Exploring Internal Corporate Venture Teams

INAUGURALDISSERTATION

zur Erlangung der Würde eines Doctor rerum oeconomicarum
der Wirtschafts- und Sozialwissenschaftlichen Fakultät der Universität Bern

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To the best team I could have ever wished for – My family

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LIST OF ABBREVIATIONS

ICVT	internal corporate venture team
ICV	internal corporate venturing
TMT	top management team
NVT	new venture team
R&D	research and development
cf.	confer
CI	confidence interval
e.g.	for example
etc.	et cetera
Ed.(s.)	editors
et al.	among others
i.e.	that is
vs.	versus
n/a	not applicable
k	number of correlations
n	number of studies
N	number of teams

1 INTRODUCTION

'Schwimmen lernt man nur dort, wo man im Meer nicht mehr stehen kann', Fabio Genovesi

Everyone is striving for innovation. Even corporations with dominant market positions recognize that innovation is a key ingredient for their long-term survival in today's dynamic business landscape in which they navigate. Traditionally, corporations engaged in external corporate venturing, where they invested or bought new venture firms to gain access to innovation (cf. Keil, 2004). This approach, however, has also shown its drawbacks as the corporate parent often did not fully possess the innovation or the developed products did not fully fit with the corporate parent's expectations. To overcome these challenges, corporations increasingly invest in internal corporate venturing (Burgelman, 1983) as they become aware of the innovation potential residing within themselves. For this purpose, corporations increasingly set up teams within their own organizational boundaries pursuing the goal of exploring new business opportunities. In my dissertation, I refer to the terminology *Internal Corporate Venture Teams (ICVT)* to describe this team phenomenon.

ICVTs are used as strategic means to pursue the creation of new business opportunities for the corporate parent that the existing operating business units are unable to capture (Burgelman, 1983). The reasons why corporations rely on ICVTs are numerous: ICVTs as an organizational unit offer the flexibility of much smaller firms to keep up with the innovation pace of new venture firms (Crockett, McGee, & Payne, 2013; Hill & Hlavacek, 1972); ICVTs allow a corporation to innovate in a safe environment without putting its traditional businesses at risk if the venture fails; and the ICVT's independence from the normal decision-making criteria of the firm (Crockett et al., 2013) ensures that novel product ideas with no immediate commercial value will not be dismissed right up front but translated into new product innova-

tions (Hill & Hlavacek, 1972) which might become a new core competences of the corporation.

Whereas the team literature about top management teams (TMT) (Hambrick & Mason, 1984) or new venture teams (NVT) (Klotz, Hmieleski, Bradley, & Busenitz, 2014) is well defined, a lack of conceptual clarification exists about what an ICVT is. Consequently, we have little knowledge about what has already been studied about this team phenomenon. With my dissertation, I aim to fill this research gap. The overall research goal is to clarify the conceptual boundaries of what constitutes an ICVT and which facets of an ICVT drive the team to success. For this purpose, I conducted a systematic literature review to depict the current state-of-the-art of ICVT research (*Study 1*) and then performed a meta-analysis to identify the facets of an ICVT that can be considered success factors (*Study 2*). With the realization of both reviews (*Study 1 & 2*), I gained extensive experience and knowledge about the task of coding, which is a key activity when conducting reviews. To share insights about what needs to be considered when planning and performing the coding process, I developed together with my research colleagues a coding guideline (*Study 3*). This coding guideline serves scientists in conducting meta-analyses of a higher quality standard and higher levels of contribution to their research field.

Based on the three research projects described above I wanted to achieve the following: (1) address the existing lack of terminological coherence in current literature by integrating the identified conceptual boundaries of ICVTs into a multi-faceted definition, thus promoting a unified use of the term ICVT to allow scholars build upon their knowledge and create a more coherent stream of literature, (2) provide a holistic picture about the key facets that have already been investigated when studying ICVTs and identify blank spots where future research is needed for the continuing development of our understanding about how ICVTs function, (3) raise scholars' awareness for the importance of using fine-grained performance

outcomes instead of aggregated outcomes when studying teams because specific performance outcomes (e.g. team efficiency, team innovativeness, new product financial success) in a meta-analysis can explain the existing controversy in a research field, (4) relatedly to this fine-grained approach, I aimed at providing a more nuanced perspective on how different performance outcomes have different sets of success factors, such insights allow meta-analysts to give more precise managerial recommendations, (5) with my reviews, I also respond to prior researchers' calls for the need to clarify the black box of performance of highly innovative teams by revealing key performance metrics on the team- and product-level of analysis, (6) building on my experience of conducting reviews, I also wanted to raise scholars' awareness about the crucial role that the task of coding plays in a meta-analysis since depending on how authors proceeded with their coding can cause variance in meta-analytic results, (7) finally, as misguided coding decisions can distort conclusions upon which an entire research community builds, together with my research colleagues I extend prior cardinal methodological resources by offering a four-step coding guideline that enables meta-analysts to collect their data in a coherent, efficient, valid, credible, and for future research connectable way.

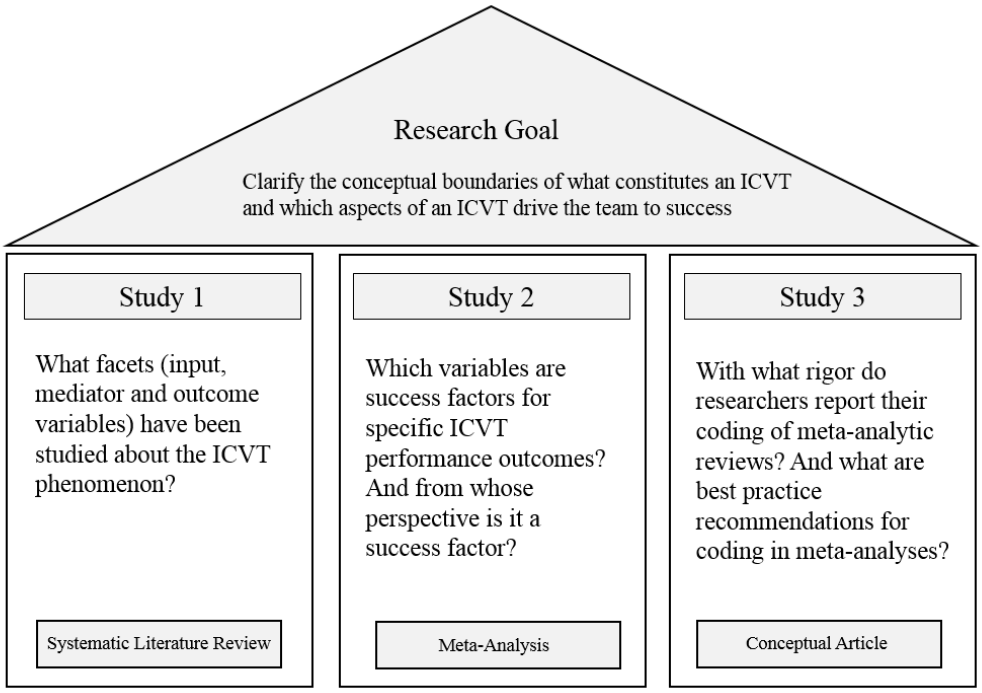
1.1 Research Projects

The core of my dissertation consists of three research projects. In the following, I will describe the aim and content of each of the three studies in greater detail (see Figure 1).

Study 1: Internal Corporate Venture Teams – A Systematic Literature Review

The starting point of my dissertation was that I found an extant body of research on TMTs (Hambrick & Mason, 1984) and NVTs (Klotz et al., 2014), but not on teams acting as new ventures within a corporation. Accordingly, I decided to conduct a systematic literature review to gain a comprehensive understanding about what facets about the ICVT phenomenon have already been studied.

Figure 1: Structure of the Dissertation



To depict the nomological network in terms of studied input, mediator and outcome variables, I analyzed 113 studies and portrayed its content in an Input-Mediator-Outcome (IMO) framework frequently used in team research to depict the state-of-the-art in team research (e.g., Klotz et al., 2014). My findings revealed that functional diversity is one of the most heavily studied team input variables. Despite its high scholarly attention, I found that researchers still use the most superficial measure of the functional diversity construct (distribution of functional roles in a team) instead of applying alternative conceptualizations (Bunderson & Sutcliffe, 2002) that would capture the actual breadth and depth of functional expertise in a team. Regarding performance outcomes of ICVTs, I observed that researchers predominately explain positive performance outcomes such as new product financial success even though project failure is rather the rule than the exception in venture projects (Keil, McGrath, & Tukiainen, 2009).

With this systematic literature review, I contribute to the conceptual clarification of what an ICVT is which until now had not been conceptually defined. Furthermore, I provide

guidance to the research community about what we already know about ICVTs by identifying and incorporating different facets of the ICVT phenomenon into an IMO framework. Finally, I also elucidate new arrays of potential future research questions for each input, mediator and outcome category, which will provide insightful answers to what we still do not know about the adventurous journey of ICVTs.

Study 2: Success Factors of Internal Corporate Venture Team Performance – A Meta-analytic Review

In *Study 1*, I identified a set of variables that have been studied about the ICVT research phenomenon. To understand which variables are success factors for performance, I conducted a meta-analysis (*Study 2*) drawing on 70 empirical articles published over the last two decades. Applying an IMO framework, I examined the relationships between 24 independent variables and performance. Unlike other team meta-analyses (e.g., Hülsheger, Anderson, & Salgado, 2009; Sivasubramaniam, Liebowitz, & Lackman, 2012), I used fine-grained performance outcomes to demonstrate how success factors vary across different performance outcomes both on the team- as well as product-level of analysis.

Besides identifying success factors for single performance outcomes, I wanted to know from whose perspective a variable is considered a success factor. For this purpose, I ran subgroup analyses, which confirmed that relationships differ substantially depending on rating source (team member, team leader or manager rating). Building on prior team meta-analyses (Bell, Villado, Lukasik, Belau, & Briggs, 2011; Sivasubramaniam et al., 2012), I also tested whether measurement differences of key constructs (e.g., functional diversity) also explain variances in findings.

The contribution of this research project is diverse: First, this meta-analysis is one of the first attempts of meta-analytically analyzing on fine-grained performance outcomes such as team innovativeness or new product novelty (cf. Beal, Cohen, Burke, & McLendon, 2003).

Second, by focusing on explaining the criterion variable of performance which has been less systematically addressed (cf. Ilgen, 1999; Mathieu, Maynard, Rapp, & Gilson, 2008), I substantially extend team- and entrepreneurship literature by conceptually clarifying the black box of performance measurement of highly innovative teams as I display definitions, key metrics and selected references for both the team- as well as product-level of analysis. Third, from a practical perspective, the identification of success factors for specific performance outcomes (e.g., team efficiency or team innovativeness) and differentiating from whose perspective (team members, team leader, manager) a facet is considered a success factor also increases a venture manager's and leader's capabilities to launch, manage and steer their ICVT to greater success.

Study 3: Bridging the Gap from 'Who and What' to 'How' in Coding: A State-of-the-Art Assessment and Guideline for Rigorous Meta-Analytic Reviews

With the systematic literature review (*Study 1*) and meta-analytic review about ICVTs (*Study 2*), I gained extent knowledge and experience in the task of coding. Coding refers to the activity that researchers perform to extract data from primary studies and to organize the coded content to create a coherent sense. Thus, *Study 3* is a conceptual research project where together with my research colleagues; I investigate with what rigor scholars report their coding in meta-analyses. For this purpose, we conducted a systematic literature review to find out what type of coding information scholars report in their meta-analytic reviews.

Systematically reviewing 124 meta-analyses revealed that there is a lack of coding transparency as scholars mostly reported 'Who' conducted the coding and 'What' type of information they coded but provided little information concerning 'How' they proceeded with their coding such as their underpinned coding decisions. On the bases of these results, we contacted the first authors of the meta-analyses considered in this research to learn how editors and reviewers addressed the questions of 'Who', 'What' and 'How' during their review

process. The answers from the inquiry indicate that the 'How' question was indeed less of an issue for the team of reviewers. To demonstrate that 'How' to code decisions are decisive for meta-analytic conclusions, we used the ICVT meta-analysis (*Study 2*) to show that 'How' to code decisions can cause variance in results but also reveal insightful answers to existing controversies in a research field. Finally, the main contribution of this research project is the development of our coding guideline that will support scholars in consciously designing the coding process to arrive at a rigorous, transparent and replicable coding.

1.2 Outline of the Dissertation

The structure of the dissertation is summarized in Figure 1 above. In chapter 2, I first clarify the conceptual boundaries of what an ICVT is. Moreover, I provide a comprehensive overview about what facets of the research phenomenon have already been researched and identify fruitful research avenues for future research on ICVTs (*Study 1*). In chapter 3, I present the meta-analysis about success factors of ICVT performance (*Study 2*) which I conducted on the basis of the studies found in the systematic literature review (*Study 1*). Chapter 4 contains the conceptual article (*Study 3*) where the task and importance of coding for meta-analytic reviews is addressed where a step-by-step guideline to scholars is provided who aim to plan and conduct their coding process in a more efficient, transparent and rigorous way. Finally, in chapter 5, I conclusively discuss the contribution of my dissertation.

2 INTERNAL CORPORATE VENTURE TEAMS − A SYSTEMATIC LITERATURE REVIEW[1]

Corporations increasingly rely on the efforts of Internal Corporate Venture Teams (ICVT) to pursue new business ideas (Covin, Garrett, Gupta, Kuratko, & Shepherd, 2018), which its existing business units are unable to address (Burgelman, 1983). ICVTs are internally-staffed venture teams that develop ideas that yet have no immediate commercial value but which potentially will be transformed into promising new business units for the corporation (Hill & Hlavacek, 1972; Kuratko, Covin, & Garrett, 2009). These new business units deriving from the ICVTs' effort may pivot a strategic shift for the corporation to survive in today's dynamic business environment.

However, despite its relevancy in today's business world, we lack a holistic picture of the different facets of the ICVT phenomenon. Thus, my research addresses the question of 'Which input, mediator and outcome variables have been studied in the context of ICVTs?'. This lack of knowledge about ICVTs is mainly because researchers have separately examined different types of ICVTs. For example, some scholars studied autonomous teams (e.g., Patanakul, Chen, & Lynn, 2012), whereas others focused on cross-functional teams (e.g., Van Der Vegt & Bunderson, 2005) or innovative teams in the context of research and development (e.g., Chen, Farh, Campbell-Bush, Wu, & Wu, 2013). Even though different terminologies of ICVTs exist, these team types share the same key purpose of an ICVT: that is, to internally develop profitable product and process innovations which ideally lead to the creation of new business units for the corporate parent (Burgelman, 1983; Covin, Garrett, Kuratko, & Shepherd, 2015; Hill & Hlavacek, 1972).

To answer my research question, I apply a systematic literature review approach (Tranfield, Denyer, & Smart, 2003). This approach yields a sample of 113 quantitative empir-

[1] I thank Prof. Baldauf and Dr. Adrian Wüthrich for valuable inputs and feedback during this research project. This research was presented at the Academy of Management Annual Meeting (AOM) in Chicago, USA (2018).

ical articles on which this review builds upon. To consolidate corresponding empirical findings, I organize variables into an Input-Mediator-Outcome (IMO) framework (Mathieu et al., 2008), which has been the theoretical basis for other team literature reviews (e.g., Hülsheger et al., 2009; Klotz et al., 2014). Examining what we already know about ICVTs, what we still do not know and where future research can contribute to a more profound understanding of the ICVT phenomenon is the objective of this systematic literature review.

By systematically reviewing the ICVT literature, I first contribute to a holistic understanding of what key variables of the ICVT phenomenon are (i.e., team compositional inputs, team processes, emergent states and performance outcomes), and how they are related to a variety of performance outcomes. More importantly, with the identification of performance outcomes on two level of analysis (team- and product level), I also shed light onto the black box of performance measurement of highly innovative teams which has been less systematically addressed in team research (Ilgen, 1999; Mathieu et al., 2008). Furthermore, I also suggest a variety of future research arrays that are needed to develop a more profound understanding about how ICVTs function. From a practical perspective, this review offers a comprehensive picture to venture managers and leaders about which team inputs and processes are crucial for the success of their ICVTs to successfully navigate the corporation through today's dynamic business landscape.

2.1 The Internal Corporate Venture Team Domain

In his early studies, Burgelman (1983) defined internal corporate venturing (ICV) as a process through which a firm transforms R&D activities into new businesses, which allow a firm to address new business opportunities that the existing operating business units are unable to address. Similarly, Roberts and Berry (1985: 6) described ICV as a 'firm's attempts to enter new markets or develop substantially different products from its existing business by setting up a separate entity within the existing corporate body'. Early studies that investigated

teams in the ICV context defined them as ‘relatively small, more or less independent clusters of marketing and technical men assigned the job of determining the best way for their companies to make the most of changing times’ (Management Review, 1967: 34). Others defined ICVTs as ‘the creation of an internally-staffed venture unit that is semi-autonomous, with the sponsoring organization maintaining ultimate authority’ (Zajac, Golden, & Shortell, 1991: 171).

There are several reasons why the ICV context presents a unique and meaningful setting in which to study teams. In fact, ICVTs are distinct in various aspects from other organizational teams as they pursue truly novel product ideas with no obvious commercial value or fit with existing corporate routines and processes (Hill & Hlavacek, 1972). In addition to this, ICVTs operate in a different organizational context where they are independent from the normal decision-making criteria of the firm (Crockett et al., 2013) in order to be protected from firm-political interferences. Another reason why corporations separate the ICVT from the traditional business units is to experiment (Covin et al., 2018) in a safe environment without putting its ongoing operative businesses at risk since venture failure is rather the rule than an exception.

Regarding team compositional aspects, ICVTs are unique as they are specifically set up to integrate members from different functional units to foster innovative thinking and to ensure rapid access to knowledge that resides in various functional units of a corporation (Ancona & Caldwell, 1992b). An additional characteristic of an ICVT is its temporary life span where members stay as long as their specialty is required on the team (Hill & Hlavacek, 1972). Due to its unique work environment, prior findings on top management team (TMT) or new venture team (NVT) literature are not applicable to the ICVT context. Unlike start-ups, the ICVT has to fight on two fronts, not only for product-market fit but also for internal

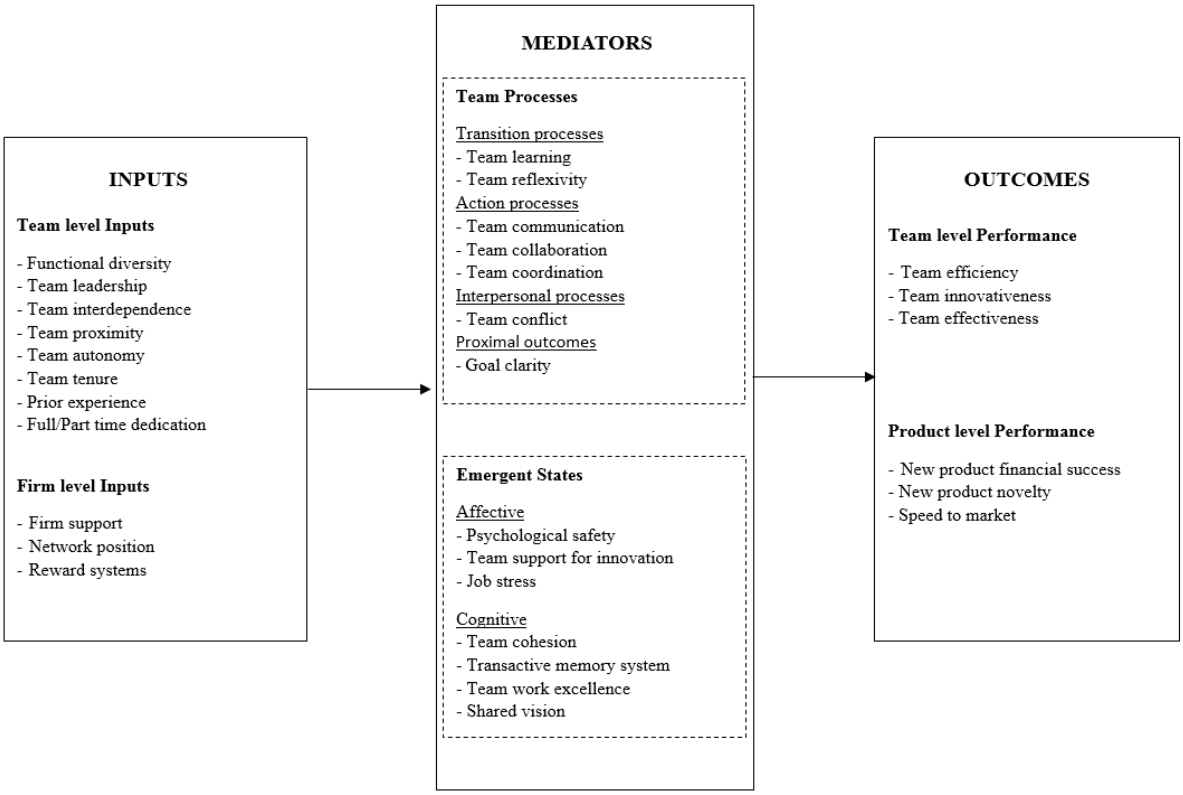
recognition from the operating business units that see how their generated resources are attributed to this new entity.

In team literature a variety of terminologies referring to ICVTs can be found, such as 'cross-functional teams' (Denison, Hart, & Kahn, 1996), 'cross-functional new product development teams' (Slotegraaf & Atuahene-Gima, 2011), 'multidisciplinary teams' (Van Der Vegt & Bunderson, 2005), 'autonomous teams' (Patanakul et al., 2012), 'new product teams' (Lynn, Skov, & Abel, 1999), or 'product innovation teams' (Im, Montoya, & Workman, 2013). Building on this terminological variety, I suggest a multi-faceted understanding of what an ICVT is: *a strategic mean of corporations to identify and explore new business opportunities that its existing business units are unable to address; a group of internally-staffed individuals from different functional units developing ideas that yet have no immediate commercial value or organizational fit with existing routines and processes; and a project-based entity with a temporary life span where in case of venture success, the ICVT will either transform into a new business unit for the corporation or be integrated into existing operations.*

To organize empirical research on ICVTs, I refer to the IMO framework by Mathieu et al. (2008). This framework has been adopted in several team literature reviews because it allows the portrayal of relevant team inputs, processes, emergent states and outcomes (e.g., Hülsheger et al., 2009; Klotz et al., 2014). As Mathieu et al. (2008: 412) outline, *inputs* 'describe antecedent factors that enable and constrain members' interactions' (e.g., functional diversity), while *mediators* consist of team processes and emergent states. *Team processes* are defined as 'members' interdependent acts that convert inputs to outcomes through cognitive, verbal, and behavioral activities' (e.g., team learning) (Marks, Mathieu, & Zaccaro, 2001: 357). *Emergent states*, in contrast, reflect 'properties of the team that are typically dynamic in nature' (e.g., team cohesion) (Marks et al., 2001: 358). Finally, *outcomes* refer to the 'results and by-products of team activity that are valued by one or more constituencies' (Mathieu et

al., 2008: 412). In this review, I distinguish between team- and product-level outcomes, such as team innovativeness or new product financial success. Figure 2 represents the set of variables that were identified in ICVT literature.

Figure 2: Input-Mediator-Outcome (IMO) Framework



2.2 Procedure of the Systematic Literature Review

I followed established procedures for systematic literature reviews (e.g., Gaur & Kumar, 2017; Tranfield et al., 2003). This approach reduces the subjectivity of data collection and thus, enhances methodological rigor of reviews by guiding authors in how to transparently document how they obtained their final study sample (De Mol, Khapova, & Elfring, 2015). Building on this knowledge, I describe in the following sections the steps of the literature search process to enhance methodological rigor of this review (see Figure 3 below).

