study found that employees possessing higher meta-cognitive abilities did benefit more from a briefing provided at the start of a project than did employees with lower such abilities. This supports theories on meta-cognition that finds it as a moderator in information assimilation contexts (Haynie et al., 2010; Haynie et al., 2012). Yet, most important for research on psychological empowerment is the support this study provides for the importance of individual characteristics in research on psychological empowerment. This study supports notions arguing that individual characteristics are vital for shaping employees perceptions of contextual factors in the workplace and that the perception of context can be contingent on those individual factors. So, studies

only focusing their efforts on contextual antecedents might have missed out on at least part of the overall picture. Furthermore, both team variables conceptualized in study 1 were found to be significantly related to individuals' perceptions of their access to resources. This underlines the importance of the team in an empowerment context. This either has been neglected in settings where the team should have played an important role in an empowerment context (e.g., Avolio et al., 2004) or was done only with considerable methodical weaknesses (e.g., Liden et al., 2000; Siegall & Gardner, 2000). This research supports other researchers' argument that teams are important in different contexts (e.g., Chen & Kanfer, 2006; Chen et al., 2007a; Gardner et al., 2012; Hirst et al., 2009) including psychological empowerment (Seibert et al., 2004). This study found that a team's competence is beneficial for employees' perceived access to resources, while a setting where an employee feels related to his team actually might have detrimental effects. This is an important implication for scholars investigating interpersonal relationships in the workplace. It shows that 'good' relationships in the workplace can lead to 'bad' outcomes. So, putting an emphasis on good relationships among coworkers might actually have a 'dark' side that has yet to be explored, while research in general assumes that a low level of interpersonal conflict is beneficial (Dreu & Weingart, 2003).

The third and final study of this thesis investigated another avenue proposed for research on psychological empowerment: boundary conditions or moderators (Aryee et al., 2012; Janssen, 2004; Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 1995a; Spreitzer, 2008). The boundary conditions were theorized to affect the relationship between psychological empowerment and affective organizational commitment. This relationship has been soundly established in the literature and this effort replicated this. Moreover, this study contributes to literature arguing for the beneficial effects of supervisor support. It found that a briefing conducted by the supervisor at the beginning of a R&D project positively moderated the direct relationship between psychological empowerment and affective commitment. The direct effect of supervisor behavior on affective commitment has been grounded in the literature already (e.g., Gerstner & Day, 1997; Zhang et al., 2012). However, this study showed that the supervisor's supporting behavior should also be regarded as a contingent factor on the formation of individuals' attitudes in the workplace. This is consistent with findings from prior research on supervisor conflict (Janssen, 2004). While team competence – opposed to theory – failed to moderate the main relationship, the negative moderating effect of team relatedness is another interesting finding of this thesis. It seems that employees' emotional resources are indeed limited and that foci with which employees interact more often are more salient for

them (Kanfer & Ackerman, 1989; Xanthopoulou et al., 2013). So, this thesis supports other researchers (Chiaburu & Harrison, 2008; Reichers, 1985) by calling for more research integrating an employee's team or colleagues into research on organizational commitment. Lastly, this thesis is to best knowledge the first effort to jointly examine interactive effects of leadership and team behavior. Considering that both types of employee relationships in the workplace showed opposing moderating effects on employees' psychological processes towards the formation of attitudes, more research is warranted to examine this interesting and potentially fruitful research avenue.

7.2 Managerial implications

Apart from the multiple contributions provided to academic research (that are described in detail in the individual chapters), it also holds several implications for organizations, and ultimately managers. First, it showed that a briefing at the beginning of a R&D project and most likely any project is beneficial to an employee's motivation and ultimately levels of job satisfaction and commitment. It probably is known to most organizations that maintaining high levels of leader-member exchange, that is having a good relationship with subordinates that goes beyond the employment contract, is beneficial to employee's motivation and work performance. However, managers may think that the benefits of always trying to maintain such a relationship are not big enough to justify this effort. Alternatively, they may just lack the time, because of all the other tasks they have to give their time and attention to, so that they cannot maintain such a relationship with every one of their subordinates. The important implication for managers now is that although a maintained effort over time is probably the most beneficial approach; a single well-timed positive event in the form of a briefing can already provide some benefits on employees' motivation levels. So, it seems worthwhile for managers to take the time to not only sit down with each of their employees face-to-face at the beginning of their new project, but also take the time to carefully prepare these briefings to be able to reap all possible benefits. Due to their nature R&D-projects are the most uncertain with respect to time, quality, cost, and overall feasibility. So, bringing each and every member of the project team to exert the most effort can make the difference between project success and failure.