2.2.1 Identification of Studies

Due to the influential special issue on corporate entrepreneurship (CE) published in the Strategic Management Journal by Guth and Ginsberg (1990), the year 1990 denoted the starting date for my literature search. In their seminal article, Guth and Ginsberg (1990: 5) stated: 'corporate entrepreneurship encompasses two types of phenomena […] (1) the birth of new businesses within existing organizations, i.e. internal innovation or venturing; and (2) the transformation of organizations through renewal of key ideas on which they are built, i.e. strategic renewal'. Thus, to derive terms for the literature search, I relied on the central dimensions of corporate entrepreneurship (internal corporate venturing and strategic renewal, cf. Guth & Ginsberg, 1990; Narayanan, Yang, & Zahra, 2009; Phan, Wright, Ucbasaran, & Tan, 2009) and specific ICVT activities (i.e., new product development, innovation, cross-functional knowledge integration, and R&D). I adopted a Boolean search procedure by entering keyword constellations such as 'team OR group AND internal corporate ventur* OR cross-functional knowledge integration'. I searched in different databases such as EBSCO Host Research Databases Business Source Premier, Google Scholar and ProQuest. This search procedure yielded approximately 1200 articles.

I only included studies that identified the team or project as the unit of analysis, focused on teams that reside within corporations and investigated teams in the context of innovation, internal corporate venturing or strategic renewal. Hence, I manually excluded articles about external corporate venture teams (e.g., joint venture teams or virtual teams) or NVTs. In line with the proposed definition of ICVTs, I manually excluded articles in which authors studied TMTs given that 'entrepreneurship and management are fundamentally different processes' (Birkinshaw, 1997: 208). Finally, I only considered quantitative empirical studies to inform about the direction and magnitude of relationships. Applying these search boundaries resulted in a final sample of 113 articles on which this review is based.

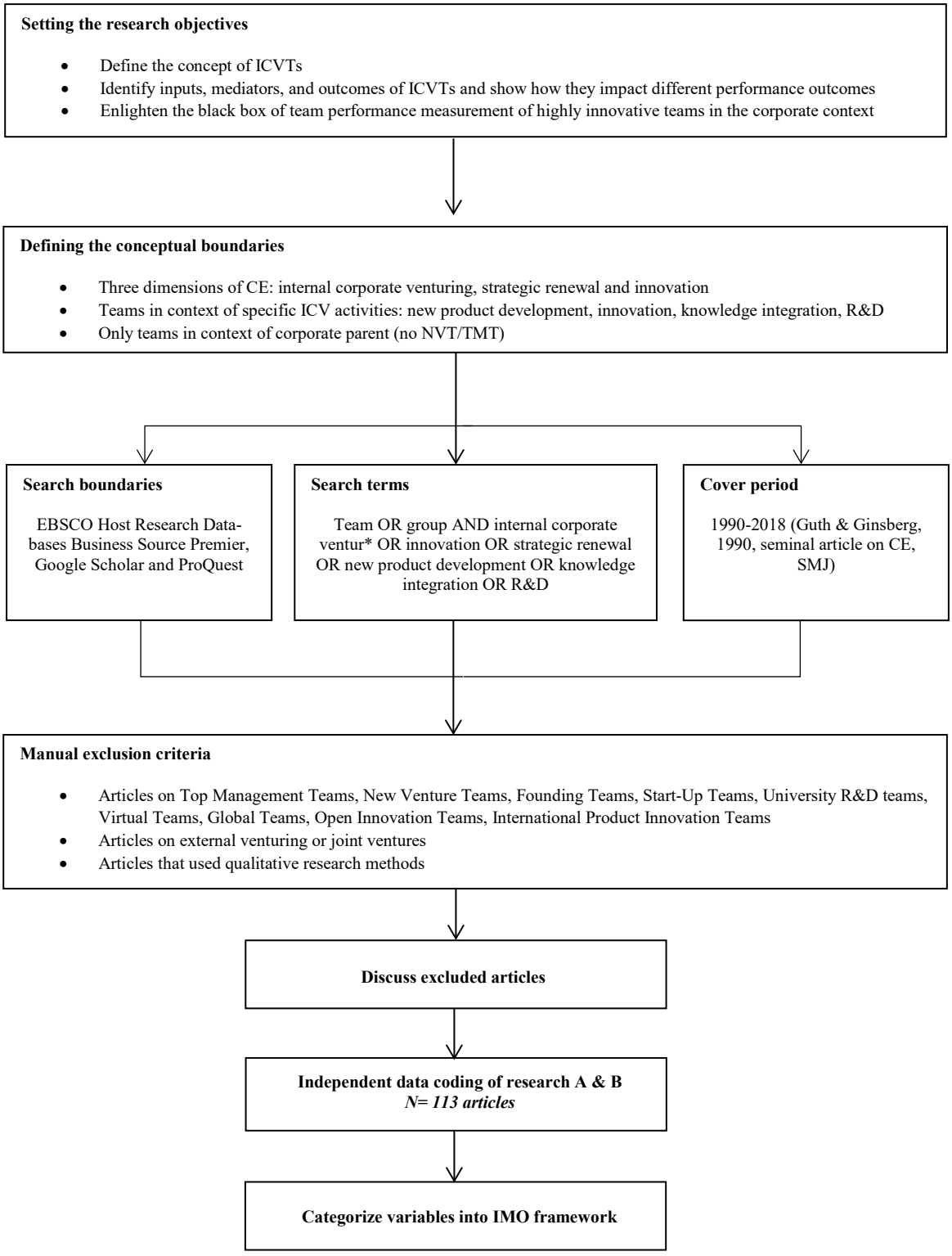
2.2.2 Coding of Studies

To ensure coding transparency, I report 'who' coded the primary articles, 'what' was coded and 'how' coders proceeded in their coding. Regarding coders' identities, the first author and a student performed the coding of studies. Both of them were knowledgeable in the field of team research and experienced in coding. I performed the first coding of studies following an inductive coding approach whereby I coded the entire study sample by extracting sample characteristics, variable characteristics and relationship signs. Applying this open coding approach allowed me to fully depict the variety of variables that have been studied so far and to ensure that less researched variables (e.g., transactive memory systems) would not be ignored in the first round of coding.

Besides variable labels, I also extracted variable definitions and measurement items as provided by original authors to ensure construct validity. This decision is based on the suggestion of several scholars to code measurement items and not to rely on indicated variable labels, as labels do not always correspond with the used scale content (Chapman, Uggerslev, Carroll, Piasentin, & Jones, 2005; Damanpour, 1991; LePine, Erez, & Johnson, 2002; Zhao, Wayne, Glibkowski, & Bravo, 2007). After the first coding, I analyzed the coded information in terms of frequency of appearance to create representative variable categories. For the categorization of variables, I followed a deductive coding approach where I allocated coded variables into input, mediator and outcome categories as proposed by Mathieu et al.'s (2008) IMO-framework.

Based on these observations, I elaborated categories for the codebook, which are represented in Appendix A. The codebook was provided to the second coder (student), who then coded the entire study sample again using the pre-defined coding categories. Coding disagreements between the two coders could be systematically discussed by analyzing the coded variable labels, definitions and measurement scales. For instance, we observed that coding

Figure 3: The Systematic Literature Search Process



ambiguities arose with the unsystematic use of variable labels; for instance, functional diversity has sometimes been labeled as cross functionality (Blindenbach-Driessen, 2015), multifunctional teams (Eisenhardt & Tabrizi, 1995) or expertise diversity (Van Der Vegt & Bunderson, 2005).

The extracted data of the entire study sample is represented in Appendix A, which illustrates the frequency of use of ICVT inputs, mediators and outcomes. Columns refer to the coding categories of the IMO framework and crosses indicate the presence of coded variables in a specific study. This table displays the highly researched ICVT topics and juxtaposes them with the blank spots of less studied variables. For example, functional diversity is the most researched input variable, whereas team interdependence has received less scholarly attention. In the following, I will elaborate on every variable represented in the IMO framework.

2.3 Team-Level Inputs of ICVTs

2.3.1 Functional Diversity

Among ICVT inputs *functional diversity*, referring to the number of functional areas represented on the team whose members are fully involved in the project (Brown & Eisenhardt, 1995), received the greatest research attention. According to the cognitive resource perspective (Hoffman & Maier, 1961) a team's diverse composition provides knowledge bases and perspectives to succeed in complex decision-making (Amason, 1996). It is argued that the functional mix of ICVTs is the most important diversity variable as it enables the team to gain direct access to expertise from other functional areas (Ancona & Caldwell, 1992b).

Indeed, scholars found that higher levels of functional diversity in ICVTs has a positive impact on speed to market because of rapid access to expertise (Carbonell & Rodriguez, 2006). One reason for the increased speed to market is that members with functional diverse backgrounds (e.g., past work experience in marketing and product development) experience

less time-consuming misinterpretations due to shared technical language (Park, Lim, & Birnbaum-More, 2009). Others found that functionally diverse ICVTs exhibited higher levels of team innovativeness as they developed more novel and useful ideas than ICVTs consisting only of functional specialists (i.e., experts in only one field) (Hirunyawipada & Paswan, 2013). This suggests that besides the number of functional areas represented on the ICVT, it is even more important to have members who incorporate a diversity of functional perspectives based on past work experiences. Interestingly, Bell et al.'s (2011) meta-analysis on the role of diversity in innovative teams demonstrated that functional diversity had only a small positive impact on innovation; and yet in another meta-analysis functional diversity was found to be unrelated to performance (Sivasubramaniam et al., 2012).

Some scholars also reported negative effects of functional diversity. For instance, some found that functional diverse ICVTs were more likely to develop incremental rather than radical innovations as the problem of consensus-finding was aggravated in radical innovation projects (Cabrales, Medina, Lavado, & Cabrera, 2008); or others found that quality of technical innovations suffered in highly functional diverse teams (Ancona & Caldwell, 1992b). Others, instead, found no significant relationship between functional diversity and team processes or performance outcomes (e.g., Cheung, Gong, Wang, Zhou, & Shi, 2016; Crockett et al., 2013; Sethi, Smith, & Park, 2001).

2.3.2 Team Leadership

Many researchers consider team leadership to be an important input variable as it directly affects how teams function (Gladstein, 1984). According to leader-member exchange theory, the quality of relationships between supervisors and subordinates is crucial for performance (Graen & Scandura, 1987). Thus, leadership styles play an important role for the success of a team. Among different leadership styles, *transformational leadership* has received significant inquiry as it reflects upon how leaders broaden the interest of team mem-

bers and 'stir their employees to look beyond their own self-interest for the good of the team' (Bass, 1990: 21). In the context of ICVTs, transformational leaders are important because they can prevent team members from putting their own interests, induced by their home functional unit, over those of the ICVT. Findings show that ICVTs with transformational leaders were more innovative because they perceived greater support in developing novel ideas (Eisenbeiss, van Knippenberg, & Boerner, 2008; Lovelace, Shapiro, & Weingart, 2001). There is also evidence that ICVTs with transformational leaders exhibited higher levels of team effectiveness (e.g., job satisfaction) (Pirola-Merlo, Härtel, Mann, & Hirst, 2002; Stoker, Looise, Fisscher, & De Jong, 2001).

Besides transformational leadership, scholars studied other leadership styles such as *participative* and *directive leadership*. For example, Somech (2006) focused on participative leadership, which describes the joint decision making by leaders and team members, and found that participative leaders strengthened the positive effect of functional diversity on team reflexivity. In contrast, leaders pursuing a directive leadership style who focused mainly on the control of goal attainment affected team reflexivity negatively (Pirola-Merlo et al., 2002).

2.3.3 Additional Team-Level Inputs

Additional ICVT inputs have also been investigated. Examining team compositional variables, a study by Carbonell and Rodriguez (2006) revealed that *full-time dedicated members* in ICVTs were more likely to accelerate speed to market of complex projects. Furthermore, Sethi (2000b) showed that *team interdependence* defined as how team members' rewards and goals are linked to the performance of the team rather to their individual excellence, significantly enhanced team cohesion. For example, superordinate goals in ICVTs, which go beyond a team member's functional responsibility, revealed to be important for the attainment of cross-functional cooperation (Pinto, Pinto, & Prescott, 1993). Additionally, even though a majority of authors reported insignificant effects of *team proximity* (physical

distances between ICVT members) on team processes, Pinto et al. (1993) showed that higher levels of team proximity increased cross-functional cooperation between the ICVT and other teams. Some researchers instead focused on *team tenure* which refers to the duration an ICVT has jointly worked together to complete a particular ICV project (Sethi, 2000b). Findings indicate that highly tenured ICVTs engaged more extensively in the examination of opportunities (Slotegraaf & Atuahene-Gima, 2011), created a stronger superordinate identity (Sethi, 2000b) and entered their markets quicker (Sivasubramaniam et al., 2012). Others examined distributional differences in tenure and found that higher levels of tenure diversity led to more relationship conflicts in ICVTs (Pelled, Eisenhardt, & Xin, 1999) and negatively affected team efficiency (Ancona & Caldwell, 1992a). Finally, a few studies showed that *autonomy* led to new product financial success (Chen, Neubaum, Reilly, & Lynn, 2015) or that members' *prior experience* (e.g., members who developed similar products before) led to higher customer satisfaction but low new product novelty (Hirunyawipada & Paswan, 2013).

2.4 Firm-Level Inputs of ICVTs

2.4.1 Firm Support

The most prominent firm-level input is *firm support*, which describes the nature and extent of a corporate parent's involvement in the ICVT such as management's encouragement to take risks, provision of information or financial resources. Indeed, firms providing a context of support in terms of resources and information, were found to increase an ICVT's psychological safety (Edmondson, 1999) as well as to increase the probability of bridging the gap between idea generation and idea implementation (Clegg, Unsworth, Epitropaki, & Parker, 2002). Bridging this gap is especially important for ICVTs as one of their key challenges is to guarantee that promising business ideas will make it to the market. Hence, to fully draw on the unique competences of team members, firms need to make sure that individuals feel at ease expressing their ideas and are encouraged to take risks. Otherwise, new product novelty

in terms of radicalness of innovations is likely to be reduced. Indeed, researchers showed that ICVTs encouraged to take risks by the corporate parent developed more novel products (Cabrales et al., 2008) and that new product financial success was high for ICVTs experiencing personal attention by corporate management (Crockett et al., 2013).

Interestingly, ICVTs facing financial resource constraints still performed well in terms of team efficiency and new product quality (Weiss, Hoegl, & Gibbert, 2011). This finding suggests that supportive and open-minded venture managers who create a stimulating work climate where failure is tolerated are more important for ICVT performance than abundance of financial resources.

2.4.2 Network Position

Unlike other operating teams, ICVTs are independent from the normal decision-making criteria of the firm (Crockett et al., 2013: 856) to foster its innovative potential. Despite its separation from other traditional teams, ICVTs have to fulfill their strategic purpose of integrating and making the best use of the knowledge and skills that are spread across the organization. Indeed, scholars argued that an ICVT's central *network position* is crucial for the generation of new ideas as it increases the likelihood of gaining access to strategic resources residing in other functional areas (Tsai, 2001).

To assess an ICVT's network centrality, authors have also referred to interdepartmental connectedness, which describes the level of an ICVT's established contacts across multiple functional domains within their parent organization (Sethi, 2000b). Indeed, ICVTs that occupied a central network position were more motivated to achieve work excellence and reported a higher number of new product introductions (Sethi & Nicholson, 2001; Tsai, 2001). Not only did firms with well integrated ICVTs introduce more novel products, firms cultivating interdepartmental connectedness also experienced more resource exchange between the ICVT and other functional units because both parties felt that they can trust one

another (Tsai & Ghoshal, 1998). Thus, interdepartmental connectedness is key for an ICVT's success because operating business units dealing with the day-to-day business of the corporation and who are not directly involved in the product development might show greater acceptance and commitment to market new product innovations developed by the ICVT within their existing operating structure.

2.4.3 Additional Firm-Level Inputs

A few studies on firm-level ICVT inputs also analyzed how *reward systems* influence the degree of radicalness of innovation. For example, Cabrales et al. (2008) demonstrated that the combined use of short- and long-term incentives based on outcomes promoted more incremental than radical innovation. Building on this, Sarin and Mahajan (2001) compared process- and outcome-based rewards, supposing that they have opposite effects on ICVT performance. In fact, they showed that long-term projects with process-based rewards had stronger negative relationships with performance, whereas outcome-based rewards had marginally significant positive effects. Further, Sarin and Mahajan (2001) found that team members' satisfaction increased when rewards were based on their position rather than being distributed evenly among the team.

2.4.4 Future Research on ICVT Inputs

Even though there is a bulk of research about the effects of functional diversity in ICVTs, only few authors have so far considered different conceptualizations of functional diversity. According to Bunderson and Sutcliffe (2002), functional diversity can be conceptualized in four distinct ways: (1) *functional assignment diversity* refers to the distribution of covered functional areas in a team, (2) *dominant function diversity* indicates in which functional areas the team possesses most knowledge as team members indicate in which area they have spent the major part of their previous careers, (3) *functional background diversity* describes the breadth of functional experience within a team and finally, (4) *intrapersonal diver-*

sity captures the distribution of functional specialists and generalists inside a team. This distinction is highly relevant as meta-analytical results demonstrated that different conceptualizations resulted in substantial differences regarding both the direction and magnitude of effects between functional diversity and subsequent outcomes (Bell et al., 2011; Sivasubramaniam et al., 2012).

In the majority of reviewed ICVT studies, scholars (Lovelace et al., 2001; Somech, 2006) conceptualized functional diversity as functional assignment diversity (distribution of functional roles in a team). Only a small number of scholars (e.g., Cheung et al., 2016; Vera & Crossan, 2005) relied on the remaining three conceptualizations of functional diversity. This is unfortunate because functional assignment diversity reveals little information about the actual breadth and depth of functional expertise residing in a team. Rather, this conceptualization reflects whether 'current functional assignments cover some relevant range of functional categories' (Bunderson & Sutcliffe, 2002: 879). This makes it difficult to adequately test predictions from the cognitive resource perspective, which suggests the integration of experiences and viewpoints to actually result in favorable ICVT outcomes (Amason, 1996). Future research should therefore more strongly consider alternative conceptualizations of functional diversity such as dominant function or functional background diversity that reflect the actual breadth and depth of functional expertise in an ICVT.

Also, only a few researchers have so far examined how *full time vs. part-time dedication* of team members affects ICVT outcomes (e.g., Carbonell & Rodriguez, 2006; Swink, 1999). Further exploring this issue could be a fruitful area of inquiry because part-time members of ICVTs might be negatively influenced by existing bonds with their home functional unit and might put their unit's interest over those of the ICVT's. Relatedly, not spending as much time with the ICVTs as their full-time dedicated counterparts might inhibit the building of trust and is likely to result in venture failure.

Finally, future research on ICVT inputs should investigate in more depth the complex relationship of the corporate parent, venture leaders and the ICVT. Early process studies provide evidence that the relationship between the TMT of a corporate parent and venture team leaders are central determinants for an ICVT's success (Hitt, Nixon, Hoskisson, & Kochhard, 1999). Only recently, studies started to investigate the interplay between the corporate parent and venture management team (e.g., Crockett et al., 2013). For instance, Covin et al. (2015) investigated the role of market familiarity and unfamiliarity of the corporate parent with the ICVT's target market. They found that prior market knowledge of the corporate parent is a founding condition of ICVT success because the team could build on the parent's extensive knowledge base, which helped them avoiding erroneous assumptions about their target market. Regarding the main task of an ICVT to innovative outside the corporate parent's core competencies it would be interesting to study the mechanisms that ICVTs adopt to overcome uncertainties where they cannot count on their corporate parent's prior experience. Thus, examining different facets of the complex relationship between the corporate parent, venture managers and team members of the ICVT are a fruitful array for future scientific inquiry.

2.5 Mediators: Team Processes

2.5.1 Team Communication

Besides input variables, researchers also examined the relationship of various team process variables on performance. For instance, team communication is a popular research topic where scholars mainly distinguish between *internal and external team communication*. Internal team communication denotes an ICVT's ability to combine and exchange knowledge among team members (Smith, Collins, & Clark, 2005). Expectancy theory (Vroom, 1964) suggests that individuals who work in functionally diverse ICVTs generally expect their team members to be experts in their fields, which in turn motivates them to share knowledge with one another. Indeed, various scholars found that ICVTs who communicated internally created

more novel products (Liu, Chen, & Tao, 2015; Park, Lim, & Birnbaum-More, 2009; Tsai & Ghoshal, 1998) and witnessed higher levels of team cohesion (Keller, 2001). In contrast, some scholars claimed that internal communication could be detrimental for ICVT performance. For instance, Dayan, Elbanna, and Di Benedetto (2012) displayed that internal communication was harmful to performance as members of similar functional domains were more likely to internally form alliances in order to put their functional domain's interests above those of their team's.

External team communication describes the degree of information exchange with people outside the team such as customers or experts (Keller, 2001). For instance, Sethi (2000a) illustrated that ICVTs engaging in knowledge integration of customer opinions during the idea development phase created higher quality products, while Wenpin Tsai (2001) found that ICVT's exhibited higher levels of team innovativeness when engaging in external team communication. A few scholars also integrated both team communication types to draw comparisons about their relative importance for an ICVT's performance (Fedor, Ghosh, Caldwell, Maurer, & Singhal, 2003; Keller, 2001; Schulze & Hoegl, 2006). For example, Schulze and Hoegl (2006) found that external communication decreased a new product's financial success when teams were in the first stages of product conceptualization and that it only became a crucial success factor during the later stage of product development. In contrast, internal team communication showed to be beneficial especially in the early stages of product conceptualization. Thus, suggesting that ICVTs in their early stages should focus their communication within the team and only integrate 'outside' opinions in later stages of product development.

2.5.2 Team Learning

In most of the reviewed studies, authors viewed the development of innovation as a process of *team learning* (Gu, Wang, & Wang, 2013). Team learning is described as a process of experimentation, reflection and codification (Gibson & Vermeulen, 2003). Scholars found

that higher levels of team learning increased an ICVT's product novelty, speed to market, and new product financial success (Dayan & Di Benedetto, 2011; Lynn et al., 1999; Sarin & McDermott, 2003). Moreover, Covin et al. (2018) showed that the relationship between an ICVT's learning proficiency and its performance was strongest when the initial value proposition was low. In other words, ICVTs faced with low initial founding conditions in terms of how to appeal to the target market made greater use of their team's learning proficiency.

Related to team learning, some scholars have investigated the impact of team members' resistance against conformity (i.e., minority dissent) and their ability to change beliefs and routines (i.e., team unlearning). Findings suggest that ICVTs are more likely to develop novel ideas if they are exposed to minority dissent and unlearning processes (Akgün, Lynn, & Byrne, 2006; De Dreu, 2002; De Dreu & West, 2001; Lee & Sukoco, 2011). Thus, the ICVT's constant search for alternative solutions by reflecting and questioning existing ideas is a crucial factor for the team's success.

2.5.3 Team Conflict

Another widely explored team process is *team conflict* in ICVTs (De Dreu, 2006; Lovelace et al., 2001; Pelled et al., 1999). Defined as 'the process resulting from tensions between team members' (De Dreu & Weingart, 2003: 741), team conflict denotes a multidimensional construct. Whereas cognitive or task-related conflicts describe task-oriented debates about how to best achieve objectives (Amason, 1996), affective or relationship conflicts instead refer to personality clashes between team members (Jehn & Bendersky, 2003).

In a majority of ICVT studies, researchers payed special attention to how the functional diverse composition of an ICVT affected team conflict. According to the cognitive resource perspective (Hoffman & Maier, 1961), ICVTs are expected to engage in task-related conflict because members originating from different functional areas exhibit high levels of functional background diversity. Indeed, several authors (e.g., Lovelace et al., 2001; Pelled et al., 1999)

provided empirical evidence for this proposition. In contrast, social comparison theory (Festinger, 1954) asserts that ICVTs are less prone to relationship conflict because differences regarding permeable attributes (i.e., functional background) outweigh those with respect to less permeable characteristics (e.g., age, gender). In fact, Pelled et al. (1999) found that functional diverse ICVTs were less likely to engage in relationship conflicts as their functional diverse backgrounds make it very difficult to compare themselves with one another.

Yet, on the basis of the reviewed studies, it is less clear whether task-related conflict results in favorable ICVT outcomes. For instance, De Dreu (2006) or Slotegraaf and Atuahene-Gima (2011) showed that task conflict positively affected team innovativeness as the team considered multiple evaluation criteria during their decision making processes. Most notably, De Dreu (2006) and Song, Dyer, and Thieme (2006) revealed that functional diverse ICVTs engaging in task conflict were more innovative when they possessed high levels of problem-solving abilities and led open discussions. Others instead, found task conflict to be detrimental for team innovativeness (Lovelace et al., 2001) or reported non-significant results (Miron-Spektor, Erez, & Naveh, 2011).

2.5.4 Additional ICVT Processes

Also other team processes have been examined. For instance, Pinto et al. (1993) found that *collaboration* in ICVTs was positively associated with team efficiency and team effectiveness. Other scholars found evidence that higher levels of *team coordination* enabled ICVTs to be more successful in accomplishing their tasks (Kock, Lynn, Dow, & Akgün, 2006; Pearce & Ensley, 2004) and to achieve higher levels of team innovativeness, even when experiencing enhanced levels of time pressure (Chong, Van Eerde, Chai, & Rutte, 2011).

Finally, this review suggests that *goal clarity* denotes a relevant ICVT process too. For example, Hirunyawipada and Paswan (2013) provided evidence that higher levels of goal constraints strengthened the positive relationship between ICVTs' functional diversity and

team innovativeness in terms of idea usefulness. In line with this, earlier studies (Lynn et al., 1999) showed that goal clarity in terms of understanding its target market positively impacted new product financial success and speed to market.

2.6 Mediators: Emergent States

2.6.1 Team Cohesion

Team cohesion is one of the most frequently studied cognitive emergent states in organizational team literature (Kozlowski & Ilgen, 2006) and refers to a team's sense of belonging and team members' morale associated with membership in the group (Bollen & Hoyle, 1990). Indeed, ICVT members who strongly identified with their teams were more willing to innovate (Glynn, Kazanjian, & Drazin, 2010). Further, Van Der Vegt and Bunderson (2005) demonstrated that highly cohesive ICVTs were more able to smooth specialization differences among their functional diverse team members and were more likely to stimulate team learning.

In this review, superordinate identity and team cohesion are used interchangeably. In fact, superordinate identity encompasses not only a team's sense of belonging but also the extent to which members identify with their team rather than with their original functional units (Tajfel, 1982). Regarding the functional diverse team composition of ICVTs, scholars have argued that the integration of diverse expertise is successful when team members are not holding stereotypes against each another (Sethi et al., 2001). Researchers empirically documented that ICVTs that created a superordinate identity spanning different functional backgrounds were more likely to create novel products (Sethi, 2000b; Sethi et al., 2001). Thus, team cohesion seems to be crucial for the successful creation of bonds between members coming from different functions to guarantee knowledge exchange and the development of new product innovations.

2.6.2 Team Climate for Innovation

Researchers have given significant attention to the four dimensions of the team climate theory (participative safety, support for innovation, vision and task orientation) developed by West (1990). Participative safety, which is often labeled in literature as *psychological safety,* is defined as the extent to which team members have 'a shared belief that the team is safe for interpersonal risk taking' (Edmondson, 1999: 354). Earlier studies found that ICVTs experiencing a work climate in which expressing doubts is accepted were more likely to find ways to improve their work processes (Edmondson, 1999). Besides team effectiveness, also a team's innovativeness in terms of using more novel work approaches showed to be related to psychological safety (Gu et al., 2013; Peltokorpi & Hasu, 2014). In contrast, ICVT members that felt less free to express doubts experienced stronger negative relationships (Lovelace et al., 2001).

Whereas psychological safety describes a team's comfort of idea expression, *team support for innovation* is defined as a team's supportiveness in pursuing innovative ideas (West et al., 2003) including their tolerance for failure (Vera & Crossan, 2005). Some studies revealed that team support for innovation mediates the relationship between transformational leadership and team innovativeness (Chen et al., 2013; Eisenbeiss et al., 2008). This suggests that ICVTs benefit from transformational leaders only if their work climate is open towards pursuing unconventional ways of thinking as well as potential failures. Also, Pirola-Merlo (2010) showed that team innovativeness is positively related with high levels of perceived support for innovation by ICVTs. Similarly, Weiss et al. (2011) demonstrated that team support for innovation is an important contingency variable. Their findings highlight that ICVTs faced with financial resource constraints do not necessarily experience inferior performance; on the contrary, ICVTs perform well as long as they exhibit high levels of team support for innovation.

The third dimension of team climate theory is *shared vision*. Scholars found that high levels of shared vision are positively related to team effectiveness (Pirola-Merlo et al., 2002), team innovativeness (Gu et al., 2013) and new product financial success (Crockett et al., 2013). Task orientation is the fourth dimension and is referred to as *team work excellence*. Eisenbeiss et al. (2008) found that support for innovation enhanced team innovativeness only when teamwork excellence was high. Others found that team work excellence is positively related to team effectiveness because members saw a higher meaning in what they were doing (Pirola-Merlo et al., 2002).

2.6.3 Additional ICVT Emergent States

A few additional ICVT emergent states have also been examined. For example, Keller (2001) revealed that *job stress* negatively mediated the relationship between functional diversity and team cohesion. That is, functionally diverse ICVTs under jobs stress were less likely to form team cohesion when members were stressed due to lack of shared functional goals. Moreover, ICVTs with higher levels of stress were ineffective learners as they were impaired by fears (Akgün, Lynn, & Byrne, 2006).

Regarding decision-making processes, the existence of a *transactive memory system* (TMS) (a situation in which each team member possesses awareness of who knows what in the team, cf. Wegner, 1987) has shown to be important for teams to make effective and efficient decisions. Researchers found that ICVTs were likely to build a TMS when they experienced higher levels of team stability, familiarity or trust (Akgün, Byrne, Keskin, Lynn, & Imamoglu, 2005). Further, scholars argued that a TMS is an important source of memory as it reduces the cognitive load of each team member (Mohammed, Ferzandi, & Hamilton, 2010). In the context of corporate venturing, where speed to market is important and the ICVT's composition is characterized by high levels of functional diversity, a TMS is especially relevant for rapidly identifying the most knowledgeable team member. Indeed, scholars found

that ICVTs with a TMS were more likely to rely on their collective knowledge to make intuitive judgements, to learn from each another and to speed up new product introductions (Akgün, Byrne, Keskin, & Lynn, 2006; Dayan et al., 2012). Additionally, scholars found that the impact of TMS on new product financial success was higher when ICVTs were faced with high task complexity. Considering the complex work environment of ICVTs, an active TMS seems to be an important success factor (Akgün et al., 2005).

2.6.4 Future Research on ICVT Mediators

Following Marks et al. (2001), there are three primary types of team processes: action processes, transition processes, and interpersonal processes. Action processes describe activities that directly lead to goal accomplishment (e.g., decision making), whereas transition processes refer to a team's reflexivity on past performance and planning for future actions (e.g., development of alternative courses of action). Interpersonal processes, on the other hand, occur throughout both transition and action phases and reflect the processes teams use to manage interpersonal relationships (e.g., conflict management) (Marks et al., 2001). The studies considered in this review reveal that previous ICVT researchers have so far predominately examined action processes, such as team communication, at the expense of transition and interpersonal processes. Thus, future research on ICVTs should examine in more depth how transition and interpersonal team processes affect ICVT performance.

Referring to interpersonal processes, prior work on team conflict showed that ICVTs often witness task-related conflicts (Pelled et al., 1999). In fact, scholars have argued that setting up a functional diverse ICVT naturally implies the occurrence of task-related conflicts as members from different functional areas possess different thought worlds (Dougherty, 1992). Building on this, researchers state that task-related misconceptions may limit consensus finding or learning, which interferes with an ICVT's ability to identify and successfully develop innovative project solutions (Lovelace et al., 2001). Even though conflict is pertinent in

ICVTs and scholars emphasize the importance of conflict resolution as an important predictor of performance (Behfar, Peterson, Mannix, & Trochim, 2008), little is known about *conflict resolution behaviors* of highly functional diverse ICVTs. In fact, I identified only a few empirical studies in which authors examined the impact of different conflict-resolution styles on ICVT performance (Sarin & O'Connor, 2009; Song et al., 2006). Identifying a set of different problem resolution skills would enrich our understanding of how ICVTs are able to jointly overcome challenges despite their functional diverse thought worlds.

Referring to transition processes, prior work has shown that *team adaptation* is central to teams working in innovative contexts as adaptive teams shift their knowledge structures to identify and adjust to performance hindrances (Burke, Stagl, Salas, Pierce, & Kendall, 2006). Scholars generally argue that team adaptation is distinct from team learning as learning does not necessarily lead to any changes in behavior, whereas adaptation refers to the adjustment of actions based on the knowledge gained from learning (LePine, 2003). The process of ICV is essentially geared towards the creation of something new (Sharma & Chrisman, 1999), which means that ICVTs are permanently confronted with high levels of uncertainty and contextual ambiguity (Keil et al., 2009). Therefore, ICVTs might often be confronted with the need to adapt established role structures during the course of evolving ICV projects. Future research should therefore explore how ICVTs adjust to shifts in the internal (e.g., membership change or re-allocation of resources) or external environment (e.g., legal changes or changing customer needs) in different phases of the venture project.

2.7 Outcomes

2.7.1 Team-Level Performance Outcomes

While scholars predominately focused on explaining the left hand-side of the framework such as team inputs and processes, less clarity exists on the right-hand side of the equation (Ilgen, 1999; Mathieu et al., 2008). To shed light onto the black box of team performance

measurement, I systematically extracted performance outcomes used by scholars in this study sample. This allowed me to identify six performance outcomes, which I allocated on the team- and product-level of analysis.

Unlike start-up literature, where the majority of authors have focused on financial firm-level outcomes (cf. Klotz et al., 2014), ICVT studies display a greater variety of team-level performance outcomes. On the team-level of analysis, I identified three performance outcomes: *team efficiency*, *team innovativeness* and *team effectiveness*. As Appendix A shows *team efficiency* (n=39) was the most commonly used team-level outcome. It refers to a team's adherence to schedule and budget objectives (Ancona & Caldwell, 1992b; De Dreu, 2006; Hoegl, Weinkauf, & Gemuenden, 2004). Key metrics of team efficiency are 'the team did a good job adhering to budget and meeting all of the schedule deadlines' (Sarin & Mahajan, 2001) or 'the team's project duration met the planned time schedule'(Atuahene-Gima, 2003). Therefore, researchers using team efficiency as an outcome are primarily interested in understanding the speed and cost-efficiency of the ICVT when performing venturing activities that, in turn, are likely to result in competitive advantages.

Given the innovation context of ICVTs, numerous studies (n=36) have adopted *team innovativeness* as a team performance outcome. However, among the studies included in this review team innovativeness shows less terminological consistency than team efficiency. Due to this lack of construct clarity, I define team innovativeness as the extent to which the team makes use of its potential to innovate. I found a variety of key metrics that scholars used to measure a team's innovativeness, such as degree of radicalness of the innovation developed by the team (radical vs. incremental innovation; Miron-Spektor et al., 2011), number of suggested and actually implemented new ideas by the team (De Dreu, 2006; Eisenbeiss et al., 2008; Pelled et al., 1999; Somech, 2006), number of innovations introduced by the team (Lovelace et al., 2001) or extent to which the team is considered being an innovative team (De

Dreu, 2006; De Dreu & West, 2001). Some scholars also applied knowledge related metrics such as 'the team produced knowledge that did not exist before' (Denison et al., 1996), 'the team made an outstanding contribution to scientific or technical development in its field' (Keller, Julian, & Kedia, 1996) or 'the team developed innovative ways of accomplishing work targets' (Somech & Khalaili, 2014) to capture the degree of team innovativeness in ICVTs.

Among team-level performance outcomes, *team effectiveness* (n=28) is the least frequently used performance outcome. It can be defined as an overall measure of the team's current productivity and future capability to continue working together (Hackman, 1987). This definition is supported by the study sample, which demonstrates that team effectiveness was mostly measured as an ICVT's work quality, job satisfaction, or responsiveness to customer expectations (Edmondson, 1999; Hoegl & Parboteeah, 2006; Somech, 2006). In this regard, I identified several key metrics such as the extent to which the team met or exceeded customer expectations (Edmondson, 1999), the team's satisfaction with its own performance (Pirola-Merlo et al., 2002), the team's reputation of work excellence in the firm (Faraj & Sproull, 2000), degree to which the team advanced their image to customers (Hoegl & Gemuenden, 2001) or the team's willingness to continue working together (Pinto et al., 1993). Overall, this review discovered that scholars conceptualized ICVT outcomes primarily along three dimensions on the team-level of analysis to capture the team's self-evaluation as well as external perceptions of how successfully the team performs.

2.7.2 Product-Level Performance Outcomes

Besides team-level performance outcomes, scholars also often included product-level performance outcomes in their studies, such as *new product financial success, new product novelty* and *speed to market*. The most commonly used product-level performance outcome is *new product financial success* (n=29). New product financial success is defined as an overall

measure of financial success of the product in terms of relative profits, sales objectives or return on investment (Cooper & Kleinschmidt, 1987). Scholars apply key metrics such as the degree to which a new product met or exceeded overall sales expectations, return on investment or profit expectations (Liu et al., 2015; Schulze & Hoegl, 2006; Sethi, 2000a), the degree to which the firm perceives its product to be profitable compared to its main competitor (Joshi & Sharma, 2004) or the degree to which the corporate parent would agree the ICVT to have met milestones in terms of market share (Crockett et al., 2013). As previously stated, this finding is consistent with Klotz et al.'s (2014) review on NVTs, where the majority of authors used sales growth and profitability to determine a venture's performance.

A crucial element for a corporation's success is the timing of new product introductions to benefit from first-mover advantages. Building on this, researchers frequently adopted *speed to market* (n=25) as a performance measure (Pearce & Ensley, 2004; Sarin & McDermott, 2003; Vera & Crossan, 2005). It is defined as the time span between idea conception and product launch (Dayan & Elbanna, 2011). Noteworthy, different terminologies are used to refer to speed to market, such as development speed or innovation speed (Atuahene-Gima, 2003; Carbonell & Rodriguez, 2006). In ICVT studies, scholars adopted key metrics which reflect both an external perspective of speed to market, such as 'the product was developed and launched in less time than what is considered normal for our industry' (Açikgöz, 2017) and an internal perspective of speed to market with metrics such as 'the product was developed much faster than other comparable products by our organization' (Sarin & Mahajan, 2001) or 'the top management team was very pleased with the time it took us to bring the product to market' (Lynn et al., 1999).

Lastly, researchers also used *new product novelty* (n=21) as a performance outcome in their studies, which describes the newness of the product to the market or to the firm (Kleinschmidt & Cooper, 1991). For example, scholars used key metrics such as the degree to

which the product is considered radically different from industry norm (Hirunyawipada & Paswan, 2013), the degree to which the product is new to the firm or industry (Joshi & Sharma, 2004), the extent to which the new product is innovative compared to other products (Park, Lim, & Birnbaum-More, 2009) or the number of patents received (Peltokorpi & Hasu, 2014). Based on these findings, I conclude that ICVT studies show to equally integrate team- and product-level performance outcomes to gain a more holistic and fine grained view about the success of ICVTs.

2.7.3 Future Research on ICVT Outcomes

This review showed that in all studies considered, efficiency on the team-level and new product financial success on the product-level were the most commonly used ICVT outcomes. But financial success is not always the primary motivation for a corporation to invest in internal corporate venturing (Keil et al., 2009; Narayanan et al., 2009). Other factors such as strengthening cross-functional interactions among units or giving employees the possibility to foster their entrepreneurial self can be possible drivers for firms to invest in ICVTs too. Besides, financial performance measures are only appropriate for assessing the performance of ventures operating in more advanced stages of their development (Garrett & Covin, 2015). The under-reporting of an ICVT's success when using purely financial performance measures can also be explained by the slow market adoption of recently launched products. Therefore, future researchers need to consider different stages of an ICV project where performance metrics correspond most immediately with the current phase of the ICV process (early, middle and establishes stage ventures). This distinction of different venture stages would also allow researchers to determine which inputs and processes are most crucial for which stage of the venture project (Garrett & Covin, 2015).

Even though I found that ICVT literature uses a broader spectrum of performance outcomes than NVT literature (Klotz et al., 2014), I would like to point out that a considerable

amount of studies predominantly used single performance outcomes (e.g., Chen et al., 2013; De Dreu & West, 2001; Eisenbeiss et al., 2008) which provide only a narrow perspective about an ICVT's success (e.g., only using team efficiency as outcome). For instance, it could be that the team is not efficient but exhibits high levels of new product novelty. Thus, future research should integrate multiple performance outcomes of different levels of analysis to depict a holistic picture of an ICVT's venture success.

Another important aspect to consider when evaluating ICVT outcomes is the high probability of project failure. Entrepreneurship literature states that teams working on venture projects often fail and that only a few initiatives actually lead to the creation of new businesses (Phan et al., 2009). However, none of the reviewed studies examined *venture failure* as an ICVT outcome, which also leads to a lack of understanding what failure in the ICV context means and what potential drivers of venture failure are. For instance, Keil et al. (2009) found that failure may result in positive outcomes as team members are likely to gain new knowledge and develop unique capabilities through their engagement in the failed initiative, which they can implement in existing teams or in subsequent ICV projects. Thus, future research on ICVTs should shift their focus from explaining only success towards a more integrative approach by also examining ICVT failure. This would lead to more construct clarity in terms of what managers, venture team leaders and members of the ICVT perceive as failure and how they cope with the probability of failure during the ICV project.

2.8 Discussion and Future Implications

This systematic review addresses the question of what the focal inputs, mediators and outcomes are that scholars use when investigating the ICVT phenomenon, and how they impact ICVT performance. I find that scholars have studied various team types performing specific ICV activities (i.e., new product development, innovation, cross-functional knowledge integration, or R&D). To synthesize this extant knowledge on ICVTs, I have consolidated

research on these particular types (e.g., autonomous teams, cross functional teams or product innovation teams) relying on the well-established IMO framework (Mathieu et al., 2008) to allocate input, mediator, and outcome variables (N=113). As there is a lack of knowledge regarding how scholars measure performance of highly innovative teams, this review identifies the most dominant performance outcomes that have been used by researchers and allocates them on the team- and product-level of analysis. In addition to this, I also identify several key discussion points towards which future researchers should direct their attention when investigating the ICVT phenomenon.

First, future research should consider different conceptualizations of functional diversity (Bunderson & Sutcliffe, 2002). Bringing individuals with different functional expertise together is arguably a key purpose for corporations when implementing ICVTs (Corbett, Covin, O'Connor, & Tucci, 2013) because functionally diverse teams benefit from rapid access to expertise (Ancona & Caldwell, 1992b), which in turn enables them to develop more novel and useful products (Hirunyawipada & Paswan, 2013), as well as to enter markets more quickly (Carbonell & Rodriguez, 2006). Accordingly, a majority of authors considered functional diversity to be a key input factor of ICVTs. Even though most scholars have found higher levels of such heterogeneity to be beneficial for ICVTs and their parent corporations, negative effects (e.g., Cabrales et al., 2008) or non-significant results have also been reported (e.g., Cheung et al., 2016; Crockett et al., 2013; Sethi et al., 2001). One promising way to address these equivocal results would be to consider measurement differences of functional diversity as a potential moderator between functional diversity and subsequent outcomes (Bell et al., 2011; Bunderson & Sutcliffe, 2002; Sivasubramaniam et al., 2012). So far, the majority of authors have measured functional diversity as the distribution of functional roles in a team (Brown & Eisenhardt, 1995), rather than identifying the actual breadth and depth of functional expertise of the team (Park, Lim, & Birnbaum-More, 2009; Vera & Crossan, 2005). Con-

sidering alternative conceptualizations of functional diversity (cf. Bunderson & Sutcliffe, 2002) that reflect the breadth and depth of functional skills and expertise of the ICVT is crucial. In fact, these alternative conceptualizations relate more directly to key propositions from the cognitive resource perspective (cf. Williams & O'Reilly, 1998) where the degree of breadth and depth of expertise in a team is considered a key success factor.

Second, future scholars should put stronger emphasis on critical mediating processes and emergent states, rather than examining direct relationships between ICVT inputs and outcomes. This suggestion is in line with Klotz et al. (2014), who drew similar conclusions when reviewing the empirical literature on NVTs. As for ICVT processes, I observe that there is a tendency to study 'action processes' instead of 'transition' or 'interpersonal processes' (Marks et al., 2001). For instance, team adaptation (Burke et al., 2006) is likely to denote an important transition process in ICVTs because projects are characterized by high levels of risk and uncertainty (Keil et al., 2009). Accordingly, future research on team adaptation could enlighten the complexity of how venture managers and leaders can steer their ICVTs to success despite high levels of incertitude.

Furthermore, this review indicates that only a few ICVT scholars examined cognitive constructs such as transactive memory systems (TMS) (Akgün et al., 2005; Dayan & Elbanna, 2011; Faraj & Sproull, 2000), which reflect how team members tap into each other's different fields of expertise and translate the teams' functional diversity into task-related outcomes (Lewis, 2003). Future research should investigate the development of TMSs and other cognitive emergent states over the team's lifecycle. This is highly relevant because processual case studies of single ICVTs (Burgelman, 1983; Hitt et al., 1999) suggest that ICV projects involve multiple critical milestones and events where a shared understanding about where in the team a specific information resides is essential.

Finally, I find that scholars have so far predominately focused on explaining positive ICVT outcomes, such as new product financial success or new product novelty (Schulze & Hoegl, 2006; Song et al., 2006; Tsai, 2001). Considering the ICVT work context that is characterized by high levels of ambiguity and uncertainty (Covin et al., 2015), project failures mark a central outcome and are likely to be the rule rather than the exception (Keil et al., 2009). Most corporations are reluctant to share information on failed ICV initiatives (Garrett, 2010), so the corresponding knowledge gap in the literature might partly reflect the challenges of scholars to obtain adequate data on venture failure. Nevertheless, future research should put a greater emphasis on understanding what drives ICV failures and what managers, team leaders and ICVT members perceive as failure and how failure affects subsequent venture projects.

2.9 Conclusion

ICVTs denote a central organizational entity on which corporations rely when engaging in ICV activities (Guth & Ginsberg, 1990; Hill & Hlavacek, 1972). ICVTs reflect the actual means through which corporations compete in new ways with new ventures (Crockett et al., 2013), enter new business opportunities that its existing operating business units are unable to address (Burgelman, 1983), and ultimately assure their long-term competitiveness. ICVTs are risky endeavors whose outcomes are highly uncertain (Keil et al., 2009). This creates multiple challenges for those who initiate and lead them. Both scholars and corporate venture managers, therefore, seek to understand the relevant factors likely to increase an ICVT's chances of success. To organize corresponding scientific work, I propose an IMO framework (Mathieu et al., 2008) based on a systematic review of input, mediator, and outcome variables. My findings outline several questions that should be addressed by future research to unravel what we still do not know about the venturesome journey of ICVTs.

3 SUCCESS FACTORS OF INTERNAL CORPORATE VENTURE TEAM PERFORMANCE − A META-ANALYTIC REVIEW[2]

In today's dynamic business landscape, corporations increasingly rely on the effort of internal corporate venture teams (ICVT) as such organizational units offer the flexibility of much smaller enterprises to keep up with the innovation speed of new venture firms (Crockett et al., 2013; Hill & Hlavacek, 1972). With ICVTs, corporations aim to explore new business opportunities that its existing teams are unable to address (Burgelman, 1983) and to innovate in a safe environment where its operating businesses are protected from potential ICVT failure. Thus, the ICVT's separation from existing operating teams, its independence from the normal decision-making criteria of the firm (Crockett et al., 2013), and its potential to create new business opportunities for the corporation distinguishes them from other team types.