Additionally, making the effort of providing a well-prepared and timed briefing to project team members holds further benefits than just increasing psychological empowerment or mo-

tivation. Study 2 showed that the positive effect on motivation works through increased perceptions of access to organizational information as well as resources. It is easy to see that this most likely will provide benefits in addition to motivation. Having better or more complete information, for example, enables employees to better fulfill their tasks and work more autonomously. Therefore they don't need to consult with their supervisors in case of doubts about how to proceed. Furthermore, they can better align their actions and efforts towards the goals of their assigned project. In a similar manner, having more access to and knowing about the resources one can draw upon if needed, will help to realize the best possible course of action. No one can say how many projects failed because a project engineer underestimated the available resources and instead opted for the cheapest solution resulting in non-feasibility for the product, and project failure. Or being less dramatic, how much cost could have been saved ultimately, if the responsible engineers in one project team had known that a similar effort had been conducted a year ago in a different business unit and they could have drawn upon the lessons learned from this earlier project.

Moreover, study 3 provided managers with even more reason to direct some of their energy and time in good briefing efforts. It showed that a good briefing increases the positive effect that psychological empowerment has on employees' commitment to the organization. Especially in today's business world with its "war for talents" this is an opportunity that should not be wasted. Increasing their subordinates' commitment levels to themselves (as leaders) and the organization to the highest possible level helps them retain their most valuable employees instead of being victims of the "brain drain" that occurs when these employees join competitors.

So what could managers do to realize the above described benefits or what is a good briefing? While this certainly depends on context, type of project or even the individual project setting, this thesis can provide four hints that managers or project leaders could keep in mind when sketching a briefing. First of all, they could ensure that employees have all information available that they need to contribute to the project. As an example, this should not only be information on the expected project result but also background information on why this project is important to the organization. Second, project leaders could make clear what role they expect their team members to fulfill and what the concrete tasks are that they expect them to complete. More senior team members might be expected to support and watch over more junior ones to help them contribute. To be able to do this, they need to know what their

role comprises. Third, project leaders could treat briefings as bi-directional exchanges. They could discuss their ideas openly with their subordinates to get their opinions and enable them to adapt accordingly. And fourth, not only should the project at hand be part of the briefing, but also the environment surrounding it. For example, are similar projects going on in the organization for other product lines? Is this project part of a holistic program? Or does the concerned project compete over critical resources with other projects? As mentioned earlier, these are only some of the ideas for the content of a good briefing, and managers and project leaders shall adapt these according to their and their organizations' specific needs.

Additionally, this thesis underlined the importance of a team for an individual employee's motivational and affective states. More specifically, it provides hints for managers that different team components impact these states differently. It underlines the importance that employees place on working in a competent team. Managers always aim for having the most competent team out of performance reasons alone. This thesis showed how this increased performance might come to be and hence that selecting the most competent team for a given task is an important endeavor, because of its effects on psychological empowerment. This will increase work results over and above the effects of the mere skills the team members bring with them.

Furthermore, it could be learned from this thesis, that assembling teams that have the highest possible competence and are "best friends" at the same time (i.e., are highly related) can have effects that the manager might not foresee. For example, a team that relates highly among each other does not provide the benefits of increased sharing of and access to resources as could have been predicted. Instead, it seems that being friends with one's colleagues leads to disappointed expectations, because team members cannot provide as many resources as one would expect when having a good personal relationship. Managers should therefore keep an eye on relations within their teams and manage expectations concerning the available resources accordingly.