Several studies have been conducted on teams in the context of internal corporate venturing such as innovation project teams (Weiss et al., 2011), cross-functional teams (Slotegraaf & Atuahene-Gima, 2011) or autonomous teams (Patanakul et al., 2012). When studying ICVTs, scholars drew their attention to various team inputs, firm inputs, team processes and emergent states (Cabrales et al., 2008; Covin et al., 2018; Hirunyawipada & Paswan, 2013). However, empirical results of these studies remain equivocal. Hence, the overarching research question is: *Which team- and firm-level inputs, team processes, and emergent states are success factors for specific ICVT performance outcomes?*

Drawing on 70 independent empirical studies (8'731 teams) conducted over the past two decades, I developed an Input-Mediator-Outcome (IMO) framework depicting the current state of art in ICVT literature. In this study, I meta-analytically review theoretically justified

[2] I thank Prof. Baldauf and Dr. Simone Schweiger for valuable inputs and feedback during this research project. This research was presented at the Babson College Entrepreneurship Research Conference (BCERC) in Boston, USA (2019) and at the European Academy of Management (EURAM) in Lisbon, Portugal (2019). This project has been elected as one of the top 40 papers presented at BCERC and has been published in the Journal of Frontiers of Entrepreneurship Research (FER, 2019).

constructs and identify success factors for specific ICVT performance outcomes (e.g., team innovativeness). Besides identifying success factors for specific ICVT performance outcomes, I also investigated whether the perception of a success factor as such depended on the rater's perspective. For this purpose, I performed a subgroup analysis using rating source (team member, team leader or manager rating) as a moderator. I also responded to prior researchers' call to test whether measurement differences of functional diversity, which is one of the core constructs in ICVT research, leads to substantial differences in magnitude and direction of relationships (Bunderson & Sutcliffe, 2002; Sivasubramaniam et al., 2012).

With this meta-analysis, I contribute to the development of an increasingly important theme within the entrepreneurship field by clarifying the conceptual boundaries of the ICVT phenomenon as well as identifying success factors for specific performance outcomes. Moreover, this meta-analysis is to the best of my knowledge one of the first attempts of meta-analytically analyzing on fine-grained performance outcomes such as team innovativeness or new product novelty (cf. Beal et al., 2003). Focusing on explaining the criterion variable of performance, which has been less systematically addressed in team research (cf. Ilgen, 1999; Mathieu et al., 2008), I substantially extend team- and entrepreneurship literature by conceptually clarifying the black box of performance of highly innovative teams as I display key metrics for both the team- as well as product-level of analysis. The IMO framework also provides an overview of promising research topics that scholars should address in the future to gain more insights about the nature and dynamics of the ICVT phenomenon. From a practical perspective, the identification of success factors for specific performance outcomes might also increases a venture manager's leveraging capabilities to steer the ICVT to success.

3.1 What is an Internal Corporate Venture Team (ICVT)?

In his early studies, Burgelman (1983) defined ICV as a process through which a firm transforms R&D activities into new businesses that allow a firm address new business oppor-

tunities that the existing operating business units are unable to address. Similarly, Roberts and Berry (1985: 6) described ICV as a 'firm's attempts to enter new markets or develop substantially different products from its existing business by setting up a separate entity within the existing corporate body'.

The term ICVT was originally defined as 'a relatively small, more or less independent clusters of marketing and technical men assigned the job of determining the best way for their companies to make the most of changing times' (Management Review, 1967: 34). This definition was extended by Hill and Hlavacek (1972) who emphasized the ICVT's key purpose, that is, the development of true product innovations instead of products that fit the existing business. In their field study they found that ICVTs are extremely important for ensuring that novel product ideas with no immediate commercial value and new technologies that do not fit yet into the corporation's existing operations will not be ignored but translated into new product innovations (Hill & Hlavacek, 1972). Others attributed additional characteristics by defining the ICVT as 'the creation of an internally-staffed venture unit that is semi-autonomous, with the sponsoring organization maintaining ultimate authority (Zajac et al., 1991: 171). What distinguishes the ICVT from other traditional team types is their ultimate goal of creating new business opportunities for the corporation (Burgelman, 1983), its entrepreneurial spirit, its independence from the firm's normal decision-making criteria (Crockett et al., 2013), the team's integration of functional diverse know how as well as its temporary life span where members stay as long as their specialty is required on the team (Hill & Hlavacek, 1972).

I consider ICVTs as being subject to one of the four key activities of internal corporate venturing: new product development, innovation, cross functional knowledge integration, and R&D (Sharma & Chrisman, 1999). Yet, subsequent researchers examining the nature of ICVTs used different terminologies. For example, scholars referred to innovation project

teams (Weiss et al., 2011), cross-functional new product development teams (Slotegraaf & Atuahene-Gima, 2011), multidisciplinary teams (Van Der Vegt & Bunderson, 2005), autonomous teams (Patanakul et al., 2012), new product teams (McDermott & O'Connor, 2002), or product innovation teams (Taylor & Greve, 2006). Building on the terminological variety, I suggest a multi-faceted understanding of what an ICVT is: *a strategic mean of corporations to identify and explore new business opportunities that its existing business units are unable to address; a group of internally-staffed individuals from different functional units developing ideas that yet have no immediate commercial value or organizational fit with existing routines and processes; and a project-based entity with a temporary life span where in case of venture success, the ICVT will either transform into a new business unit for the corporation or be integrated into existing operations.*

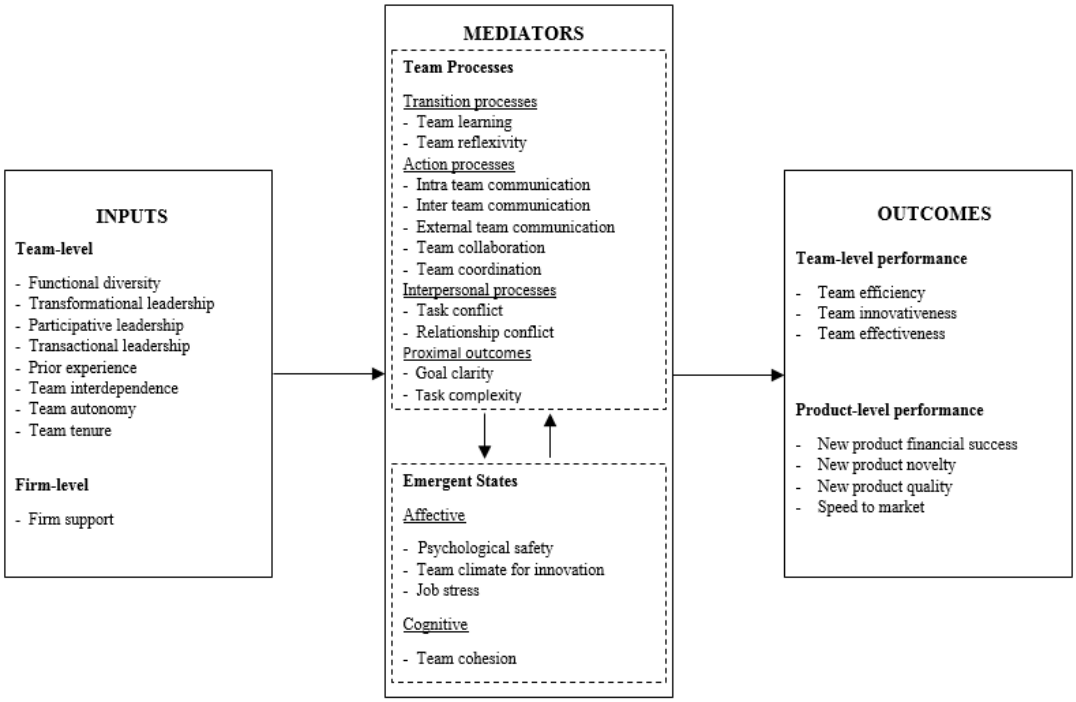
3.2 Input-Mediator-Outcome Framework of ICVT Research

I adopt the theoretical IMO framework by Mathieu et al. (2008), which has already guided team- and entrepreneurship researchers when classifying variables into input, process and outcome categories (e.g., Hülsheger et al., 2009; Klotz et al., 2014; Sivasubramaniam et al., 2012). The framework depicts all team- and firm-level inputs, team processes and emergent states, as well as team- and product-level performance outcomes that I identified from the sample (see Figure 4).

Team- and firm-level inputs denote the conditions that ICVTs face and, as such, reflect the 'factors that enable and constrain members' interactions' (Mathieu et al., 2008: 412). Team processes entail how the team interacts to 'convert inputs to outcomes' (Marks et al., 2001: 357). In team literature (Marks et al., 2001), scholars distinguish between three types of team processes: action processes (activity that leads directly to goal accomplishment, e.g., team communication), transition processes (ability to develop alternative courses of action, e.g., team reflexivity), and interpersonal processes (ability to manage interpersonal relation-

ships, e.g., task conflict management). Emergent states characterize dynamic team properties and reflect cognitive and affective states of teams (Marks et al., 2001). Outcomes refer to the "results and by-products of team activity that are valued by one or more constituencies" (Mathieu et al., 2008: 412), which can be attributed on the team- as well a product-level of analysis.

Figure 4: Theoretical Framework



Details of the included studies (n=70) are provided in Appendix B, where the frequency of variables across the entire study sample is represented. For instance, in Appendix B it can be observed that functional diversity (team-level input), team cohesion (emergent state) and team efficiency (team-level performance outcome) are highly researched constructs in ICVT literature. Furthermore, Appendix C provides definitions, key metrics and selected references for all 24 variables included in the IMO framework.

3.2.1 ICVT Performance Outcomes

Among team-level performance outcomes *team efficiency* (N=25) is the most commonly used performance outcome (see Appendix B), describing the ICVT's capability of adhering to budget and schedule of the venture project (Ancona & Caldwell, 1992b). Whereas most scholars measure team efficiency very similarly, they differ substantially in their measurement of the other two team-level performance outcomes *team innovativeness* (N=20) and *team effectiveness* (N=16). For instance, key metrics for team innovativeness range from number of suggested and actually implemented new ideas by the team (Eisenbeiss et al., 2008) to the extent to which the team is considered innovative (De Dreu & West, 2001). Hence, I refer to team innovativeness as the extent to which the team makes use of its potential to innovate. Regarding team effectiveness, I agree with researchers who point out the lack of construct clarity (Mathieu et al., 2008). To clarify the concept of team effectiveness, I build on Hackman's (1987) definition, which subsumes the team's current productivity as well as future capability of continuing working together. Key metrics are the extent to which the team meets or exceeds customer expectations (Edmondson, 1999) or the team's satisfaction with its own project performance (Pirola-Merlo et al., 2002).

Interestingly, while some team researchers report a prevailing use of financial performance outcomes to measure team performance (e.g., Klotz et al., 2014), which is perturbing as there are many potential impediments that are outside the control of the team to gain new product financial success (e.g., dedicated sales force to market the new product; Beal et al., 2003), I found a balanced variety of product-level outcomes used to measure ICVT performance. For instance, besides *new product financial success* (N=17), scholars often measured *new product novelty* (N=18), *new product quality* (N=15) or *speed to market* (N=12). In the following, I review some of the variables, which received most scholarly attention in ICVT literature.

3.2.2 Team- and Firm-Level Inputs

Functional diversity as a job-related diversity attribute (Webber & Donahue, 2001) is considered a key strategic asset of the ICVT because it enables the team to gain direct and rapid access to a wide array of expertise from different functional domains in the organization (Ancona & Caldwell, 1992b). According to the cognitive resource perspective (Hoffman & Maier, 1961), a team's functional diverse composition provides knowledge bases and perspectives to succeed in complex decision-making (Amason, 1996). For instance, scholars found that functional diverse ICVTs bring products faster to the market, because less time-consuming misinterpretations occur as team members with diverse work experience understand more easily each other's technical language (Park, Lim, & Birnbaum-More, 2009). Some scholars even reported that ICVTs with members who possess a diverse functional background outperformed the teams that consisted only out of functional specialists (Hirunyawipada & Paswan, 2013). Nevertheless, some researchers also reported negative effects of functional diversity (Cabrales et al., 2008) and others found no significant relationship between functional diversity and performance (e.g., Cheung et al., 2016; Crockett et al., 2013; Sethi et al., 2001). This equivocality of findings represents the ongoing debate and discussion about the relative importance of functional diversity as a success factor for an ICVT.

Another important ICVT topic is the role of *team leadership*, which is a crucial input variable as it directly affects how teams function (Gladstein, 1984). Leadership scholars distinguish between person- and task-oriented leadership (Burke et al., 2006) which entail leadership styles such as *transformational, participative* or *transactional leaders* (Bass, 1990; Bass, Avolio, Jung, & Berson, 2003). According to leader-member exchange theory (Graen & Scandura, 1987), good relationships between team leaders and team members are essential to gain access to many benefits of these relationships. Indeed, transformational leaders who inspire their ICVT enhance their team's innovativeness because team members feel greater sup-

port in their attempt to pursue novel ideas (Eisenbeiss et al., 2008). Also, participative leaders who integrate their team in joint-decision making report a positive relationship with ICVT performance (Somech, 2006). Instead, transactional leaders who follow a task-oriented leadership style where leader-team relationships are not in the locus of attention appear to be detrimental for ICVT performance (Pirola-Merlo et al., 2002).

Researchers also intensively discuss the importance of *firm support* for the ICVT. Recent studies show that an abundance of financial resources is not a pre-requisite for innovation, but that teams faced with financial constraints become even more efficient in developing new high-quality products (Weiss et al., 2011). Researchers also found evidence that the empowerment of the corporate parent plays an even more important role than slack of financial resources (Crockett et al., 2013). For instance, ICVTs encouraged to take risks displayed higher levels of team innovativeness (Caldwell & O'Reilly III, 2003). One explanation for this could be that the team feels empowered by the corporate parent to bridge the critical gap between idea generation and product realization (Clegg et al., 2002). Indeed, bridging this gap is one of the ICVT's biggest challenges as they are working on promising business ideas that show no immediate commercial value for the organization (Hill & Hlavacek, 1972).

3.2.3 Team Processes and Emergent States

In ICVT literature the role of different communication types such as *intra-, inter- and external communication* is highly discussed. According to expectancy theory (Vroom, 1964), members of functional diverse ICVTs expect their team members to be experts in their fields which in turn motivates them to share their knowledge with one another. Whereas most scholars report positive relationships for intra- and inter team communication with ICVT performance (Liu et al., 2015; Park, Lim, & Birnbaum-More, 2009), a few researchers display that intra team communication can also harm ICVT performance. For instance, team members from the same functional domain build alliances to put their domain's interest above the

ICVTs' (Dayan et al., 2012). Regarding external team communication, scholars found that functional diverse ICVTs benefit from their member's diverse contacts with important external networks, which positively impact performance (Keller, 2001). Others stated the opposite where ICVTs engaging with customers and technology experts at the initial phase of product conceptualization actually witness less financial success (Schulze & Hoegl, 2006). One explanation for this could be that ICVTs become 'more likely to produce descriptions of current customer requirements and technological possibilities, rather than new and different value propositions' (Schulze & Hoegl, 2006: 215).

Building on the dynamic theory of organizational knowledge creation (Nonaka, 1994), knowledge creation at the team level is important as it can be elevated to the organizational level, where it creates 'streams of related knowledge which might then trigger changes in the organizations wider knowledge system' (Nonaka, 1994: 15). In fact, scholars found that *team learning* positively relates to team innovativeness because the team makes greater use of the different functional expertise residing in the team (Lynn et al., 1999). Interestingly, a recent study (Covin et al., 2018) reveals that ICV learning proficiency is positively related to performance when the team is faced with unclear value propositions, suggesting that ICVTs in order to innovate should be given the freedom to define their own value proposition.

Because of the ICVTs functional diverse composition, scholars attribute an important role to the creation of *team cohesion* inside the team. Drawing on the cognitive resource perspective (Hoffman & Maier, 1961), ICVTs are expected to engage in task-related conflicts which origin from their different functional backgrounds. Interestingly, highly cohesive ICVTs demonstrate to be able to smooth specialization differences in functional diverse teams, which positively affect ICVT performance (Van Der Vegt & Bunderson, 2005). Indeed, Sethi et al. (2001) supported this finding by showing how the creation of a superordinate identity, which unites members from different functional backgrounds, fosters new prod-

uct novelty as well as new product financial success. There is also evidence that a shared entrepreneurial vision is a significant positive predictor of new product financial success as it helps the ICVT to remain focused while innovating (Crockett et al., 2013).

3.3 Methodology: Identification of Studies and Coding

To identify relevant ICVT studies, I followed established literature search procedures (e.g., Tranfield et al., 2003). By systematically searching for primary studies on ICVTs, I intended to remove subjectivity of the data collection process (De Mol et al., 2015). The seminal special issue on Corporate Entrepreneurship published in the Strategic Management Journal (Guth & Ginsberg, 1990) is the starting point of the literature search. Since then various studies on ICVTs have been conducted.

Considering the conceptual boundaries of ICVTs, I draw on the central dimensions of corporate entrepreneurship (internal corporate venturing and strategic renewal, cf. Guth & Ginsberg, 1990; Narayanan et al., 2009; Phan et al., 2009) and specific ICVT activities (i.e., new product development, innovation, cross-functional knowledge integration, and R&D) to define terms for the literature search. I searched for 'team OR group AND internal corporate ventur* OR innov* OR strategic renewal OR new product development OR knowledge integration OR R&D' in EBSCO, JSTOR, ProQuest, and Google Scholar. To be included in this meta-analysis, a study should have: (1) identified the team or project as the unit of analysis, (2) focused on teams that reside within corporations, (3) investigated teams in the context of innovation, internal corporate venturing or strategic renewal, (4) used quantitative empirical methods, (5) reported correlations between at least one team-level variable and one performance variable, (6) used a unique rather than converging sample. If two studies entailed converging samples, only one of the two studies was retained.

I manually excluded articles on external corporate venture teams such as joint venture teams or virtual teams as they do not represent teams residing within a firm's boundaries. A further exclusion criterion was that the study uses at least the project as unit of analysis (Im et al., 2013). Thus, articles with businesses or divisions as unit of analysis were excluded because they entail multiple projects and do not represent the work of a specific team (Tsai, 2001; Tsai & Ghoshal, 1998). Further, I excluded studies with individual-level performance outcomes (Miron, Erez, & Naveh, 2004; Scott & Bruce, 1994). Applying these decision criteria resulted in a final sample of 70 articles (see Appendix B).

In a first step, I used an inductive coding approach by coding every information provided in primary articles. I coded variable labels and measurement items as provided by the original authors to ensure construct validity as several authors highlighted review authors should also code for measurement items as variable labels do not always correspond with the used scale content (Chapman et al., 2005; Damanpour, 1991; LePine et al., 2002; Zhao et al., 2007). Following an open coding approach has the potential to uncover variables which yet do not fit into existing theoretical frameworks but which might become important in the future for theory building.

After coding all articles, I analyzed the coded information in terms of frequency of appearance of variables to create representative coding categories. In a second step, I also adopted a deductive coding approach where I classified the categories into the theoretical IMO-framework (Mathieu et al., 2008) which provides broad coding categories (e.g., team inputs, team processes and emergent states). Based on these observations I inductively and deductively elaborated the coding categories of the codebook, which are represented in Appendix B. After this, a second coder coded the entire sample again attributing the coded information into the pre-defined coding categories of the codebook. As we coded variable labels, definitions and measurement scales of each variable, we could systematically discuss of

any coding disagreement. Coding ambiguities also arose with the unsystematic use of variable names. For example, functional diversity has sometimes been labeled as cross functionality (Blindenbach-Driessen, 2015), multifunctional teams (Eisenhardt & Tabrizi, 1995) or expertise diversity (Van Der Vegt & Bunderson, 2005).

Finally, to perform the meta-analytic calculations the second coder and I extracted data concerning sample size, correlation coefficients, Cronbach's alphas, rating source and measurement differences.

3.3.1 Meta-Analytic Procedure

To test the set of 24 independent variables as potential success factors for ICVT performance, I applied the artifact-corrected meta-analytic approach by Hunter and Schmidt (2004) to adjust for sampling and measurement error. This methodological choice seems to be justified, because the majority of included studies relied on self-reported psychometric data. I used correlation coefficients along with sample size and Cronbach's alpha as inputs for the meta-analytic estimations. When Cronbach's alpha was not reported, I substituted the missing value with the mean alpha based on all studies that measured the specific variable (Geyskens, Steenkamp, & Kumar, 1998). In cases where one study reported multiple correlations for the same independent variable, the average of these correlations was taken (e.g., impact of functional diversity on team innovativeness rated by team members and managers). I computed 95% confidence intervals to determine the significance of relationships. A confidence interval that does not include zero indicates that the corrected correlations are significant at the level of $p<.05$ (two tailed) (Lipsey & Wilson, 2001).

To account for sampling error, I used a random effect model to measure corrected mean effect sizes between independent variables and performance outcomes. Weighting the effect sizes by sample size prevents studies with very big samples to inflate the mean effect (Hunter & Schmidt, 2004). I also checked for converging sample and retained only one study

whenever authors published articles using the same sample. This ensures that the sample of the meta-analysis is not artificially inflated. Robustness of results are indicated by fail-safe K, which provides an estimate of the number of studies with null results, needed to make the reported mean effects insignificant (Rosenthal, 1979). Thus, large values of fail-safe K indicate the stability of the observed results.

I applied the rule of thumb suggested by Hunter and Schmidt (2004), where moderating effects are expected if more than 25% of unexplained variance (I^2) exist. As the percentage of unexplained variance in the results is often higher than 25%, a subgroup analysis of all independent variables on overall ICVT performance was performed. Due to the limited number of observations for single performance outcomes (e.g., team efficiency), I performed the subgroup analysis on overall ICVT performance, which aggregates the seven performance outcomes (see Table 2). If a study reported different rating sources for overall ICVT performance then the two correlations were kept (e.g., team member and manager ratings of functional diversity on overall ICVT performance) otherwise, correlation coefficients were aggregated (e.g., team member rating on team efficiency and innovativeness). To test whether magnitude and direction of relationships change on a finer grained level than overall ICVT, I performed a post-hoc subgroup analysis on aggregated team- and product-level performance (see Table 3).

3.3.2 Moderators of ICVT Performance

To explain the variability of findings, I considered two types of moderators in this meta-analysis. I used rating source as a moderator to test whether the perception of a success factor depended on the rater's perspective. Because prior meta-analyses found evidence that measurement differences of functional diversity — one of the ICVT's core constructs — leads to substantial different results, I also moderated for measurement differences of functional diversity (Sivasubramaniam et al., 2012).

Rating source. To rate ICVT performance, scholars draw on different types of respondents. For example, some used team member (Hirunyawipada & Paswan, 2013), team leader (Eisenbeiss et al., 2008) or top manager ratings to measure ICVT performance (Chen et al., 2013). With rating source as a moderator, I would like to understand whether team members, team leaders and managers differ significantly in their views about which team inputs, firm inputs, team processes and emergent states are success factors for ICVT performance. Identifying potential agreement or disagreement among raters about the importance of certain team inputs or team processes as success factors might give crucial managerial insights to venture managers and team leaders to understand what is important to their ICVT.

Measurement differences. I used two measurement approaches to categorize functional diversity. The first approach relies on Bunderson and Sutcliffe's (2002) recommendation to consider four types of functional diversity: functional assignment diversity, dominant function diversity, functional background diversity, intrapersonal diversity. The second approach relies on Sivasubramaniam et al.'s (2012) recommendation to distinguish between Blau/Teachman Index and simple count. As I also observed perceived measurements of functional diversity, I used it as a third moderator type. Thus, I tested for three measurement differences: Blau/Teachman, simple count and perceived measurement of functional diversity.

3.4 Main Results: Success Factors of ICVT Performance

For each of the seven ICVT performance outcomes, I determined a number of success factors. These success factors encompass team- and firm-level inputs as well as team processes and emergent states. Table 1 summarizes the results of the bivariate relationships. Results are presented when at least three correlations (k) were available.