More important, however, is the lesson that managers can learn from the relationship between psychological empowerment, team relatedness, and their interactive effect on organizational commitment. In many companies, when thinking about initiatives to lower employee turnover, several measures for increasing empowerment of employees come to mind. This might work well, when thinking about highly skilled R&D employees working autonomously and that can easily be granted more control over their work and discretion about information

and resources. But, most managers struggle when they try to lower employee fluctuation with similar measures in a department where employees work on third party IT development according to very narrow customer specifications on tight time lines. There, work is highly structured, decision making authority for the individual employee is extremely limited, and this is hard to change for the individual manager. Consequently, employees do not attribute much meaning to their work, feel like they are being remote controlled, and fail to see the impact they have on company success; thus, they feel disempowered and non-committed to their employer. Findings of study 3 show that for those employees that for one reason or another just can't be empowered, a good team climate can be a way to at least keep commitment levels to the organization constant (by alleviating the negative effect of low levels of psychological empowerment) and thereby lower fluctuation. Thus, performing team building activities or facilitating a friendly or better family-like atmosphere minimizes harmful effects that low levels of empowerment have on levels of commitment. Thus, to make employees want to stay with their employer even when their job is non-empowering, they might value the good atmosphere at their workplace and therefore prefer to stay anyway. Put briefly, if you can't empower employees, put them in a team where it is fun to work. Or the other way around, if you realize that harmony is low within your team, try to empower each and every employee.

7.3 Limitations

The present thesis with its 3 different studies provides relatively robust results, since tests for potential biases during this thesis did not alter results. However, it has to be acknowledged that some weaknesses still remain within this thesis. The first weakness concerns the appropriateness of the pre-test sample for scale development. As a reminder, the items for the scales were generated using existing literature, discussing the construct definitions with academic experts and testing and expanding them through expert interviews. Afterwards, following the approach suggested by Hinkin (1998), the scales underwent factor analytical procedures for refinement and validation. An initial CFA was conducted to reduce the number of items and a second one to finalize the scales. The second CFA was performed using the second sample of 152 R&D employees from different industries – the same as for theory testing in study 2 and 3. However, the initial CFA was performed using a convenience sample of 274 university researchers. This might give rise to limitations concerning the external validity of the new scales (Clark & Watson, 1995). The risk is that by not using the target group of the new scales for initial item reduction, items might have been eliminated prematurely. Howev-

er, for two reasons this risk seems acceptable. First, from a methodological standpoint the use of a convenience sample in early stages of the scale development process usually suffices (Clark & Watson, 1995; Netemeyer et al., 2003). In this case, the population of the convenience sample was carefully matched to the target population. All participants had to have relevant project experience and they had to work on tangible research topics (e.g. a new injection technique for diesel engines). Second, the first CFA, on purpose, only reduced the number of items for each scale down to six. This was done, so there was still room for further item reduction employing the final sample of the target population. Concluding, despite the use of a convenience sample in the scale development process, it seems reasonable to suspect that the new scales – along with very good internal consistency – possess sufficient external validity to allow conclusions with respect to the sample of R&D researchers. Nonetheless, this thesis encourages future researchers to replicate the refinement and validation process in chapter 4, since employing multiple independent samples helps to strengthen the results of scale development efforts (Smith & McCarthy, 1995).

Second, one could argue that the results of this thesis might be subject to a common method bias. All variables assessed in this thesis used self-assessment instruments concerned with individuals' perceptions of the surveyed factors. This might be a problem, because method biases are one of the main sources of measurement error. According to self-perception theory and cognitive dissonance theory, individuals try to maintain internally consistent perceptions. This can lead to the inflation of correlations between measures and the issue has been raised by many researchers (e.g. Bem, 1967; Festinger, 1957; Kristof-Brown et al., 2005; Podsakoff et al., 2003). Again, for three reasons, this choice can be argued in favor for this approach. First, the issue has been settled many times in favor of the usefulness of perceptive measures as descriptions of organizational or job characteristics (compare Seibert et al., 2004). Second, it is acknowledged that common method variance or response consistency effects tend to inflate main effects (compare e.g., Podsakoff et al., 2003). As such, for example, the positive relationship between the predictor variable of psychological empowerment and the criterion variable of affective organizational commitment might be partially ascribed to response tendencies. However, it is difficult to argue that common method variance could create moderator effects. Siemsen et al. (2010) analytically derived the impact of common method variance in predictors on common method variance in criterions. They found that while simple regressions can be heavily inflated, this is much less of a problem in multiple linear regressions as employed in this thesis. Even more interesting, they de-