Table 1: Meta-Analysis Results - Inputs, Processes and Emergent States

Independent Variables	*k*	*N*	r_c	*Z*	*p*	*Q*	I^2	*95% CI*	*Fail-safe K*
Functional Diversity - Overall ICVT Performance	34	1838	.181**	3.472	.001	266.600***	87.622	.080, .279	1001
Aggregated Team-Level Performance	14	656	.047	0.547	.584	70.195***	81.480	-.121, .212	118
Team efficiency	6	357	.142	0.858	.391	45.677***	89.054	-.182, .438	7
Team effectiveness	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	4	244	-.072	-0.576	.565	10.407*	71.175	-.309, .172	0
Aggregated Product-Level Performance	20	1451	.263***	4.276	.000	166.960***	88.620	.145, .374	670
NP financial success	3	409	.476***	4.664	.000	9.644**	79.261	.291, .626	77
NP novelty	10	1133	.211**	3.275	.001	40.835***	77.960	.086, .330	114
NP quality	3	330	.312	1.519	.129	23.518***	91.496	-.093, .629	35
Speed to market	4	460	.154	0.811	.417	47.028***	93.621	-.217, .487	8
Transformational Leadership - Overall ICVT Performance	24	2478	.437***	5.117	.000	839.855***	97.261	.281, .570	4775
Aggregated Team-Level Performance	17	2316	.431***	5.179	.000	323.567***	95.055	.279, .562	2611
Team efficiency	6	1353	.474***	5.398	.000	20.814**	75.978	.317, .605	410
Team effectiveness	4	179	.441***	5.166	.000	4.047	25.868	.286, .574	33
Team innovativeness	6	1975	.396*	1.976	.048	288.698***	98.268	.003, .683	545
Aggregated Product-Level Performance	7	928	.457*	2.405	.016	328.515***	98.174	.091, .714	318
NP financial success	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	2	713	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	3	766	.294*	2.161	.031	10.453**	80.867	.028, .521	19
Speed to market	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Participative Leadership - Overall ICVT Performance	19	907	.173*	2.264	.024	149.606***	87.968	.023, .316	156
Aggregated Team-Level Performance	9	482	.249**	3.185	.001	21.695**	63.126	.097, .389	56
Team efficiency	2	122	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team effectiveness	4	187	.264*	2.458	.014	5.995	49.954	.055, .452	10
Team innovativeness	2	77	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aggregated Product-Level Performance	10	491	.106	0.905	.366	121.756***	92.608	-.123, .324	17
NP financial success	4	425	.096	0.413	.680	67.217***	95.537	-.347, .505	1
NP novelty	1	102	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	1	66	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	4	425	.059	0.312	.755	43.510***	93.105	-.301, .404	0
Transactional Leadership - Overall ICVT Performance	9	1414	.338***	4.807	.000	69.794***	88.538	.206, .459	779
Aggregated Team-Level Performance	6	1307	.405***	5.897	.000	32.696***	84.708	.279, .517	592
Team efficiency	3	1225	.448***	4.174	.000	8.431*	76.278	.250, .610	184
Team effectiveness	2	82	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	1	1103	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aggregated Product-Level Performance	3	173	.246**	2.617	.009	4.857	58.825	.063, .413	10
NP financial success	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	1	66	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Prior Experience - Overall ICVT Performance	16	1411	.266***	4.574	.000	141.901***	89.429	.155, .371	870
Aggregated Team-Level Performance	5	400	.253**	3.074	.002	10.816*	63.019	.094, .400	32
Team efficiency	3	333	.348***	5.521	.000	2.476	19.214	.230, .456	29
Team effectiveness	1	59	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	1	67	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aggregated Product-Level Performance	11	1285	.272***	3.707	.000	130.034***	92.310	.131, .402	552
NP financial success	3	845	.229	1.510	.131	28.859***	93.070	-.069, .489	52
NP novelty	4	547	.176	1.139	.255	35.416***	91.529	-.128, .450	3
NP quality	1	195	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	3	950	.342***	6.723	.000	4.530	55.847	.247. .430	87
Team Interdependence - Overall ICVT Performance	17	503	.237*	2.541	.011	138.291***	88.430	.055, .403	187
Aggregated Team-Level Performance	10	272	.384**	2.738	.006	80.193***	88.777	.115, .601	150
Team efficiency	3	135	.321	1.431	.152	12.564**	84.082	-.122, .657	6
Team effectiveness	3	135	.517	1.224	.221	51.106***	96.087	-.331, .903	25
Team innovativeness	4	180	.326*	2.002	.045	13.497**	77.773	.007, .585	16
Aggregated Product-Level Performance	7	296	.033	0.312	.755	38.239***	84.309	-.173, .237	0
NP financial success	2	172	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	2	189	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	1	65	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	2	172	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Team Autonomy - Overall ICVT Performance	19	807	.179**	2.735	.006	149.200***	87.936	.051, .301	302
Aggregated Team-Level Performance	10	587	.231*	2.250	.024	67.456***	86.658	.030, .413	84
Team efficiency	4	386	.243	1.438	.151	25.552***	88.259	-.090, .528	17
Team effectiveness	2	70	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	3	203	.006	0.031	.975	13.143**	84.783	-.356, .366	0
Aggregated Product-Level Performance	9	536	.130	1.435	.151	80.628***	90.078	-.048, .299	60
NP financial success	3	432	.082	0.663	.507	11.908**	83.205	-.160, .314	1
NP novelty	4	536	.036	0.291	.771	22.314***	86.555	-.202, .270	0
NP quality	1	104	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	1	212	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team Tenure - Overall ICVT Performance	26	1612	.078	1.468	.142	142.232***	82.423	-.026, .180	84
Aggregated Team-Level Performance	14	757	-.009	-0.137	.891	45.533***	71.449	-.133, .116	0
Team efficiency	3	206	.001	0.004	.997	6.938*	71.174	-.267, .268	0
Team effectiveness	3	164	-.153	-1.923	.054	0.415	0.000	-.302, .003	0
Team innovativeness	5	399	-.062	-0.614	.539	14.524**	72.459	-.225, .136	0
Aggregated Product-Level Performance	12	980	.170*	2.241	.025	74.775***	85.289	.022, .311	107
NP financial success	3	313	.302*	2.445	.014	9.431**	78.794	.062, .510	19
NP novelty	3	253	-.165**	-2.596	.009	0.455	0.000	-.284, -.041	2
NP quality	3	333	.177	1.113	.266	12.354**	83.810	-.135, .456	8
Speed to market	3	354	.326*	2.539	.011	11.119**	82.013	.077, .537	26
Firm Support - Overall ICVT Performance	29	1917	.331***	7.532	.000	176.049***	84.095	.249, .409	2617
Aggregated Team-Level Performance	12	431	.291**	2.988	.003	64.052***	82.827	.103, .459	141
Team efficiency	5	235	.162	0.985	.325	21.977***	81.799	-.161, .454	1
Team effectiveness	4	215	.360	1.615	.106	30.153***	90.051	-.080, .683	21
Team innovativeness	2	72	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aggregated Product-Level Performance	17	1528	.355***	7.222	.000	106.781***	85.016	.264, .439	1511
NP financial success	6	1137	.374***	3.535	.000	56.916***	91.215	.173, .545	232
NP novelty	5	628	.227***	3.962	.000	8.112	50.688	.116, .332	37
NP quality	3	345	.486***	4.074	.000	8.989*	77.751	.269, .657	68
Speed to market	3	752	.387***	4.577	.000	7.258*	72.445	.229, .525	75
Team Learning - Overall ICVT Performance	30	2822	.391***	4.727	.000	1005.719***	97.116	.237, .526	5985
Aggregated Team-Level Performance	13	1984	0.498***	3.505	.000	759.548***	98.420	.236, .692	2296
Team efficiency	5	1368	.528***	3.916	.000	47.086***	91.505	.285, .707	478
Team effectiveness	2	75	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	4	1401	.638***	4.989	.000	43.304***	93.072	.429, .782	645
Aggregated Product-Level Performance	17	1060	.304***	4.173	.000	158.067***	89.878	.165, .432	854
NP financial success	7	924	.430***	4.097	.000	62.785***	90.444	.236, .592	370
NP novelty	2	269	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	4	317	.351***	4.543	.000	5.574	46.176	.205, .481	38
Speed to market	4	354	.101	1.882	.060	2.374	0.000	-.004, .205	0
Team Reflexivity - Overall ICVT Performance	26	1472	.381***	5.867	.000	258.808***	90.340	.261, .490	1966
Aggregated Team-Level Performance	17	813	.479***	6.620	.000	116.852***	86.307	.352, .589	1238
Team efficiency	7	578	.374**	3.010	.003	52.451***	88.561	.136, .571	117
Team effectiveness	5	383	.539***	3.891	.000	30.003***	86.668	.291, .719	142
Team innovativeness	3	203	.628***	3.709	.000	14.036**	85.751	.335, .811	69
Aggregated Product-Level Performance	9	849	.181	1.657	.098	98.488***	91.877	-.033, .379	76
NP financial success	3	482	.021	0.216	.829	6.327*	68.387	-.164, .204	0
NP novelty	3	236	.154	1.736	.083	3.501	42.879	-.020, .318	2
NP quality	3	398	.346	1.572	.116	37.286***	94.636	-.089, .670	47
Speed to market	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Intra Team Communication - Overall ICVT Performance	23	1189	.295***	3.778	.000	287.994***	92.361	.145, .432	1173
Aggregated Team-Level Performance	13	894	.231**	3.194	.001	71.243***	83.156	.090, .362	234
Team efficiency	5	447	.162	1.866	.062	12.393*	67.723	-.008, .323	11
Team effectiveness	1	145	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	6	498	.229	1.551	.121	50.708***	90.140	-.061, .483	49
Aggregated Product-Level Performance	10	554	.387*	2.510	.012	213.041***	95.775	.089, .621	347
NP financial success	2	171	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	4	392	.402	1.254	.210	129.106***	97.676	-.235, .798	45
NP quality	2	197	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	2	171	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Inter Team Communication - Overall ICVT Performance	20	687	.194***	5.008	.000	43.911**	56.730	.119, .266	282
Aggregated Team-Level Performance	10	450	.181*	2.588	.010	26.680**	66.267	.044, .312	43
Team efficiency	5	333	.193*	2.446	.014	7.728	48.243	.039, .339	11
Team effectiveness	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	3	209	.299***	4.369	.000	0.233	0.000	.169, .420	11
Aggregated Product-Level Performance	10	469	.202***	4.545	.000	17.128*	47.455	.116, .285	93
NP financial success	3	323	.247***	4.478	.000	0.828	0.000	.141, .348	13
NP novelty	2	246	n/a	n/a	n/a	n/a	n/a	n/a	n/a

NP quality	4	327	.222*	2.032	.042	11.176*	73.157	.008, .417	13
Speed to market	1	95	n/a	n/a	n/a	n/a	n/a	n/a	n/a
External Communication - Overall ICVT Performance	8	1323	.250**	2.643	.008	119.239***	94.129	.066, .417	553
Aggregated Team-Level Performance	5	1323	.371***	4.582	.000	43.142***	90.728	.219, .505	512
Team efficiency	3	1282	.316*	2.133	.033	21.563***	90.725	.026, .557	124
Team effectiveness	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	1	1103	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aggregated Product-Level Performance	3	179	.063	0.327	.744	18.787***	89.355	-.303, .412	0
NP financial success	1	86	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	2	179	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team Collaboration - Overall ICVT Performance	12	1014	.337***	8.743	.000	22.752*	51.653	.265, .404	487
Aggregated Team-Level Performance	7	661	.371***	7.548	.000	10.639	43.603	.280, .454	179
Team efficiency	2	174	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team effectiveness	1	145	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	1	29	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aggregated Product-Level Performance	5	353	.296***	5.651	.000	7.090	43.585	.196, .389	71
NP financial success	2	298	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	2	220	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	1	133	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team Coordination - Overall ICVT Performance	30	1381	.432***	8.253	.000	275.627***	89.479	.339, .517	3369
Aggregated Team-Level Performance	21	1210	.457***	8.245	.000	103.968***	80.763	.360, .545	1635
Team efficiency	8	481	.483***	3.918	.000	53.303***	86.868	.257, .658	230
Team effectiveness	7	436	.463***	6.332	.000	13.830*	56.617	.332, .575	165
Team innovativeness	4	827	.344***	3.571	.000	10.447*	71.284	.160, .504	57
Aggregated Product-Level Performance	9	910	.375**	3.474	.001	144.189***	94.452	.170, .548	301
NP financial success	2	171	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	2	760	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	3	739	.260	1.293	.196	17.293***	88.434	-.137, .586	5
Speed to market	2	171	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Task Conflict - Overall ICVT Performance	14	1022	.024	0.173	.862	398.804***	96.740	-.242, .287	13
Aggregated Team-Level Performance	9	711	-.130	-0.648	.517	259.922***	96.922	-.484, .259	0
Team efficiency	2	240	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team effectiveness	1	197	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	4	149	-.247	-1.505	.132	11.128*	73.041	-.524, .076	6
Aggregated Product-Level Performance	5	508	.279	1.400	.161	129.119***	96.902	-.114, .596	53
NP financial success	1	197	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	1	103	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	2	405	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	1	103	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Relationship Conflict - Overall ICVT Performance	4	472	.266*	2.129	.033	22.096***	86.423	.022, .480	52
Aggregated Team-Level Performance	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team efficiency	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team effectiveness	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Aggregated Product-Level Performance	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP financial success	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Goal Clarity - Overall ICVT Performance	23	1596	.277**	3.384	.001	451.084***	95.123	.119, .421	1372
Aggregated Team-Level Performance	7	271	.464***	9.580	.000	5.229	0.000	.380, .541	158
Team efficiency	3	126	.454***	5.296	.000	1.566	0.000	.299, .586	20
Team effectiveness	2	70	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	1	43	n/a	n/a	n/a	n/a	n/a	n/a	n /a
Aggregated Product-Level Performance	16	1325	.181	1.743	.081	434.472***	96.548	-.023, .371	585
NP financial success	4	821	.018	0.062	.950	135.414***	97.785	-.501, .528	14
NP novelty	4	606	.195	1.286	.198	40.242***	92.545	-.103, .461	15
NP quality	3	496	.437	1.622	.105	77.478***	97.419	-.098, .776	86
Speed to market	5	924	.122	0.522	.602	148.405***	97.305	-.327, .526	40
Task Complexity - Overall ICVT Performance	27	1053	.137**	3.227	.001	113.254***	77.043	.054, .217	316
Aggregated Team-Level Performance	9	430	.070	1.789	.074	9.674	17.304	-.007, .147	0
Team efficiency	4	385	.042	0.512	.609	6.247	51.978	-.117, .198	0
Team effectiveness	3	343	.100	1.529	.126	2.632	24.008	-.028, .225	0
Team innovativeness	1	81	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Aggregated Product-Level Performance	18	927	.178**	3.053	.002	96.303***	82.347	.064, .287	238
NP financial success	7	702	.123	1.531	.126	25.305***	76.289	-.035, .275	16
NP novelty	3	220	.346	1.019	.308	52.761***	96.209	-.322, .784	17
NP quality	3	304	.312***	4.863	.000	2.323	13.916	.190, .424	17
Speed to market	5	533	.099*	2.267	.023	1.525	0.000	.014, .184	1
Pychological Safety - Overall ICVT Performance	17	751	.456***	7.654	.000	63.471***	74.792	.351, .550	961
Aggregated Team-Level Performance	11	443	.503***	6.635	.000	32.987***	69.685	.371, .615	409
Team efficiency	3	141	.410	1.595	.111	19.515***	89.751	-.099, .750	17
Team effectiveness	4	180	.637***	9.757	.000	2.495	0.000	.538, .718	92
Team innovativeness	4	240	.444***	7.201	.000	0.740	0.000	.334, .542	37
Aggregated Product-Level Performance	6	350	.377***	4.293	.000	21.235**	76.454	.212, .521	111
NP financial success	2	184	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	2	201	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	1	42	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	1	107	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team Climate for Innovation - Overall ICVT Performance	19	2091	.417***	3.481	.000	847.171***	97.875	.192, .601	4248
Aggregated Team-Level Performance	14	1661	.470***	3.670	.000	512.143***	97.462	.234, .655	3289
Team efficiency	3	1226	.412	1.278	.201	74.539***	97.317	-.230, .804	333
Team effectiveness	3	181	.509	1.582	.114	38.875***	94.855	-.133, .850	29
Team innovativeness	8	1513	.472*	2.101	.036	298.957***	97.659	.034, .758	1119
Aggregated Product-Level Performance	5	430	.258***	5.086	.000	7.185	44.328	.161, .351	57
NP financial success	1	83	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	2	347	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP quality	1	206	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Speed to market	1	83	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Job Stress - Overall ICVT Performance	25	1051	.006	0.131	.896	131.996***	81.818	-.086, .098	0
Aggregated Team-Level Performance	13	655	-.097	-1.485	.138	59.727***	79.909	-.221, .031	18
Team efficiency	6	634	-.157	-1.428	.153	35.920***	86.080	-.358, .059	12
Team effectiveness	4	437	.047	0.578	.563	7.664	60.854	-.112, .204	0
Team innovativeness	3	206	-.200	-1.827	.068	4.074	50.907	-.398, .015	3
Aggregated Product-Level Performance	12	855	.115*	2.073	.038	43.610***	74.777	.006, .221	49
NP financial success	4	658	.119	1.268	.205	14.213**	78.893	-.065, .295	7
NP novelty	3	246	.038	0.248	.804	11.065**	81.926	-.259, .329	7
NP quality	4	459	.149	1.335	.182	15.581**	80.746	-.070, .354	7
Speed to market	1	65	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team Cohesion - Overall ICVT Performance	50	2997	.404***	7.023	.000	859.364***	94.298	.300, .500	12125
Aggregated Team-Level Performance	36	2421	.436***	6.462	.000	612.281***	94.284	.314, .543	7913
Team efficiency	12	1780	.447***	3.724	.000	194.315***	94.339	.224, .626	1121
Team effectiveness	10	547	.425***	6.504	.000	20.480*	56.055	.307, .530	239
Team innovativeness	10	1631	.474**	3.115	.002	210.629***	95.727	.189, .685	1188
Aggregated Product-Level Performance	14	928	.314***	6.251	.000	40.817***	68.151	.220, .403	435
NP financial success	1	78	n/a	n/a	n/a	n/a	n/a	n/a	n/a
NP novelty	6	680	.247**	3.038	.002	21.311**	76.537	.089, .392	57
NP quality	7	558	.390***	6.369	.000	11.372	47.238	.278, .492	143
Speed to market	0	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a

Note. n=70 (number of studies included in the meta-analysis); N = total sample size for all studies combined, based on number of teams; k=number of correlations (if less than three correlations exist, no analysis was conducted); rc (corrected) = the sample-size-weighted, reliability-corrected estimate of the population correlation coefficients; Z= value for testing the null hypothesis ; p= * p < 0.05, ** p < 0.01,*** p < 0.001; Q = heterogeneity test; I2=percentage of unexplained variance; 95% CI = 95 percent confidence interval for corrected r, lower and upper limit; n/a= not applicable, at least three correlations are needed to calculate effect sizes.

Overall ICVT performance. From all independent variables psychological safety (r_c=.456, p<.001, k=17) had the strongest, whereas task complexity (r_c=.137, p<.001, k=27) the weakest positive impact on overall ICVT performance. Among determinants with weak effect sizes were team autonomy (r_c=.179, p<.05, k=19), participative leadership (r_c=.173, p<.05, k=19), functional diversity (r_c=.181, p<.001, k=34) and inter team communication (r_c=.194, p<.001, k=20). Medium effect sizes were determined for intra team communication (r_c=.231, p<.001, k=13), team interdependence (r_c=.237, p<.05, k=17), external team commu-

nication (r_c=.25, p<.05, k=8), prior experience (r_c=.266, p<.001, k=16), relationship conflict (r_c=.266, p<.05, k=4) and goal clarity (r_c=.277, p<.001, k=23). Among determinants with strong effect sizes were transformational leadership (r_c=.437, p<.001, k=24), team coordination (r_c=.432, p<.001, k=30), team climate for innovation (r_c=.417, p<.001, k=19), team cohesion (r_c=.404, p<.001, k=50), team learning (r_c=.391, p<.001, k=30), team reflexivity (r_c=.381, p<.001, k=26), team collaboration (r_c=.337, p<.001, k=12), transactional leadership (r_c=.338, p<.001, k=9) and firm support (r_c=.331, p<.001, k=29).

Team efficiency. Ten success factors for enhanced team efficiency were identified, which are distributed across team- and firm-level inputs, team process and emergent. Out of which three team input variables were determined as success factors for team efficiency: transformational leadership, transactional leadership and prior experience. The corrected mean effect size for transformational leadership on team efficiency is .474 (p<.001, k=6), for transactional leadership .448 (p<.001, k=3) and for prior experience .348 (p<.001, k=3). Regarding team processes and emergent states, seven determinants can be considered as success factors for team efficiency: team learning (r_c=.528, p<.001, k=5), team coordination (r_c=.483, p<.001, k=8), goal clarity (r_c=.454, p<.001, k=3), team cohesion (r_c=.447, p<.001, k=12), team reflexivity (r_c=.374, p<.05, k=7), external communication (r_c=.316, p<.05, k=3) and inter team communication (r_c=.193, p<.05, k=5).

Team effectiveness. I discovered six success factors that lead to higher team effectiveness in ICVTs. These success factors are distributed across team inputs and team processes. When testing all team- and firm-level inputs on team effectiveness, two team input variables revealed to be success factors for team effectiveness: transformational leadership (r_c=.441, p<.001, k=4) and participative leadership (r_c=.264, p<.05, k=4). I also tested for the impact of all team processes and emergent states on team effectiveness. Four success factors

were observed: psychological safety (r_c=.637, p<.001, k=4), team reflexivity (r_c=.539, p<.001, k=5), team coordination (r_c=.436, p<.001, k=7) and team cohesion (r_c=.425, p<.001, k=10).

Team innovativeness. I identified nine success factors for team innovativeness. These success factors are distributed across team-level inputs and team processes. When testing all team- and firm-level inputs on team innovativeness, two team inputs revealed to be success factors for team innovativeness: transformational leadership (r_c=.396, p<.05, k=6) and team interdependence (r_c=.326, p<.05, k=4). I also tested for the impact of all team processes and emergent states on team innovativeness. Seven success factors were determined: team learning (r_c=.638, p<.001, k=4), team reflexivity (r_c=.628, p<.001, k=3), team cohesion (r_c=.474, p<.05, k=10), team climate for innovation (r_c=.472, p<.05, k=8), psychological safety (r_c=.444, p<.001, k=4), team coordination (r_c=.344, p<.001, k=4) and inter team communication (r_c=.299, p<.001, k=3).

New product financial success. Five success factors were discovered that positively impact new product financial success. When testing all team- and firm-level inputs on team innovativeness, two team inputs and one firm input revealed to be success factors for new product financial success: functional diversity (r_c=.476, p<.001, k=3), team tenure (r_c=.302, p<.05, k=3) and firm support (r_c=.374, p<.001, k=6). I also tested for the impact of all team processes and emergent states on new product financial success. Two success factors were found: team learning (r_c=.430, p<.001, k=7) and inter team communication (r_c=.247, p<.001, k=3).

New product novelty. For new product novelty I found three success factors as well as one factor decreasing new product novelty. Whereas functional diversity (r_c=.211, p<.001, k=10) and firm support (r_c=.227, p<.001, k=5) positively impact new product novelty in ICVTs, team tenure (r_c=.-.165, p<.05, k=3) reduces an ICVT's new product novelty. I also

tested for the impact of all team processes and emergent states on new product novelty. Only one success factor was identified: team cohesion (r_c=.247, p<.05, k=6).

New product quality. Six success factors were discovered for new product quality of ICVTs. When testing all team- and firm-level inputs on new product quality, two success factors emerged: transformational leadership (r_c=.294, p<.05, k=3) and firm support (r_c=.486, p<.001, k=3). I also tested for the impact of all team processes and emergent states on new product quality. Four success factors were observed: team cohesion (r_c=.390, p<.001, k=7), team learning (r_c=.351, p<.001, k=4), task complexity (r_c=.312, p<.001, k=3) and inter team communication (r_c=.222, p<.05, k=4).

Speed to market. For increased speed to market of ICVTs, four success factors were identified. These success factors are distributed across team inputs and team processes. When testing all team- and firm-level inputs on speed to market, two team inputs and one firm input revealed to be success factors for speed to market: prior experience (r_c=.342, p<.001, k=3), team tenure (r_c=.326, p<.05, k=3) and firm support (r_c=.387, p<.001, k=3). I also tested for the impact of all team processes and emergent states on speed to market. Task complexity had a weak but positive effect on speed to market (r_c=.099, p<.05, k=5).

3.4.1 Subgroup Analysis Results

Rating source. I found evidence for my underlying assumption that the evaluation of an independent variable as success factor depends on the rater's perspective. As Table 2 shows, rating source moderated 10 of 24 relationships between independent variables and overall ICVT performance. Four of the team input variables — transactional leadership, participative leadership, team tenure and team autonomy — were moderated by rating source. When ratings of overall ICVT performance were provided by managers (e.g., CEOs), the relationship with transactional leadership was significantly higher than for team member ratings. In the case of participative leadership, I found the opposite direction of relationship where

team members rated participative leaders as important success factor and managers instead rated them as detrimental for ICVT performance. Significant negative relationships were also found for team member ratings about the role of team tenure where having individuals for too long on the team is seen as harmful for ICVT performance. Team leaders instead rated team tenure as success factor, demonstrating their interest in maintaining team stability. Whereas team members and leaders diverge in their point of view, manager rating's revealed that team tenure is perceived as almost unrelated to ICVT performance. Rating source also moderated the relationship between team autonomy and ICVT performance. Managers rated team autonomy as crucial success factor for ICVT performance, whereas team members and leaders attributed less importance to autonomy as success factor. In fact, team leader ratings suggest that autonomy plays almost no role for ICVT performance.

I also performed subgroup analyses for team processes and emergent states. Five team process and emergent state variables — team collaboration, task conflict, team climate for innovation, job stress and team cohesion — were moderated by rating source. For team collaboration and team cohesion, effect sizes were significantly highest for team member ratings, followed by team leader and manager ratings. Whereas for these variables a certain consistency is found, job stress and task conflict indicated some controversies. Indeed, managers see in job stress a success factors, whereas team members and leaders state job stress to reduce overall ICVT performance. While managers rated job stress as success factor, they perceived task conflict as detrimental for ICVT performance. Team leaders instead demonstrated to favor task conflict in ICVTs. Regarding team climate for innovation, only a small but significant difference between team leader and manager ratings about the relative importance of team climate for innovation was found.

Measurement differences. Following scholars' recommendations to investigate the moderating role of measurement differences of the functional diversity construct (Bunderson

& Sutcliffe, 2002; Sivasubramaniam et al., 2012), I adopted two types of moderators. Since the majority of studies relied on the traditional measure of functional diversity as functional assignment diversity (only considering distribution of job titles in the team when measuring the functional diversity construct), I could not perform a subgroup analysis using the suggested alternative conceptualizations by Bunderson and Sutcliffe (2002) which would capture the breadth and depth of functional diversity in a team. However, I could test the second moderator type (Blau/Teachman index, Simple count and perceived functional diversity). Contrary to prior meta-analyses (Sivasubramaniam et al., 2012), the relationships between functional diversity and overall ICVT performance were significantly higher when the variable was measured as Blau/Teachman index than Simple count. But, the relationship is the strongest when functional diversity is measured as perceived functional diversity, suggesting that depending on whether scholars use subjective (perceived functional diversity) or objective measures of functional diversity (simple count, Blau/Teachman index) the strength of relationship varies significantly.

Table 2: Subgroup Analysis Results

		k	N	*rc*	95% CI Lower	95% CI Upper	Test of null Z-value	Test of null *p*-value	Heterogeneity Q-value	Heterogeneity p-value
Transactional Leadership - Overall ICVT Performance		6	1'414	0.338	0.206	0.459	4.807***	0.000	69.794	0.000***
Moderator: Rating source	Team members	4	204	0.204	0.038	0.360	2.400*	0.016		
	Team leaders	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Managers	3	1'225	0.487	0.347	0.606	6.128***	0.000		
									9.622	0.008**
Participative Leadership - Overall ICVT Performance		13	907	0.173	0.023	0.316	2.264*	0.024	149.606	0.000***
Moderator: Rating source	Team members	7	442	0.424	0.337	0.503	8.759***	0.000		
	Team leaders	4	280	0.133	-0.092	0.345	1.156	0.248		
	Managers	5	358	-0.006	-0.392	0.382	-0.027	0.978		
									9.946	0.007**
Team Tenure - Overall ICVT Performance		18	1'612	0.078	-0.026	0.180	1.468	0.142	142.232	0.000***
Moderator: Rating source	Team members	4	208	-0.202	-0.402	0.017	-1.810	0.070		
	Team leaders	9	930	0.206	0.028	0.372	2.262*	0.024		
	Managers	8	638	0.029	-0.129	0.186	0.361	0.718		
									8.045	0.018*
Team Autonomy - Overall ICVT Performance		18	1'612	0.078	-0.026	0.180	1.468	0.142	142.232	0.000***
Moderator: Rating source	Team members	2	131	0.123	-0.190	0.414	0.769	0.442		
	Team leaders	4	488	0.031	-0.255	0.312	0.206	0.836		
	Managers	3	215	0.382	0.260	0.492	5.773***	0.000		
									6.606	0.037*
Team Collaboration - Overall ICVT Performance		8	1'014	0.337	0.265	0.404	8.743***	0.000	22.752	0.019*
Moderator: Rating source	Team members	3	349	0.474	0.360	0.574	7.286***	0.000		
	Team leaders	3	561	0.391	0.262	0.507	5.581***	0.000		
	Managers	5	465	0.240	0.151	0.325	5.189***	0.000		
									11.182	0.004**
Team Cohesion - Overall ICVT Performance		28	2'997	0.404	0.300	0.500	7.023***	0.000	859.364	0.000***
Moderator: Rating source	Team members	9	607	0.530	0.440	0.610	9.780***	0.000		
	Team leaders	10	871	0.256	0.139	0.365	4.203***	0.000		
	Managers	17	2'104	0.382	0.166	0.563	3.356**	0.001		
									14.464	0.001**
Job Stress - Overall ICVT Performance		9	1'051	0.006	-0.086	0.098	0.131	0.896	131.996	0.000***
Moderator: Rating source	Team members	3	250	-0.148	-0.343	0.060	-1.399	0.162		
	Team leaders	2	98	-0.202	-0.388	0.000	-1.964	0.050		
	Managers	5	784	0.074	-0.059	0.204	1.091	0.275		
									6.376	0.041*
Task Conflict - Overall ICVT Performance		9	1'022	0.024	-0.242	0.287	0.173	0.862	398.804	0.000***
Moderator: Rating source	Team members	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Team leaders	6	738	0.336	0.099	0.536	2.739**	0.006		
	Managers	2	240	-0.288	-0.401	-0.167	-4.537***	0.000		
									22.393	0.000***
Team Climate for Innovation - Overall ICVT Performance		13	2'091	0.417	0.192	0.601	3.481***	0.000	847.171	0.000***
Moderator: Rating source	Team members	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Team leaders	5	414	0.402	0.274	0.516	5.757***	0.000		
	Managers	8	1'656	0.399	-0.020	0.699	1.872	0.061		
									14.641	0.001**
Functional diversity - Overall ICVT Performance		20	1'838	0.181	0.080	0.279	3.472**	0.001	266.600	0.000***
Moderator:	Blau/Teachman Index	10	536	0.088	-0.031	0.203	1.450	0.147		
Measurement differences	Simple count	7	738	0.060	-0.085	0.201	0.810	0.418		
	Perceived	4	564	0.446	0.278	0.587	4.838***	0.000		
									13.609	0.001**

Note. Only significant moderation effects are reported; k = number of correlations; N = number of teams; *rc* = the sample-size-weighted, reliability-corrected estimate of the population correlation coefficients; CI 95% = 95 percent confidence interval for corrected r; Z= z-value for testing the null hypothesis ; Q = heterogeneity test statistics between groups; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; n/a= not applicable, at least three correlations are needed to calculate effect sizes.

3.4.2 Post-Hoc Subgroup Analysis Results

Results from the post-hoc subgroup analysis reveal that for some variables the magnitude of effects remain stable on aggregated team- or product-level performance, other variables instead indicate a significant change in the direction of relationship when tested on less aggregated levels than overall ICVT performance. For instance, differences between rating sources remain stable for transactional leadership, team collaboration, team cohesion and job stress on aggregated team-level performance (see Table 3). But, job stress on aggregated product-level performance, shows that the direction of relationship changes with positive team member ratings for job stress. Another interesting finding is that team leaders and managers disagree about the importance of team reflexivity on aggregated product-level performance. While team leaders rate it as crucial success factor for product-level performance, managers rate it as detrimental factor. Interestingly, manager ratings surpassed team leader ratings when evaluating the importance of team climate for innovation for team-level performance, suggesting that magnitude of effect sizes can change significantly when measured on less aggregated performance outcomes than overall ICVT performance.

Table 3: Post-Hoc Analysis Results

		k	N	*rc*	95% CI Lower	95% CI Upper	Test of null Z-value	Test of null *p*-value	Heterogeneity Q-value	Heterogeneity p-value
Transactional Leadership - Team-level Performance		5	1'307	0.405	0.279	0.517	5.897***	0.000	32.696	0.000***
Moderator: Rating source	Team members	4	204	0.200	0.044	0.347	2.503*	0.012		
	Team leaders	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Managers	3	1'225	0.482	0.334	0.606	5.779***	0.000		
									7.007	0.008**
Team Collaboration - Team-Level Performance		5	661	0.371	0.280	0.454	7.548***	0.000	10.639	0.100
Moderator: Rating source	Team members	2	216	0.528	0.424	0.619	8.519***	0.000		
	Team leaders	3	561	0.391	0.262	0.507	5.581***	0.000		
	Managers	3	245	0.230	0.106	0.347	3.594***	0.000		
									13.938	0.001**
Team Cohesion - Team-Level Performance		23	2'421	0.436	0.314	0.543	6.462***	0.000	612.281	0.000***
Moderator: Rating source	Team members	9	607	0.546	0.462	0.620	10.693***	0.000		
	Team leaders	7	556	0.256	0.121	0.381	3.663***	0.000		
	Managers	15	1'843	0.391	0.152	0.587	3.113**	0.002		
									14.897	0.001**
Job Stress - Team-Level Performance		7	655	-0.097	-0.221	0.031	-1.485	0.138	59.727	0.000***
Moderator: Rating source	Team members	3	250	-0.251	-0.365	-0.130	-3.984***	0.000		
	Team leaders	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Managers	4	465	0.020	-0.140	0.179	0.241	0.810		
									7.357	0.025*
Job Stress - Product-Level Performance		6	855	0.115	0.006	0.221	2.073*	0.038	43.610	0.000***
Moderator: Rating source	Team members	2	169	0.099	-0.141	0.329	0.807	0.420		
	Team leaders	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Managers	3	609	0.198	0.116	0.278	4.660***	0.000		
									13.460	0.001**
Team Reflexivity - Product-Level Performance		6	849	0.181	-0.033	0.379	1.657	0.098	98.488	0.000***
Moderator: Rating source	Team members	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Team leaders	2	285	0.468	0.095	0.726	2.415*	0.016		
	Managers	3	460	-0.061	-0.152	0.032	-1.288	0.198		
									14.437	0.001**
Team Climate for Innovation - Team-Level Performance		10	1'661	0.470	0.234	0.655	3.670***	0.000	512.143	0.000***
Moderator: Rating source	Team members	0	n/a	n/a	n/a	n/a	n/a	n/a		
	Team leaders	4	273	0.392	0.198	0.557	3.808***	0.000		
	Managers	6	1'367	0.454	-0.035	0.768	1.830	0.067		
									12.182	0.002**

Note. Only significant moderation results are reported; k = number of correlations; N = number of teams; *rc* = the sample-size-weighted, reliability-corrected estimate of the population correlation coefficients; CI 95% = 95 percent confidence interval for corrected r; Z= z-value for testing the null hypothesis ; Q = heterogeneity test statistics between groups; * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; n/a= not applicable, at least three correlations are needed to calculate effect sizes.

3.5 Discussion and Implications for Future Research

As a separate entity within organizational boundaries aimed at new value creation for the firm (Covin et al., 2015), ICVTs allow corporations to experiment in a safe environment without putting its ongoing operative businesses at risk. Even though, the phenomenon received its first scholarly attention 50 years ago (Hill & Hlavacek, 1972; Management Review, 1967; Von Hippel, 1977), there is still a lack of terminological consistency. In fact, researchers studying teams in the context of internal corporate venturing referred to various terminol-

ogies such as ‘cross-functional new product development teams’ (Slotegraaf & Atuahene-Gima, 2011), ‘autonomous teams’ (Patanakul et al., 2012) or ‘product innovation teams’ (Taylor & Greve, 2006). Consequently, conclusions about the ICVT phenomenon remain fragmented across multiple studies.

By meta-analytically consolidating empirical research on ICVTs, I tested the importance of various team-, firm-level inputs, team processes and emergent states as success factors for specific team- as well as product-level performance outcomes. For each performance outcome, I identified several success factors. Identifying success factors for specific performance outcomes such as team innovativeness rather than relying on aggregated outcomes (e.g., performance) allows me to contribute substantially to team- as well as entrepreneurship literature (Covin et al., 2018; Park, Lim, & Birnbaum-More, 2009). In addition, I also demonstrate that depending on the rater’s perspective (team member, team leader and manager ratings) the relative importance of a success factor for overall ICVT performance varies significantly. Results from the post-hoc subgroup analysis display that the strength of relationship might even vary when measured on a less aggregated level of performance, emphasizing the importance of conducting multilevel analyses in team research.

According to the cognitive resource perspective (Hoffman & Maier, 1961) a team’s diverse composition provides knowledge bases and perspectives to succeed in complex decision-making (Amason, 1996). Even though, researchers argue functional diversity to be one of the ICVT’s key characteristics (Hill & Hlavacek, 1972), findings about its importance for performance remain contradictory (Cabrales et al., 2008; Crockett et al., 2013; Hirunyawipada & Paswan, 2013). Results from this meta-analysis reveal two interesting aspects about the construct. First, functional diversity remains non-significant at the team-level of performance and only displays significant effects on the product-level of performance. Future research should thus integrate also product-level performance outcomes and not only use team-level

performance outcomes when studying the role of functional diversity for performance. With this finding, I extend prior meta-analyses that reported only small or non-significant effects of functional diversity on performance (Bell et al., 2011; Sivasubramaniam et al., 2012).

Second, the sub group analysis also demonstrates that the relationship between functional diversity an overall ICVT performance is moderated by measurement differences. Contrary to prior team meta-analyses (Sivasubramaniam et al., 2012), which reported significant differences for functional diversity when measured as Blau/Teachman Index or simple count, I demonstrate that there is only a small difference between these two measurement types. But, if the construct is measured as perceived functional diversity the impact on overall ICVT performance is significantly higher compared to Blau/Teachman Index and simple count. Therefore, future research should take into account that effect sizes tend to be higher when functional diversity is measured on a subjective instead of an objective basis.

Noteworthy to mention is that the majority of reviewed ICVT studies measured the functional diversity construct as number of functional areas represented on the team which is unfortunate because functional assignment diversity reveals little information about the actual breadth and depth of functional expertise that is accumulated in a team (Bunderson & Sutcliffe, 2002). Future research should therefore use alternative conceptualizations of the functional diversity construct as suggested by Bunderson and Sutcliffe (2002) to adequately test predictions from the cognitive resource perspective which suggest the integration of different experiences and viewpoints to result in favorable ICVT outcomes (Amason, 1996).

This meta-analysis also offers insights about the importance of different communication types for ICVT performance. To have a functional diverse ICVT implies to gain access to different knowledge bases more rapidly as well as to integrate the different knowledge streams within the ICVT (Ancona & Caldwell, 1992b). Thus, the ICVT does not only innovate within the team's boundaries, but also spans functional boundaries to integrate infor-

mation from team member's home functional units. The meta-analytical results show that only one of the three communication types namely inter team communication has a positive impact on team innovativeness. Thus, this finding suggests that the functional diverse team composition is primarily important to establish connections with other functional units residing in the corporation and that each team member functions as a representative of their home functional teams which in turn fosters the team's innovativeness.

Transformational leadership is the only team-level input, which positively affects all three team-level outcomes. Results from the subgroup analysis support the importance of transformational leaders for ICVT performance by showing that team members, team leaders and managers agree on their indispensable role in ICV projects. In contrast, subgroup analyses results of the other two leadership styles reveal that team members and managers differ significantly in their views about the relative importance of participative and transactional leadership for overall ICVT performance. Whereas managers prefer transactional leaders over participative leaders, the opposite is true for team members favoring participative leaders. By delineating this divergence of thought worlds, I aim to raise awareness of managers who are primarily responsible for the selection of the venture team leader. Since the team is the one in charge of innovating, managers might want to evaluate carefully their options of the future ICVT team leader.

I also identify new arrays of future research for variables that have been less the focus of attention. For instance, even though team tenure has often been used as control variable in ICVT studies it has never been the core construct of an empirical study. I found that team tenure is the only variable, which reduces a new product's novelty. This might be less surprising, but results from the subgroup analysis revealed that the direction of relationship changes significantly depending on rating source. Whereas team members see team tenure as detrimental for their performance, team leaders highly appreciate it as a crucial success factor.

Thus, this finding refers to the discrepancy between team member's wish for turnover vs. team leader's conservative approach of keeping team stability. Interestingly, managers demonstrate to be impartial regarding the importance of team tenure for their ICVT's successes. From a manager's perspective, this finding might be essential to realize that team tenure de facto matters and that ICVT membership change needs to be carefully managed. Thus, future ICVT scholars might be interested to understand the reasons why team members' favor membership turnover. Potential future research questions could be: Do people join the ICVT on a voluntary basis? What are internal and external drivers that make ICVT members want to leave the team? Are ICVT members working in the ICVT on a part- or full-time basis? And, how do part-time ICVT members cope with the pressure from their home functional unit while being on venture project?

Another fruitful array for future research is the role of autonomy in ICVTs. Even though autonomy is often mentioned as a pre-requisite for ICVTs to innovate, the relationship between the corporate parent and the ICVT has seldom been investigated (e.g., Crockett et al., 2013). Surprisingly, I found that managers rate autonomy as a crucial success factor, whereas team leaders and team members attribute almost no importance to it. Future research should enlighten the complexity of the corporate parent-ICVT relationship by investigating how both parties work together in their attempt to identify new business opportunities that ideally become the new core competences of the firm.

3.6 Limitations and Contribution

Despite the benefits of a meta-analytical approach in providing accurate mean effect sizes (Hedges & Olkin, 1985), I recognize several limitations of this study. First, I am limited in the ability to make causal inference because the majority of the primary studies included in this meta-analysis used cross-sectional data. Second, the small number of correlations for some constructs makes the results subject to second-order sampling error, which stem from

the sampling of studies in the meta-analysis (Hunter & Schmidt, 2004). Despite the robustness of results indicated by high Fail safe K's, which indicate that there must be found a relatively high number of studies which would nullify the results, I recommend to interpret them with caution.

This research contributes to the clarification of an increasingly important theme in team- and entrepreneurship literature by delineating the conceptual boundaries of the ICVT phenomenon. Moreover, this meta-analysis is among the first attempts of meta-analytically analyzing relationships on fine-grained performance outcomes such as team innovativeness or new product novelty (cf. Beal et al., 2003; Hülsheger et al., 2009; Sivasubramaniam et al., 2012). I also contribute to team literature, which has predominantly focused on the left-hand side of the IMO framework (Mathieu et al., 2008) resulting in less clarity of the team performance construct (Ilgen, 1999). Identifying performance outcomes on both the team- and product-level of analysis, as well as providing key metrics, definitions and selected references, I aimed at enlightening the black box of performance measurement of highly innovative teams. Besides depicting the current state of art of ICVT research, the IMO framework also indicates promising arrays of research that future scholars might want to address in order to develop the focal construct of ICVTs further in the field of team- and entrepreneurship literature.

4 BRIDGING THE GAP FROM 'WHO AND WHAT' TO 'HOW' IN CODING − A STATE-OF-THE-ART ASSESSMENT AND GUIDELINE FOR RIGOROUS META-ANALYTIC REVIEWS[3]

With increasing research interest in certain phenomena, the number of published meta-analyses has been growing. To enhance the quality of scientific reviews, especially in meta-analyses research, coding transparency is an essential methodological issue that needs to be addressed. Indeed, coding or data extraction of primary studies is not only a very time-intensive and crucial step when conducting a meta-analysis, but also provides the foundation on which the synthesis of findings, and therefore our knowledge base, is build. Several guidelines with step-by-step approaches for how to conduct a review exist (e.g., Gaur & Kumar, 2017; Geyskens, Krishnan, Steenkamp, & Cunha, 2009; Short, 2009; Tranfield, Denyer, & Smart, 2003; Wanous, Sullivan, & Malinak, 1989; Webster & Watson, 2002).

However, extant guidelines do not offer deep insights and suggestions concerning the coding process in meta-analytic research. In fact, precise recommendations for how to proceed with the coding of studies and how to transparently report the coding procedure are lacking. Therefore, there is a mismatch concerning the amount of time researchers spend when coding extant studies, and the documentation of activities performed during the coding process. Even though earlier studies claimed that there is a high degree of undisclosed actions, the lack of coding transparency is still a pertinent problem in management research today (Aguinis, Ramani, & Alabduljader, 2018; Wanous et al., 1989).

Analyzing 124 meta-analyses, we find evidence that the majority of authors do not transparently report their coding decisions. Our findings document that authors are mainly concerned with reporting 'Who' conducted coding (e.g., number of coders) and 'What' in-

[3] This research has been conducted in co-authorship with Prof. Baldauf and Dr. Simone Schweiger. It has successfully passed four R&R's in a top-tier journal and will hopefully be accepted for publication. This manuscript here is an earlier version from our review process.

formation has been coded (e.g., type of variables) instead of 'How' they proceeded with the coding of primary studies (e.g., choice of coding approach). On the bases of these results we contacted authors of the meta-analyses considered in this research to learn how editors and reviewers addressed the questions of 'Who', 'What' and 'How' during the review process. The answers indicate that the 'How' question was indeed less of an issue (see Appendix D). To raise awareness for the importance of reporting 'How', we show on an unpublished meta-analysis that 'How' to code decisions can reveal crucial answers for the existing controversy of findings in a research field as well as cause variance in meta-analytic results. With the aim to promote methodological rigor in meta-analyses, we finally present a guideline for researchers suggesting how coding can be performed in rigorous, efficient, transparent, and replicable ways.

4.1 State-of-the-Art Assessment of Coding in Meta-Analyses

As the task of coding has a crucial impact on knowledge gained from meta-analytic research, we assessed the state-of-the-art of coding in meta-analyses. Systematically analyzing 124 meta-analyses published in leading academic journals, we evaluated the extent to which authors transparently reported their coding procedures (e.g., adopted coding approaches and related coding decisions). Before presenting these findings, however, we explain how we proceeded with the identification and coding of studies.

4.1.1 Identification of Studies

To retrieve relevant studies, we applied certain search strategies using combinations of relevant keywords (e.g., meta* AND cod*) to explore different databases such as Business Source Premier (EBSCO), JSTOR, and Google Scholar. To gain a comprehensive understanding about the rigor of coding transparency, we specified no start date for study consideration and the search included studies published up until May 2019. The initial inclusion criteria that we applied were that in the title or abstract section of the articles the term "meta-analysis" or

'meta*' had to appear and the word 'cod*' (e.g., coding, coded, coders, codification, codify, recode) had to be used in the full-text search. Importantly, we focused on leading journals known for publishing management related research to depict the methodological rigor of coding applied in journals serving as role models for the research community.

Applying these inclusion criteria, our search yielded 243 articles of which we had to exclude several studies (n=119) for the following reasons: they were literature reviews (e.g., Schleicher et al., 2018), had no management context (e.g., Martocchio, Harrison, & Berkson, 2000) or were purely methodological articles (e.g., Adams, Smart, & Huff, 2017). Our final sample contains 124 meta-analyses published in the Journal of Management (n= 30), Academy of Management Journal (n=25), Personnel Psychology (n=21), Journal of Applied Psychology (n=20), Journal of Organizational Behavior (n=12), Journal of Management Studies (n=11) and Strategic Management Journal (n=5).