rived that common method variance would in fact deflate results for interaction terms, making them more difficult to detect. So, the interactive effects for meta-cognitive monitoring in study 2 and briefing as well as team relatedness in study 3 can therefore be considered as lower bound estimates of their true correlations, if common method is a problem within this thesis. And third, this research was not concerned with behavioral outcomes such as job performance or innovative behavior, which are most likely to suffer from this type of bias (Podsakoff et al., 2003). Instead, the central constructs of interest were psychological empowerment and affective organizational commitment – a cognitive state and an attitude towards one's employer. Psychological empowerment in particular is not so much concerned with how organizational conditions are, but how these conditions are perceived by employees (Bandura, 1977, Bandura, 1982). So, employing perceptive measures of the independent and dependent variables in this research endeavor matches the subject of the analysis of this thesis. This is psychological empowerment as a psychological process that occurs within individuals based on individual traits inherent in these individuals (e.g., their learning goal orientation) and their perceptions of their environment in the workplace. So, considering the arguments provided above, the use of perceptive measures as a common method in this thesis seems to be justified. However, we encourage other researchers to test the hypothesis supported in this thesis employing a mix of different methods. For example, the rating of the briefing could be obtained from the employee's supervisor, measures for the provisioning of access to information and resources could be obtained from interviews within the companies and then rated by the researcher, and the measures of team relatedness and team competence could be obtained as shared perceptive measures of the whole project team.

Third, it has to be acknowledged that the presence of a social desirability bias cannot be completely ruled out within this thesis. If employees respond in a socially desirable way, this "implies a need to be thought well of by others, a need for approval" (Crowne, 1991, p. 18 based on Crowne & Marlowe, 1964). Responses from individuals which are socially desirable do not reflect the true opinion or attitude of the respondent. Instead they want to present themselves in a favorable light (Podsakoff et al., 2003). If social desirability bias is present in the data, this can either inflate or suppress possible results or even act as a moderator (Ganster, Hennessey, & Luthans, 1983). To, as much as possible, eliminate the impact of social desirability two methodical remedies and one statistical remedy were employed during primary data acquisition to check for any social desirability bias that might still be present. This procedure has been proposed by Podsakoff et al. (2003). First, respondents were assured

of full anonymity of their answers. This should reduce the social desirability bias, because employees now perceive it as unnecessary to provide favorable ratings – for example, to the briefing question – to please their supervisor. Second, the spatial as well as temporal distance between the questions concerning the predictors and the criterions was rather long within the questionnaire. Since the questionnaire does not only serve as input for this thesis, but was designed to answer further research questions as well, there were several unrelated scales in between, which should reduce the salience of the predictors in respondents minds, when answering the criterions' scales. Third and as a statistical remedy, a 10 (and 8) -item version of Paulhus' (1984) impression management scale was used in this thesis, because it is theorized to represent the conscious effort of respondents at deception. Including this scale did neither alter results in the scale development process in study 1 nor affect the results of the hypothesized models in studies 2 and 3. However, it has to be noted that Cronbach's alpha for the scale was relatively low with .55 in sample 1 and .43 in sample 2. Although this is not uncommon, especially in research settings outside the US and when limiting the number of items for the scale (Li & Bagger, 2007), it can attenuate the results obtained with the scale. Concluding, although methodical remedies were employed, the low reliability estimate of the impression management scale prohibits the definitive ruling out of any social desirability bias. This thesis therefore calls on future researchers to either conduct this type of research in the US, expand the scale back to its original 20-item format or employ other measures of social desirability that show better statistical properties in the setting of this thesis.