4.1.2 Coding of Studies

To ascertain that we remained open towards the variety of information reported about coding, we followed an inductive coding approach. Hence, in an exploratory sense, we aimed to identify a wide spectrum of our focal topic from which umbrella categories with distinct dimensions of coding could be developed. Specifically, we pursued several activities: First, two experienced coders (first author and a master student) coded a randomly selected subsample of 30 articles mainly analyzing the method sections of an article for relevant information. The two coders recorded the study's characteristics (e.g., author names, journal and year of publication) and performed a word coding by extracting the original text passages of an article that referred to coding. In addition, they also verified whether tables, appendices and online appendices provided information about coding (e.g., Geyskens, Steenkamp, & Kumar, 2006; Loignon & Woehr, 2018; Sihag & Rijsdijk, 2019).

Second, after coding the sub-sample the two coders discussed their first findings concerning the modes of coding in meta-analyses with the research team. For instance, the coders found that researchers described very extensively their literature search procedure with endless enumerations of inclusion criteria. At the same time, coders identified that most authors stopped their reporting of coding by stating the number of included studies (sample size) without explaining the subsequent step of 'How' they actually extracted the information from the meticulously retrieved studies.

Third, the authors of this study analyzed the coded information in terms of frequency of appearance to create representative coding categories for their coding scheme. Some of the categories were inductively developed such as 'are coders experienced in coding' or 'do authors state that the coding process is iterative'. Other categories, instead, were deductively derived from prior guidelines suggesting the use of a coding scheme (Gaur & Kumar, 2017; Lipsey & Wilson, 2001) or the diligent documentation of inclusion criteria for the literature search (Cooper, 2009). Therefore, inductive and deductive approaches were applied when developing the coding categories (see Table 4 & Appendix E for coding categories). Based on these categories we referred to three umbrella categories capturing the reporting of coding in meta-analyses: The first umbrella category contains information about 'Who' conducted the coding, the second displays 'What' information was coded from primary studies and the third reflects the research phenomenon of this article, that is, 'How' did authors proceed with the coding of primary studies.

Fourth, the same two coders performed a pre-test of the coding scheme by coding 15 new articles of the sample. As before, they extracted the original text passages to match the information to one of the pre-defined categories of the coding scheme. Additionally, they also attributed a number to the word coding. For example, the category 'authors state that discussion meetings took place' was either coded as 1 (Yes) or 2 (No) (see Table 4). Most of the

coded information could be assigned to one of the categories, but the pre-test also showed that the coding of some categories could be more fine-grained. For example, from the category 'authors state that the coding process is iterative' the coders split the category 'authors state that coding is not always straightforward', which reflects more the problem of terminological inconsistencies found for certain constructs, instead of the process of going back and forth in coding. After pre-testing the coding scheme, the two coders coded the remaining articles where the first author performed the second coding of all articles.

Lastly, coders analyzed coding reliabilities of the different coding categories. In general, intercoder reliabilities were high (see Table 4). The two coders discussed difficulties throughout the coding process. One of the discussion topics was that for certain categories terminologies were used interchangeably such as interrater reliability (e.g., Sihag & Rijsdijk, 2019), interrater agreement (e.g., Rosenbusch, Gusenbauer, Hatak, Fink, & Meyer, 2019), interrater correlation (e.g., Carnes, Xu, Sirmon, & Karadag, 2019) or consensus rate (e.g., Jiang, Lepak, Hu, & Baer, 2012). In sum, coding categories belonging to the 'Who' and 'What' umbrella categories had generally very high intercoder reliabilities (ICR>.96; ICR=1.0), whereas some of the 'How' coding categories had lower intercoder reliabilities (ICR>.86). An explanation for this is that 'Who' and 'What' categories were more objective in nature (e.g., code number of coders), while 'How' categories were more prone to subjectivity. An example of a 'How' category that often led to discussions between the two coders was the 'type of coding approach that authors adopted'. The difficulty related to this category was that authors did not explicitly state to use a deductive or inductive coding approach. Consequently, the coders needed to interpret the text passages describing the coding procedure (e.g., Karna, Richter, & Riesenkampff, 2016). In cases, where the two coders disagreed in their assessment, the coding differences were flagged and forwarded to the research team who took the final decision. Appendix E displays the included articles (n=124), the categories that

emerged from our coding and the frequencies of coded information across the entire study sample.

4.2 From 'Who' and 'What' to 'How' in Coding

Our analysis showed that whereas information to the questions of 'Who' and 'What' are predominantly provided the question of 'How' authors proceeded with their coding remains largely underreported. This lack of reporting the 'How' issue might be due to editors' and reviewers' prior effort in ascertaining the quality of coding. To address this possibility, we conducted an inquiry with the authors of meta-analyses included in our sample. Assessing the information obtained from authors again, supports that coding issues belonging to the questions of 'Who' and 'What' and less of 'How' were addressed during the review process (see Appendix D). Next, we will discuss the findings of our review of meta-analyses (see Table 4) and provide insights into each of the three coding questions ('Who', 'What' and 'How').

4.2.1 WHO

The question of 'Who' refers to the subjects conducting the coding of primary articles in a meta-analytic review (e.g., number of coders or coders' experience in coding). Our analysis showed that two aspects dominated the reporting of coding in meta-analyses: the indication of number of coders (75%) and the reporting of intercoder reliability (71%). Following recommendations of prior review guidelines (Denyer & Tranfield, 2009), 49.2% of the meta-analyses had two coders performing the coding task. Concerning the dominant reporting of intercoder reliability (71%) in meta-analyses, authors seem to use the level of coding agreement to testify the quality of their meta-analytic reviews. However, a closer look revealed that 88.6% reported an aggregated intercoder reliability instead of intercoder reliabilities for single coding categories (11.4%, e.g., Loignon & Woehr, 2018). This lack of rigor blurs the quality

of coding as an aggregated value of coding agreement hinders the readership to identify what coding categories were more difficult to code than others.

Table 4: Review of Meta-Analyses concerning Coding Transparency

	Meta-Analyses	
WHO		
Do authors indicate the number of coders in the review? (ICR=1.0)		
Yes	93	75.0%
No	31	25.0%
How many coders are involved in the coding process? (ICR=1.0)		
1	3	2.4%
2	61	49.2%
3	18	14.5%
4 to 7	11	8.9%
n/a	31	25.0%
Do authors indicate intercoder reliability in the review? (ICR=.96)		
Yes	88	71.0%
No	36	29.0%
Do authors indicate intercoder reliabilities for single constructs (not only aggregated intercoder reliability)?[1] (ICR=.98)		
Yes	10	11.4%
No	78	88.6%
Are coders experienced in coding or trained to do the coding? (ICR=1.0)		
Yes	18	14.5%
No (n/a)	106	85.5%
Do authors state that there is (at least) one coder who is knowledgeable in the research field? (ICR=1.0)		
Yes	13	10.5%
No	111	89.5%
Are students involved in the coding of studies?[2] (ICR=1.0)		
Yes	13	10.5%
No[2]	51	41.1%
n/a	60	48.4%
What is the ratio of authors who coded/total number of coders?[3] (ICR=1.0)		
100%	51	41.1%
51 to 99%	3	2.4%
50%	15	12.1%
1 to 49%	5	4.0%
0%	5	4.0%
n/a	45	36.3%
Was a second coding performed? (ICR=.96)		
Yes	87	70.2%
No	37	29.8%
To which extent did the second coder code the sample?[4] (ICR=.98)		
Full coding	61	70.1%
Partial coding	26	29.9%

	Meta-Analyses	
Do authors state that discussions meetings took place? (ICR=1.0)		
Yes	81	65.3%
No	43	34.7%
WHAT		
Do authors report what has been coded (e.g., variables, hypotheses, relationship signs, effect sizes etc.)? (ICR=1.0)		
Yes	103	83.1%
No	21	16.9%
Is there a section in the review entitled "Coding of Studies", "Coding Procedure", "Coding" or "Coding of Variables"? (ICR=1.0)		
Yes	81	65.3%
No	43	34.7%
Do authors elaborate inclusion criteria for their literature search? (ICR=1.0)		
Yes	96	77.4%
No	28	22.6%
Do authors elaborate exclusion criteria for their literature search? (ICR=1.0)		
Yes	74	59.7%
No	50	40.3%
Do authors state the type of databases used for the literature search? (ICR=1.0)		
Yes	113	91.1%
No	11	8.9%
How many databases do authors state to use for their literature search? (ICR=1.0)		
1	12	9.7%
2-3	50	40.3%
4-6	41	33.1%
>7	10	8.1%
n/a	11	8.9%
What kind of databases were used for the literature search?[5] (ICR=1.0)		
EBSCO	62	50.0%
ABI/INFORM	54	43.5%
ProQuest	48	38.7%
Web of Science	32	25.8%
ERIC	30	24.2%
Google Scholar	26	21.0%
PsychINFO	16	12.9%
JSTOR	11	8.9%
EconLit	11	8.9%
Other (Science Direct, SSRN, PubMed etc.)	50	40.3%
n/a	10	8.1%
Do authors indicate the keyword combinations or search terms used for their literature search?(ICR=1.0)		
Yes	101	81.5%
No	23	18.5%

	Meta-Analyses	
Does the review include unpublished/grey literature? (ICR=1.0)		
Yes	95	76.6%
No[6]	9	7.3%
n/a	20	16.1%
Do authors specify the total number of included articles? (ICR=1.0)		
Yes	120	96.8%
No	4	3.2%
What is the sample size of reviews? (ICR=1.0)		
0-50	34	27.4%
51-100	44	35.5%
101-150	22	17.7%
151-200	11	8.9%
> 201	9	7.3%
n/a	4	3.2%
What time span does the review cover? (ICR=1.0)		
1-20 years	14	11.3%
21-30 years	25	20.2%
31-40 years	14	11.3%
> 40 years	6	4.8%
n/a	65	52.4%
HOW		
Do authors explain in any way 'How' they coded primary articles (e.g., how they developed coding categories or how they extracted information from articles)? (ICR=.89)		
Yes	49	39.5%
No	75	60.5%
Do authors state that coding is not always straightforward? (ICR=.91)		
Yes	20	16.1%
No	104	83.9%
Do authors state that the coding process was undertaken iteratively? (ICR=.86)		
Yes	15	12.1%
No	109	87.9%
Do authors state that their coding decisions were based on measurement items (thus, not only on variable labels)? (ICR=.98)		
Yes	46	37.1%
No (n/a)	78	62.9%
Which coding approaches do authors mention to adopt? (ICR=.87)		
Only theory driven/deductive approach	20	16.1%
Only data driven/inductive approach	0	0.0%
Both theory and data driven	4	3.2%
n/a	100	80.6%
Do authors say to use a codebook, coding scheme or coding protocol? (ICR=1.0)		
Yes	35	28.2%
No	89	71.8%

	Meta-Analyses	
Do authors state that they performed a pre-test with the coding scheme (before the actual coding of articles)?[7] *(ICR=.93)*		
Yes	14	40.0%
No	21	60.0%
Is the coding scheme with the coded information included?[7] *(ICR=1.0)*		
Yes	2	5.7%
No	33	94.3%
Do authors state that they provide their coding scheme upon request?[7] *(ICR=1.0)*		
Yes	15	42.9%
No	20	57.1%
Is a frequency table of coded variables included in the review? (ICR=1.0)		
Yes	14	11.3%
No	110	88.7%
Is a table included in the review displaying key definitions, measurement items and selected references of constructs? (ICR=1.0)		
Yes	18	14.5%
No	106	85.5%
Do authors indicate methodological references when describing their coding procedure? (ICR=1.0)		
Yes	5	4.0%
No	119	96.0%

Note. Total sample size (n=124), ICR= Intercoder reliability [1] Only reviews indicating intercoder reliability were used as total sample size (n=88), [2] PhD students who are also authors were not counted as students, No=only authors coded, n/a=no information if students coded or not, [3] 100%=all authors coded, 0%=authors did not code, n/a= no information if authors coded or not , [4] Only reviews with second coding were used as total sample size (n=87), Full coding=second coder coded the entire study sample, Partial=second coder coded only a portion of the study sample, [5] Some authors used multiple databases, this is why the total percentage exceeds 100%, [6] Authors explicitly exclude unpublished literature, [7] Only reviews stating to use a coding scheme were used as total sample size (n=35).

Whereas the number of coders and intercoder reliability were mostly documented, little information about the coders' background was given. For instance, only 14.5% of the analyzed meta-analyses contained descriptions of coders' experience in coding (e.g., past coding activities or extent of training received) or the coders' degree of knowledge about the respective research subject (10.5%) (e.g., whether there was at least one coder with extent knowledge about the research field). This raises concerns since prior guidelines specifically addressed this issue (Denyer & Tranfield, 2009) where authors were encouraged to transparently communicate their prior expertise, beliefs and values of the research field, as their background can influence the outcome of the review.

Even though our analysis demonstrated that 41.1% of the authors performed the coding of studies themselves, 48.4% of the meta-analyses left their coders' identities anonymous. As a result, readers are knowledgeable about the number of coders involved in the coding

process but are ill informed about the identity of coders. For example, in only 10.5% of the meta-analyses authors explicitly mentioned that students were hired as coders.

Several guidelines (Denyer & Tranfield, 2009; Potter & Levine-Donnerstein, 1999; Wanous et al., 1989) also suggested the adoption of a second coding to reduce coding bias. Indeed, 70.2% of the meta-analytic reviews had a second coding of primary studies. Regarding the extent of the second coding, our analysis showed that scholars adopted more often a full second coding (70.1%) than a partial second coding approach (29.9%) where only a portion of the entire study sample was coded twice.

Lastly, our analysis revealed that 65.3% of the authors included a one-sentence statement stating that discussion meetings among coders took place to solve coding disagreements but without explaining what kind of coding issues they discussed (e.g., for which variables frequently coding insecurities arose). As such, a brief statement that discussion meetings among coders took place seems insufficient concerning aims of replicability and bias reduction.

4.2.2 WHAT

The question of 'What' refers to the type of information authors report to extract from primary articles (e.g., variables, effect sizes, Cronbach alphas or sample sizes). As suggested by several review guidelines (e.g., Gaur & Kumar, 2017; Wanous et al., 1989), 83.1% of the authors stated 'What' type of information such as study characteristics or type of variable they coded.

Interestingly, 65.3% of the meta-analytic reviews had a proper section entitled 'Coding of Studies', 'Coding Procedure' or 'Coding'. However, a closer assessment of these coding sections revealed that most authors instead of explaining 'How' they proceeded with their coding, very extensively described how they conducted their literature search. Consequently, readers remain unacquainted with the coding procedure of the meticulously retrieved studies

as these coding sections predominantly entailed extensive lists of inclusion criteria (77.4%), exclusion criteria (59.7%) and databases used for the literature search (91.1%). Regarding the number of databases, we found that researchers often used two to three databases (40.3%), among which EBSCO (50.0%), ABI/INFORM (43.5%) and ProQuest (38.7%) were favored. Additionally, scholars also notoriously reported a variety of keyword combinations (81.5%) to allow replicability of their search results. Following prior research (Adams et al., 2017) where scholars raised attention to the importance of integrating unpublished studies into meta-analytic reviews, our analysis showed that 76.6% of the authors stated to include grey literature in their reviews. Finally, these coding sections often ended with the reporting of the total number of included studies (96.8%) with sample sizes varying between 51 and 100 primary articles (35.5%) and covering a time span of 21 to 30 years of research (20.2%) without explaining the subsequent step of 'How' they proceeded with the coding of articles.

4.2.3 HOW

The question of 'How' entails information about the processual aspects of authors' coding activities (e.g., adopted coding approaches). In fact, we discovered that 60.5% of the authors did not explain 'How' they coded their primary articles, which might suggest that coding is a straightforward task where subjectivity plays a minor role. Only 16.1% of the authors discussed the difficulty of coding. For instance, Heugens and Lander (2009) stated that the involvement of judgement calls in their coding was inevitable, Karam et al. (2019) instead addressed the issue of ambiguity in coding and others argued that a common problem of coding is how to deal with constructs that are labelled differently but measured identically (Sihag & Rijsdijk, 2019). Besides this, descriptions referring to coding as an iterative process were largely missing with only 12.1% of the authors describing their coding as iterative. Nevertheless, there is also a number of authors providing informative statements reflecting their 'How' to code decisions. Among best-practice examples (see Table 5) are Karam et al. (2019),

Balkundi and Harrison (2006) and Fainshmidt, Pezeshkan, Frazier, Nair, and Markowski (2016).

Furthermore, 37.1% of the authors explained to base their coding on the measurement items used in the original studies instead of extracting solely variable labels. In fact, many scholars explicitly stated to not rely on original authors' variable labels or construct names because variable labels did not always correspond with the used scale content (Chapman et al., 2005; Damanpour, 1991; Fainshmidt et al., 2016). Others instead emphasized that recording variable labels was the lowest level of specificity for coding (Christian, Edwards, & Bradley, 2010). Thus, carefully coding for measurement items used in primary studies is a crucial step to assure that dissimilar variables using the same variable labels will not be combined inappropriately or that conceptually similar variables will not be separated due to different variable labels (Klier, Schwens, Zapkau, & Dikova, 2017; Sihag & Rijsdijk, 2019).

Regarding authors' explanations of 'How' they developed coding categories, our findings show that 16.1% used a deductive/theory driven coding approach, where variables were coded into an existing theoretical framework. Only 3.2% stated to follow both a deductive/theory and inductive/data driven coding approach, where coding categories also emerged from the data. Nevertheless, the lack of reporting of 'How' is also reflected by the 80.6% of meta-analyses that did not contain any information about the type of adopted coding approach for the development of coding categories.

Despite existing guidelines proclaiming the use of a coding scheme (Lipsey & Wilson, 2001), only 28.2% of the authors stated their usage. Among authors who used a coding scheme, 60% did not run a pre-test with their coding scheme before coding their entire study sample. Regarding the accessibility of the coding scheme, 42.9% indicated to provide their coding scheme upon request with only 5.7% providing it as an online Appendix (e.g., Montano, Reeske, Franke, & Hüffmeier, 2017)

Table 5: Best-Practice Coding Statements

Statements	Content
"**As suggested by meta-analytic reporting standards (Kepes et al., 2013**), the data coding process was **guided by a set of protocols**. First, we generated a list of leader behaviours and organizational justice **constructs guided by prior meta-analytic studies** (Colquitt et al., 2001, 2013; DeRue et al., 2011; Rupp et al., 2014). If the study met the inclusion criteria above (i.e., contained both a leadership variable and a justice variable), we proceeded to code the correlations for the study variables. **We articulated definitions for each of the coded constructs along with a list of common variable names to ensure consistency** in coding among authors. An excel worksheet with macros was designated as the standard coding sheet to capture relevant information defined by the protocols [...] We determined the type and source by **examining the specific scale item(s) and item instructions in the method section**. Consistent with the coding details provided by Rupp et al. (2014), **we found that justice type was most often labeled explicitly whereas justice source was not**. Therefore, again following the coding protocol of Rupp et al. (2014), when information about the **source of justice in the method section was ambiguous**, **we would review the theoretical arguments and hypotheses to make a coding determination** about the justice source." (Karam, Hu, Davidson, Juravich, Nahrgang, Humphrey & DeRue, 2019: 148-149)	Methodological reference Coding scheme Deductive coding approach Coding of measurement items Coding is not straightforward
"After **pilot-testing and refining the system**, we had two coders rate the studies on multiple dimensions, including type of network measure and sample characteristics. All primary studies provided enough information to classify tie content, usually through description of network-related questions asked to respondents. **Responses to such questions as "Whom do you go to for work-related advice?"** or "Whom would you want to work with to accomplish the job most efficiently?" **were coded as measuring instrumental ties**. Answers to questions such as "Who are your friends?" or "Whom do you have close interpersonal relationships with?" were coded as involving expressive ties. **The raters also coded whether the network structure in a given study was a measure of network density or centrality**. **Although there are multiple types of centralities** (see Wasserman and Faust [1994] for a review), **in the studies summarized here, a majority (16 out of 19) used in-degree as the centrality measure** (Wasserman & Faust, 1994). The **interrater reliability for coding the type of network structure** was .97." (Balkundi & Harrison, 2006: 57)	Pre-test of coding scheme Coding of measurement items Intercoder reliability for single constructs
"We focused **on how constructs were measured, not labelled.** For instance, Hsu and Wang (2012) and Cui and Jiao (2011) both use 'dynamic capability' as their primary construct. **Whereas the former measures the construct with increases in R&D and marketing spending, the latter utilizes items about the firm's reconfiguration capacity** (Cui and Jiao, 2011: 391) **which better captures a generative capacity to alter the resource base.** Similarly, **the latter is characterized by higher complexity because it measures a capacity requiring a large number of interdependencies within the organization** (Reed and DeFillippi, 1990). [...] In assessing the generative nature of higher-order dynamic capabilities, **we looked for measures that capture changes to the way the organization refines the resource base**. **As an example, Schilke (2014a) uses 'new product development'** as one of the primary constructs for dynamic capabilities and measures the construct with items such as 'we extend product range'**. In that case, the utilized measure captures adaptive activities in the product development area but does not imply more overarching, generative change**." (Fainshmidt, Pezeshkan, Lance, Nair & Markowski, 2016: 1358)	Coding of measurement items Coding examples
"**We thoroughly examined the voice measure used in each study to ensure it actually assessed voice. If at least two-thirds of the items within a measure** reflected voice, we included the study in our analysis. We chose this cutoff based on examples in the literature that have applied a two-thirds criterion to voice measures [...] **if we could not clearly assess the specific measure or items used, we included the study as undifferentiated constructive voice only**." (Chamberlin, Newton & LePine, 2017: 22-24)	Two-thirds cutoff Coding of measurement items
"The **study had to empirically assess psychological safety in a manner theoretically consistent with our conceptualization of the construct**. Most often, Edmondson's (1999) psychological safety scale or some version of it was used. In cases where ad hoc scales were developed or other scales were used, **we examined the authors' theoretical definitions** to ensure that they were appropriate for inclusion [...] We utilized a **combination of theory-driven and data-driven approaches to create a categorization scheme for coding articles. We started by drawing from the theoretical frameworks** of psychological safety **to create broad, hierarchical lists of antecedents and outcomes** of psychological safety [...] Consistent with Seibert et al. (2011) and Hong, Liao, Hu, and Jiang (2013), **our meta-analysis aggregated variables** including autonomy, flexibility, job enrichment, and task complexity **into a broad "work design characteristics" category**." (Frazier, Fainshmidt, Klinger, Pezeshkan &Vracheva, 2017: 125-127)	Deductive and inductive coding approach Coding scheme Mixed category
"Examination of the **items used in the primary studies revealed that the variable labels were not always consistent with the scale content** [...] **Subcategories were also inductively identified on the basis of their frequency of appearance in the literature**." (Chapman, Uggerslev, Carroll, Piasentin & Jones, 2005: 931)	Coding of measurement items

We also found that meta-analytic reviews lacked in visually representing the findings through frequency tables or detailed tables indicating definitions, key measurement items and selected references to increase coding transparency. For example, only 11.3% of the reviews included a frequency table for displaying how often a certain variable had been coded across a study sample (e.g., Jiang et al., 2012) or a detailed table displaying core definitions, key measures and selected references for the coded variables (14.5%) (e.g., Mutlu, Van Essen, Peng, Saleh, & Duran, 2018). On the subject of methodological references concerning coding, our analysis revealed that only 4% of the meta-analyses contained references to methodological articles for describing their coding procedure, suggesting the pertinence of our coding guideline (see Figure 5).

Based on our review of meta-analyses (see Table 4 & Appendix E), we now show why 'How' to code decisions are crucial for the quality of a meta-analytic review.

4.3 Why 'How' to Code Decisions Matter: An Empirical Illustration

To demonstrate the importance of 'How', we use an unpublished meta-analysis and provide evidence how two procedural coding decisions can impact the quality of meta-analytic reviews. The first processual decision refers to the added value researchers create when using a fine-grained coding approach (see Step 2 in our coding guideline) and the second reflects how different coding approaches (coding based on measurement items instead of variable labels) can cause variance in meta-analytic results (see Step 3 in our coding guideline).