Lastly, the biggest weakness of this study is probably the biggest weakness of most studies in organizational research. It was conducted as a cross-sectional study. Meaning, this study assessed all measures at the same point in time which might lead to issues when trying to conclude causality, in other words, the direction the relationships work (Mathieu & Taylor, 2006). Theorizing some of the relationships the other way around would be plausible as well. For example, individuals who feel more empowered might also display this to their management, which in turn puts them in charge of more important projects along with more competent colleagues. Or, relationships could even be reciprocal or cyclical. For example, an employee develops higher levels of affective organizational commitment based on his or her feelings of psychological empowerment. These higher levels of commitment lead to higher levels of job performance. Employees who show higher levels of performance might be granted with more decision rights (structural empowerment), which in turn leads to higher levels of psychological empowerment, which again lead to more commitment. To alleviate

potential concerns, all relationships described in this study and their directions were based on existing research and theories. Study 2 explicitly took the already explored relationships between perceived access to information and resources with psychological empowerment as a starting point (e.g., Seibert et al., 2001; Spreitzer, 1995a, Spreitzer, 1996b). And, study 3 investigated moderators of the relationship between psychological empowerment and affective organizational commitment, which has been theorized and validated numerous times (see Seibert et al., 2011). Nonetheless, it is recommended that future research collects a longitudinal data set to provide even stronger evidence for the findings of this study.

7.4 Ideas for future research

Apart from the need for further research concerning the limitations of this thesis, its results also open up additional research avenues. First, study 2 found that individual characteristics such as goal orientations and metacognitive abilities do influence levels of psychological empowerment. Both types of variables depend on situational aspects (Allen & Armour-Thomas, 1993; Button et al., 1996). One research opportunity for organizational psychologists could therefore be to incorporate context in the study design. One possible moderator could be the level of complexity of the task the employee faces. For learning orientation, a curvilinear relationship with psychological empowerment moderated by task complexity is imaginable. With increasing complexity of a task the relationship between learning goal orientation and psychological empowerment could be enhanced, because learning goal oriented people will feel challenged and experience an opportunity to learn by mastering a task that they could not do before. However, the level of complexity could increase to a level where employees cannot master the task any more no matter how hard they try. They then might lose the feeling of being able to learn from the task, and the whole experience would lose meaning for them, and thereby they might feel less empowered. This is in line with recent research, where job complexity moderated the relationship between personality traits and job performance (David, 1994), which also proved to be curvilinear.

Second, study 2 examined the effects of meta-cognitive monitoring on information conveyed during a briefing in order to learn. Given that meta-cognitive skill is concerned with external feedback in general and the reevaluation of external feedback and idiosyncratic experiences with the purpose to adopt decision frameworks (Haynie & Shepherd, 2009), future research could incorporate representations of different experiences. This could be either the

number of similar projects they had already worked on or the number of similar briefings they had already experienced before starting into a new R&D project. Individuals possessing higher metacognitive abilities should perform better the more experience they have with projects or briefings. Providing an example, individuals with higher metacognitive skills might realize that they forgot to discuss an important topic during the last briefing and incorporate questions about it in the new one. They do this, because before the briefing they will think about last time's experience, realize areas for improvement, and adopt behavior accordingly.

Third, it was found that an intervention in the form of a briefing has a positive impact on psychological empowerment through the provision of access to information and resources. There is evidence that the effect of an intervention does potentially diminish over time in the context of empowerment (Laschinger et al., 2004). So, by how much does this effect diminish? Is this only relevant for long projects or is this an issue for shorter projects as well? Should briefings be repeated during a R&D project? If yes, how often? How should the content of the briefing be adapted from the content necessary at the beginning of a project? Future researchers – especially in the area of project management – can add considerable knowledge by answering these questions, which seem so far unexplored.

The fourth avenue for research is considering the effects on levels of team empowerment. Researchers suggest that factors influencing psychological empowerment at the individual level also influence empowerment at the team level (Maynard et al., 2012; Seibert et al., 2011). In this thesis the possible influence of interventions (i.e., a briefing) to increase the level of empowerment for a given employee in a team setting was established. It is therefore sensible to assume that this intervention might have an impact on a team level as well. To test this in future research, one can think of three possible ways. First, the individual answers of all project team members concerning team relatedness and team competence could be aggregated into measures of shared felt team relatedness and competence and their impact could be tested on team empowerment (Seibert et al., 2004). This would however require a larger amount of participants, so that after consolidating teams the number of overall subjects for analysis is still sufficient and yields enough statistical power to detect any effect. Second, all questions of the relevant scales could be rephrased to the team level, and team effects could be established through examining individual's perceptions of these effects. Or, these team level measures (of course requiring an analysis of their psychometric properties) could be aggregated to measure shared team perceptions, because it has been shown that additive indi-

vidual measures lead to different results than averaging perspective-shift versions of the same scales (Arthur, Bell, & Edwards, 2007).

Fifth, although psychological empowerment has been a much researched topic (Spreitzer, 2008), there are still many fruitful research avenues yet to be explored (Maynard et al., 2012). Even with Seibert et al. (2011) being able to examine 142 quantitative articles in their meta-analysis on psychological empowerment, the basis for definitive causal conclusions about the direction of the relationships seems to be still missing (compare Seibert et al., 2011; Spreitzer, 2008). Research on psychological empowerment so far has mostly been cross-sectional (Spreitzer, 2008). If it has been conducted longitudinally, it only examined psychological empowerment-outcome relationships (see Birdi et al., 2008; Hochwälder, 2008). The only longitudinal paper including antecedents by Laschinger et al. (2004) found mixed results concerning the antecedent-psychological empowerment-outcome relationship. While they did find evidence that changes in structural empowerment had a significant impact on psychological empowerment and job satisfaction, psychological empowerment was not a significant mediator between structural empowerment and job satisfaction. However, the only control variable taken into account was tenure, so their findings might be susceptible to omitted variable bias (Fan & Li, 1996), since they did not account for age, gender, job level or company effects, which were all found to impact psychological empowerment (Liao et al., 2009; Patterson et al., 2004; Seibert et al., 2011). Consequently, multiple researchers have called for more longitudinal research (Maynard et al., 2012; Seibert et al., 2011; Spreitzer, 2008). This thesis aspires to act as an enabler for this. The constructs of team relatedness, team competence and briefing that were developed to be set in a start-of-project context can be leveraged for this effort. For example, one could measure levels of psychological empowerment at the end of one project, the new scales at the beginning of the next and again levels of psychological empowerment shortly thereafter. This would alleviate the need for researchers to wait for a large organizational empowerment initiative to happen, since R&D researchers regularly switch from one project to the next.

It is not only for scholars interested in psychological empowerment that this thesis might hold research opportunities, but study 3 also hints at a major opportunity for researchers focusing on commitment in the workplace. The main goal of research focusing on employees' commitment is spurred by the promotion of positive behaviors in the workplace such as task performance (Meyer, Paunonen, Gellatly, Goffin, & Jackson, 1989) or organizational citizen-

ship behavior (Shore & Wayne, 1993), and the reduction of negative behavior and attitudes such as stress (Begley & Czajka, 1993) or intent to quit (Yücel, 2012). These efforts were mainly concentrating on one commitment focus or neglecting moderating effects between different foci. This thesis might be a possible starting point for the incorporation of multiple foci of commitment. It theorized and found moderating effects of the variables of briefing and team relatedness on the relationship between psychological empowerment and affective organizational commitment. It might be possible that these moderating influences come to pass, through other commitment foci as argued by Klein et al. (2012). They argue that the relationship between one focus of commitment and its antecedents is actually contingent on other commitment foci that an individual might hold and this contingency could be positive or negative. When looking at the hypothesized model in study 3, it becomes apparent that those moderators might indeed by the antecedents to commitment foci other than the organization. One could argue that a briefing conducted by the supervisor is an antecedent of supervisor commitment and that team relatedness is an antecedent to team commitment. Figure 16 summarizes this proposition. Testing the described and depicted model could shed light on how the moderations detected in this thesis come to pass and provide support for researchers arguing for a reconceptualization of the commitment construct (Chiaburu & Harrison, 2008; Johnson & Yang, 2010; Klein et al., 2012).

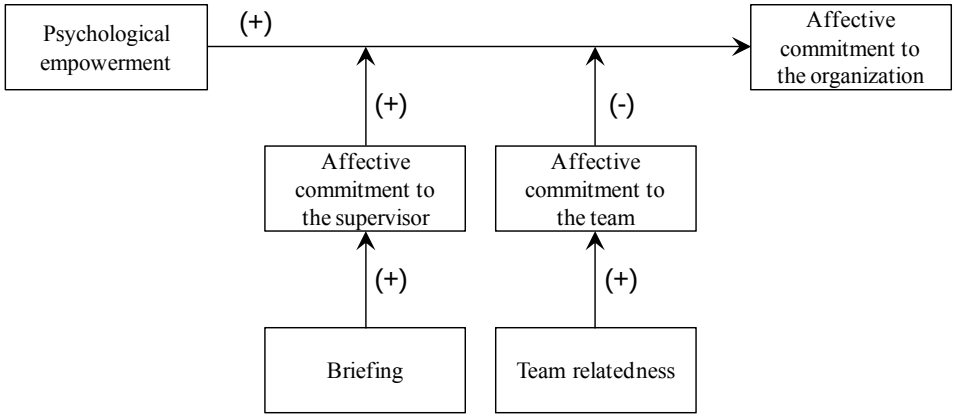

Figure 16: Proposition for research determining the moderating effects of different commitment foci based on the findings of this thesis

7.5 Conclusion

In summary, this thesis demonstrated that despite the substantial research efforts done in the past, psychological empowerment is still a highly relevant research area in organizational

psychology, and that there are many research opportunities left. This thesis contributes to different research streams such as goal orientations, meta-cognitive abilities, teams in an organizational context, supervisors and their effect on followers, affective commitment in the workplace, and most importantly psychological empowerment. As this thesis has demonstrated, it seems promising for scholars to not only include contextual antecedents of psychological empowerment in their research efforts, but also employees' individual characteristics. These have been shown to explain employees' perceptions of contextual antecedents and to act as boundary conditions for some of them. Leveraging these findings, researchers could further explore 'how' psychological empowerment develops within individuals. Furthermore, this thesis revealed that psychological empowerment – outcome relationships might be subject to contingent factors that are not yet fully explored. Expanding research beyond the supervisor- and team-related variables, which were integrated as moderators, as well as affective organizational commitment, which was integrated as an outcome, seems promising. This should help to answer the question as to 'when' or under which conditions psychological empowerment can unfold its full potential towards desired attitudes and behaviors for the individual employee as well the organization.

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Eidesstattliche Erklärung

Ich erkläre an Eides statt, dass ich die bei der promotionsführenden Einrichtung bzw. Fakultät für Wirtschaftswissenschaften der TUM zur Promotionsprüfung vorgelegte Arbeit mit dem Titel:

Psychological Empowerment: Quantitative Research on Antecedents and Outcomes in Research & Development Projects

am Lehrstuhl für Entrepreneurship unter der Anleitung und Betreuung durch Prof. Dr. Dr. Holger Patzelt und Dr. Judith Behrens ohne sonstige Hilfe erstellt und bei der Abfassung nur die gemäß § 6 Abs. 6 und 7 Satz 2 angegebenen Hilfsmittel benutzt habe.

- Ich habe keine Organisation eingeschaltet, die gegen Entgelt Betreuerinnen und Betreuer für die Anfertigung von Dissertationen sucht, oder die mir obliegenden Pflichten hinsichtlich der Prüfungsleistungen für mich ganz oder teilweise erledigt.
- Ich habe die Dissertation in dieser oder ähnlicher Form in keinem anderen Prüfungsverfahren als Prüfungsleistung vorgelegt.
- Die vollständige Dissertation wurde nicht veröffentlicht.
- Ich habe den angestrebten Doktorgrad noch nicht erworben und bin nicht in einem früheren Promotionsverfahren für den angestrebten Doktorgrad endgültig gescheitert.

Die öffentlich zugängliche Promotionsordnung der TUM ist mir bekannt, insbesondere habe ich die Bedeutung von § 28 (Nichtigkeit der Promotion) und § 29 (Entzug des Doktorgrades) zur Kenntnis genommen. Ich bin mir der Konsequenzen einer falschen Eidesstattlichen Erklärung bewusst.

Mit der Aufnahme meiner personenbezogenen Daten in die Alumni-Datei bei der TUM bin ich einverstanden.

München, den 22. Mai 2014 .....

Nick Flohrer