4.3.1 Context of the Unpublished Meta-Analysis

In this unpublished meta-analysis the authors strived to identify performance determinants of innovative teams in the corporate context. Among a set of determinants, functional diversity describing the degree of a team's functional diverse composition (Webber & Donahue, 2001) was identified as one of the most researchered constructs. Despite its high scholary attention, there is

still equivocality among scientist about the impact of functional diversity on performance (Cabrales et al., 2008; Crockett et al., 2013; Hirunyawipada & Paswan, 2013; Hyung-Jin Park, Lim, & Birnbaum-More, 2009; Sethi et al., 2001). To find explanations for the existing controversy, the authors of the unpublished meta-analysis used a sample of 34 bi-variate relationships corresponding to 1'838 teams operating in the field of corporate entrepreneurship. A description of the literature search procedure and the coding of studies is provided in Appendix F.

4.3.2 Why 'How' to Code Decisions Matter: Fine-grained Coding

The first processual decision refers to scholars' judgement to use a fine-grained coding approach (see Step 2 in guideline). In fact, many team researchers use aggregated outcomes as the dependent variable (e.g., performance) instead of fine-grained outcomes (e.g., team efficiency or team innovativeness). The authors of the unpublished meta-analysis instead decided to code the dependent variable (performance) on a fine grained level which led to the identification of seven performance outcomes attributed on the team- and product-level of analysis (see Table 6).

Indeed, the authors' decision to code on a fine-grained level provided one explanation for the existing controversy about the impact of functional diversity on performance. In fact, as Table 6 demonstrates, functional diversity is a significant determinant for product-level performance outcomes such as new product financial success (r_c=.476, p<.001) and new product novelty (r_c=.211, p<.01) but remains highly unrelated to team-level performance outcomes (p>0.05). This finding suggests that depending on the level of performance (product- vs. team-level performance) researchers choose as their dependent variable, the effect of functional diversity might remain unobserved, as it is the case for outcomes on the team-level of analysis. Therefore, the authors' decision to pursue a fine-grained coding approach for the performance construct (see

Step 2 in our coding guideline) revealed an important answer to the question of why controversial findings of the functional diversity-performance relationship exist.

4.3.3 Why 'How' to Code Decisions Matter: Coding based on Measurement Items

The second processual decision refers to scholars' judgement to base their coding on measurement items instead of solely extracting variable labels (see Step 3 in our coding guideline). As discussed in our review of meta-analyses (see Table 4), several scholars raised their concern about the coding approach of only extracting variable labels as they often do not correspond with the used scale content (Chapman et al., 2005; Damanpour, 1991; LePine et al., 2002; Zhao et al., 2007). Without controlling for the fit between original variable label and measurement items, researchers can mistakenly attribute variables to the wrong categories, which then leads to a bias of meta-analytic results.

To demonstrate how authors' coding approaches (coding based on measurement items vs. variable labels) can lead to such a bias, we let the authors of the unpublished meta-analysis classify the 34 performance outcomes only based on the recorded variable labels as used in the primary article (see Table 7) and contrasted it with their original coding approach, that is, coding based on measurement items (see Table 6). Comparing the effect sizes of the two coding approaches (coding based on measurement items vs. variable labels) revealed that the significance, magnitude of effect sizes and even direction of relationships changed substantially depending on which coding approach was adopted (see Table 6 & 7). For instance, the relationship of functional diversity on speed to market is not significant for coding based on measurement items (r_c=.154, p>.05), but becomes strongly significant when the coding is based on variable labels (r_c=.351, p<.05). In contrast, the relationship with new product novelty is significant for coding based on measurement items (r_c=.211, p<.01), but becomes insignificant when coders only consider variable labels

(r_c=.123, p>.05). Moreover, changes in the direction of relationships can also be observed where coding based on variable labels results in a positive relationship with team innovativeness (r_c=.173, p<.01) and coding based on measurement items led to a non-significant negative relationship (r_c = -.072, p>.05). These findings show that depending on 'How' scholars decide to code their primary studies (coding based on measurement items vs. variable labels) conclusions of meta-analytic reviews can vary drastically. Therefore, these findings support prior researchers' calls to not solely code variable labels as measurement items provide richer information to assure construct validity and therefore, a higher quality of a meta-analytic review.

Table 6: Comparing Meta-analytic Results obtained from different Coding Approaches (Measurement Items)

Coding based on Measurement Items	*k*	*N*	r_c	*Z*	*p*	*Q*	I^2	*95% CI*	*Fail-safe K*
Functional Diversity - Overall Performance	34	1838	.181**	3.472	.001	266.600***	87.622	.080, .279	1001
Aggregated Team-Level Performance	10	513	.056	0.503	.615	63.433***	85.812	-.162, .270	118
Team efficiency	6	357	.142	0.858	.391	45.677***	89.054	-.182, .438	7
Team effectiveness	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Team innovativeness	4	244	-.072	-0.576	.565	10.407*	71.175	-.309, .172	0
Aggregated Product-Level Performance	20	1451	.263***	4.276	.000	166.960***	88.620	.145, .374	670
New product financial success	3	409	.476***	4.664	.000	9.644**	79.261	.291, .626	77
New product novelty	10	1133	.211**	3.275	.001	40.835***	77.960	.086, .330	114
New product quality	3	330	.312	1.519	.129	23.518***	91.496	-.093, .629	35
Speed to market	4	460	.154	0.811	.417	47.028***	93.621	-.217, .487	8
Mixed Performance	4	188	.020	0.184	.854	6.466	53.607	-.195, .234	0

Note. k= number of correlations (if less than three correlations exist, no analysis was conducted); n=20 (number of studies included); N=number of teams; r_c (corrected)= the sample-size-weighted, reliability-corrected estimate of the population correlation coefficients; Z= value for testing the null hypothesis ; p=p-value, *p < 0.05, ** p < 0.01,*** p < .001; Q = heterogeneity test; I^2=percentage of unexplained variance; 95% CI = 95 percent confidence interval for corrected r, lower and upper limit; Fail-safe K= number of studies with null results needed to make the reported mean effect sizes insignificant.

Table 7: Comparing Meta-analytic Results obtained from different Coding Approaches (Variable Labels)

Coding based on Variable Labels	*k*	*N*	r_c	*Z*	*p*	*Q*	I^2	*95% CI*	*Fail-safe K*
Functional Diversity - Overall Performance	34	1838	.181**	3.472	.001	266.600***	87.622	.080, .279	1001
Aggregated Team-Level Performance	15	1308	.117	1.806	.071	75.869***	81.547	-.010, .241	71
Team efficiency	5	354	.057	0.277	.782	55.883***	92.842	-.335, .433	0
Team effectiveness	3	218	.078	1.134	.257	1.831*	0	-.057, .211	0
Team innovativeness	7	808	.173**	2.884	.004	16.186*	62.930	.056, .285	36
Aggregated Product-Level Performance	13	1082	.259**	2.540	.011	151.311***	92.069	.061, .438	291
New product financial success	0	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
New product novelty	5	394	.123	0.616	.538	56.308***	92.896	-.263, .475	4
New product quality	3	330	.312	1.519	.129	23.518***	91.496	-.093, .629	35
Speed to market	5	522	.351*	2.265	.024	50.450***	92.071	.049, .594	65
Mixed Performance	6	495	.173	1.580	.114	25.579***	80.453	-.042, .372	25

To sum up, the two processual decisions demonstrated that 'How' to code decisions can impact the quality of a meta-analytic review. Following these coding decisions (see our coding guideline) and its transparent reporting, can empower future research in providing more fine-grained conclusions, ensuring construct validity, giving new insights into ongoing scholarly debates and most importantly fulfill a meta-analysis' purpose of explaining why there exist controversial findings in a research field. In the attempt to guide future scholars and enhance methodological rigor in meta-analyses, we developed a coding guideline with several recommendations on 'How' to code (see Figure 5).

4.4 Recommendations on 'How' to Code

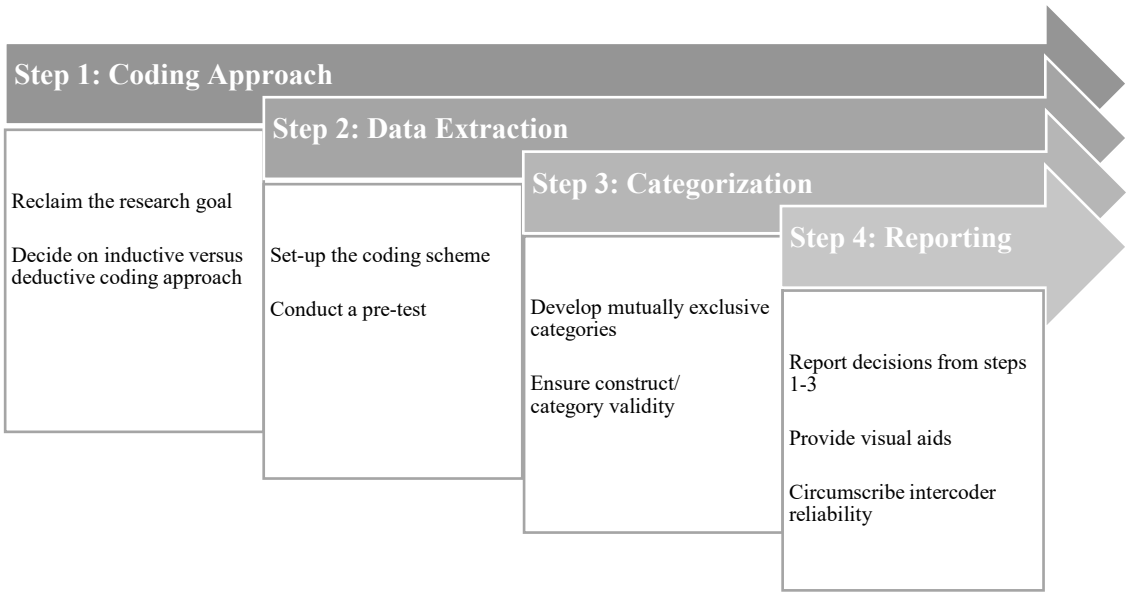
As the question of 'How' to code primary articles for meta-analyses has not been addressed thoroughly in extant guidelines, we recommend to pay more attention in future meta-

analytic research and take the issues to extract, categorize and document data seriously. While the coding strategy may be straightforward for low-inference parameters (e.g., sample size, journal ranking, country of origin), high-inference parameters (e.g., abstract categories) pose special challenges on coders. The latter require a higher degree of judgement and subjective interpretation by coders and, hence, may vary between coders. The resulting higher potential of coder bias, in turn, leads to coding variations that might lead to differences in subsequent conclusions (Cooper, 2009).

Subsequently, we provide a guideline for the process of coding, i.e., the question of 'How' to code with a focus on high-inference parameters. The relevance of each of the presented aspects to be considered in the coding process may vary depending on theme and discipline of the meta-analysis. Nevertheless, there are commonalities that cut across the various approaches of meta-analyses. As such, we suggest a comprehensive guideline supporting scientists to conduct coding in a rigorous, efficient, transparent, and replicable way.

Coding is an iterative process in which coding decisions are not made in a linear course, but are rather reflected and refined continuously (e.g., Kirca et al., 2011; Sleesman, Conlon, McNamara, & Miles, 2012). In the same vein, the four coding steps, shown in Figure 5, depend on and overlap each other and, hence, need to be acknowledged not in a sequential but rather integrated manner.

Figure 5: Recommended Guideline for the Process of Coding along four Steps



4.4.1 Step 1: Coding Approach

Reclaim the research goal of the meta-analysis. The research questions and hypotheses of the meta-analysis should not only drive the choice of data sources or inclusion and exclusion criteria (i.e., 'What' to code) (Creswell & Plano Clark, 2007). Also, the research goal informs the process of coding, i.e., 'How' to code.

We broadly classify two fundamentally different types of meta-analyses pursuing different research goals. We call these two types meta-analysis of 'relationships' and meta-analysis of 'themes'. With a meta-analysis of relationships, researchers seek to understand the boundary conditions under which a specific relationship holds and investigate where differences in findings stem from. With a meta-analysis of themes, contrarily, researchers aim at making sense of a broader research field, integrating different research streams, and develop meaningful concepts, categories or even new theory.

These two research goals involve differing degrees of specificity or homogeneity of the pieces of research that are to be synthesized. Meta-analyses of relationships typically entail a syn-

thesis of the state-of-the-art of a specific relationship or several relationships in terms of a nomological network (i.e., antecedents, consequences and/or contextual conditions) around a focal construct. When conducting such a meta-analysis, a multitude of studies exist that investigate the same or at least similar constructs. Meta-analyses of themes entail a synthesis of a theory or topic with boundaries set by the researcher. As a theory or research theme is investigated from different perspectives with various constructs, a meta-analysis of themes requires broader categories and more judgement which variables to include into a category by the coder.

Table 8 shows examples of meta-analyses that pursue one of these goals. Reclaiming the goal of the meta-analysis is decisive for the whole coding process. The goal influences the type of parameters relevant to the synthesis but also whether parameters are to be extracted data-driven (i.e., inductively) or theory-driven (i.e., deductively).

Table 8: Research Goals of Meta-Analyses

Meta-analysis of…	Synthesis of a…	Exemplary Meta-Analyses
Relationships	Relationship	Carnes et al. (2019); Schweiger et al. (2019); Zhao et al. (2010)
	Nomological Network	Anseel et al. (2015); Bilgili et al. (2017); Frazier et al. (2017)
Themes	Theory	Geyskens et al. (2006); Heugens et al. (2009); Van den Broeck et al. (2016)
	Topic	Chapman et al. (2005); Karam et al. (2019); Mueller et al. (2013)

Decide on inductive versus deductive coding approach. To varying degrees, the research goals and accordingly the different types of meta-analyses require inductive or deductive coding approaches or combinations thereof (Creswell & Plano Clark, 2007). While meta-analyses of relationships predominantly require deductive coding approaches, meta-analyses of themes primarily involve inductive coding. Coding parameters deductively is predominant when meta-

analyzing a predefined and specific relationship (e.g., resource slack-performance relationship, Carnes et al., 2019) or nomological network (e.g., antecedents and outcomes of psychological safety, Frazier, Fainshmidt, Klinger, Pezeshkan, & Vracheva, 2017). Such meta-analyses summarize what has been investigated or applied repeatedly in several studies. As such, the coder consistently looks for the same data in every primary study (e.g., variable label, definition, measurement, perceived vs. objective measurement, cross-sectional vs. lagged measurement and boundary conditions such as industry, geographical location, firm size, firm age, etc.).

Inductive coding approaches are predominantly adopted when theories (e.g., self-determination theory, Van den Broeck, Ferris, Chang, & Rosen, 2016) or research topics (e.g., applicant attraction to organizations and job choice, Chapman et al., 2005) were reviewed. The researcher approaches the data in a more explorative way requiring the coder to constantly allocate, reconsider, aggregate, and refine identified data encountered from study to study. Thereby, concepts emerge from the original data — either leading to completely new umbrella categories or umbrella categories based on some theory the coder imposes on the original data. The inductive approach, more than the deductive, requires more openness from coders as constructs will emerge while coding. This means that coders need to go back and forth between collected data and conceptual literature and eventually, when umbrella concepts have emerged, coders are going to recode all studies in the dataset again to validate the developed categories.

As we have shown in the meta-analytic example of the relationship between functional diversity and performance, combinations of deductive and inductive coding approaches within one meta-analytic study are common (see Appendix F). Meta-analysts are often interested in a specific focal construct that has intensively been investigated in extant research. Typically, this focal construct demands a deductive coding approach as conceptualization and operationalization are well agreed upon. As long as primary studies include the required focal construct, scientists

are often open as to which outcomes of this focal construct are investigated. As such, they face a wide variability of outcome constructs, which then requires inductive coding.

In the meta-analytical example, functional diversity is the focal construct, which however has been measured very similarly although many different labels of the same concept exist (see Appendix F). As such, deductive coding has been adequate for functional diversity, as the authors knew which parameters were of interest at the outset (i.e., variable label, definition and measurement items). Contrarily, team performance has been less systematical addressed in team research (Ilgen, 1999; Mathieu et al., 2008). Hence, the authors decided to code performance inductively by letting the parameters of team performance (and, specifically, its categories) emerge from the data.

4.4.2 Step 2: Data Extraction

Set-up the coding scheme. The coding scheme, codebook, coding protocol, or coding manual is the documentation of what data is to be extracted from the original studies. The content of the coding scheme is informed by the research goal, type of meta-analysis, and accordingly whether parameters require deductive or inductive coding (see Figure 5 and Table 8).

The goal of the coding scheme is to enable data reduction in the sense of simplifying and abstracting original data and data organization in the sense of collocating the reduced data to make it interpretable. It is the structure along which the data is inserted in a uniform and standardized way (Gaur & Kumar, 2017). The coding scheme enables the coder to document qualitative and quantitative parameters important to the specific meta-analysis. It lists the studies to be included in the meta-analysis in rows. Column labels stipulating the coding parameters guide coders where and how pieces of information of each study is to be extracted.

A major goal for meta-analyses is to investigate where heterogeneity of studies that examined the same relationship or theme stem from (Borenstein, Hedges, Higgins, & Rothstein, 2009). This implicates for the coding scheme that, ideally upfront, the scientist has an idea in what respect, i.e., related to which parameters, the studies potentially vary. Hence, it is advisable in the interest of efficiency to set up the coding scheme not before the authors feel knowledgeable enough on the respective research they are intending to synthesize. A data extraction pre-test should additionally accommodate for initial uncertainties (see below).

Typically, the coding scheme of meta-analyses in organizational research encompass parameters falling into the four categories of a) information on variables of interest such as independent and dependent variables, moderators and mediators, control variables (e.g., labelling and definition in the study, measurement (items), if applicable reliability estimates), b) data (e.g., type, perceived vs. objective, firm size, firm age), c) quality (e.g., journal ranking, study setting such as geographic location), and d) quantitative information (e.g., sample size, effect sizes such as correlations between variables of interest).

Depending on whether parameters require deductive or inductive coding approaches, the initial coding scheme differs. The coding scheme is, for parameters to be coded deductively, quite predefined how data should be inserted in the coding table, as variables are specific enough from the outset. Parameters requiring inductive approaches entail that new categories emerge from the data, and hence, the initial coding scheme cannot be as straightforward predefined. The coding scheme is iteratively adapted while the study proceeds as authors and coders, respectively, gain more insights into the data.

In the meta-analysis example, the authors noticed a lack of detail and disaggregation pertaining to the outcome measures of the primary studies. Specifically, many meta-analyses refer to outcomes such as ‘performance’ rather than acknowledging a fine-grained portfolio of types of

outcomes pertaining to different levels of analysis (i.e., team, business unit or firm). Outcome measures are important parameters often relevant to explaining heterogeneity of studies. Hence, if provided in the majority of primary studies, we recommend extracting information that further aids in disaggregating outcomes (e.g., level of analysis, rater level, data source dependence, etc.) as more in-depth analyses are possible.

In the meta-analytical example above, we finally coded seven outcome categories related to two levels of analyses (team- and product-level performance). This fine-grained coding made it possible for the authors to disentangle where the conflicting findings of the functional diversity-performance relationship stem from. As such, a detailed coding scheme from the beginning facilitates opportunities to run more in-depth analyses and provide more precise meta-analytic conclusions. Hence, it may be necessary to aggregate parameters later in the coding process when authors observe that there are not enough observations for each to render meaningful analyses.

Thus, we recommend constructing the coding scheme as comprehensive (i.e., coding all parameters of potential interest) and fine-grained as possible. This avoids that coders need to go back to the manuscripts to be coded over and over again. Comprehensive and fine-grained coding can be conducted by splitting multiple data entries. This requires simultaneous data entries with varying degrees of broadness — especially for parameters to be coded inductively. The first data entries into the coding scheme should be originally taken from the text in a 1:1 manner — either as narrative text (e.g., original text passages of the study informing about how authors defined a construct) or original word coding (e.g., coding of measurement items). While the first codes for a phenomenon may be broad narrative entries, the subsequent codes for the same phenomenon allow the coder to narrow these down to first-, second- and third-order categories as the coding proceeds and categories emerge.

Referring to performance as an inductively coded concept in the meta-analytic example, the first coding entries were original text passages related to performance of innovative teams in the corporate context that the authors took originally from the article in identical terms. The next, narrower parameters on performance only included excerpts of the first parameter, such as the definition and key measurement items of the construct. While the possible data entries may not be obvious from the outset, they will become obvious during the coding process. In this manner, we created multiple data entries for the same phenomenon with varying degrees of broadness.

When the dataset becomes very large, keeping an overview of coded information becomes more and more difficult. We recommend combining word and number coding (i.e., determining preliminary category numbers for similar content) from the beginning wherever possible as filtering along numbers makes the database much easier to handle. In deductive coding approaches, this is easier to accomplish than in inductive approaches, as categories can often be predefined. Contrarily, when coding inductively, categories develop as the coding proceeds and hence, numbers can typically not be assigned until the last studies have been coded. If the researcher, as the study proceeds, decides to subdivide data entries, it is easier to filter for numbers rather than going manually through the database.

Conduct a pre-test. We recommend conducting a coding pre-test on a subset of primary studies (Weber, 1990). This subset ideally represents the full data sample, e.g., in terms of quality characteristics and parameters to be extracted. The purpose of conducting a pre-test is to evaluate the coding scheme with associated decision rules and the data extraction procedure. Moreover, it can serve to further refine the inclusion criteria when studies are coded that are considered not suitable for the intended relationship or theme to be synthesized. A pre-test enables the coders to engage in the conventions of the coding process. When parameters involve high degrees of judgement and interpretation, a pre-test can activate discussions and agreement between coders

leading to a higher degree of consistency between them. Further, a pre-test has the potential to uncover missing coding parameters such as those that potentially constitute the heterogeneity between studies and those that need further specification (Cooper, Hedges, & Valentine, 2009).

4.4.3 Step 3: Categorization

Develop mutually exclusive categories. Building categories means abstracting from and summarizing data (e.g., research focus, conceptualizations, operationalizations, relationships) leading to data reduction simplifying comparisons between studies (Brewerton & Millward, 2001; O'Reilly, Paper, & Marx, 2012). Categories, to varying degrees, are either theoretically imposed and predefined (deductive approach) or emerge from the data (inductive approach) as elaborated on above. Inductive coding in search of emergent categories is well aided by applying a systematic style as sticking to a certain coding style helps coders to code in a consistent way.

Relevant for deductive coding approaches, the conceptual literature of the respective topic will inform the coder of adequate categories serving as a guideline. Some scholars suggest relying on prior-developed procedures for classifying coded variables or to use categories from coding schemes developed by others (Christian, Garza, & Slaughter, 2011; Gaur & Kumar, 2017; Judge & Ilies, 2002a; Martin, Guillaume, Thomas, Lee, & Epitropaki, 2016; Ng & Feldman, 2008).

When coding inductively or coding high-inference parameters, developing categories is one of the core challenges for coders. Moving back and forth between extant literature, coders' decisions on how to construct categories are inevitably shaped by their personal judgements and experiences. This bears a high potential of coder bias. As such, when multiple coders are involved, developing categories needs to be done in close collaboration to ensure consistency.

For deductive and inductive coding approaches alike, we recommend a structured categorization approach leading to replicable categories in the interest of consistent categories. Specifically, we suggest defining category name, category definition, key measurement items, scope and boundary conditions as soon as possible — even in an inductive coding approach. Of course, this label is to be altered while coding proceeds, but especially when dealing with multiple categories, this approach helps coders to categorize distinctively and mindfully.

Further, we advise continuously feeding category descriptions during the coding process with example codes as well as variable labels, key measurement items based on selected references, and definitions that go into a category (e.g., Loignon & Woehr, 2018). This further specifies the meaning of a category as the coding proceeds. Moreover, especially relevant to inductive coding approaches when relations between concepts / categories are not predefined but rather emerge from the data, a hierarchical category system such as a tree diagram and a continuously refined framework of categories is helpful to visualize linkages between categories (e.g., Thomas, 2006).

A major goal of developing categories is to yield mutually exclusivity. This means that categories should have theoretical scope and boundary conditions as such that they cannot overlap each other in their meaning. As such, when categories are stable in the end of the coding process, every variable should clearly be assignable to one category and no other. If coders feel that a variable can theoretically belong to more than one category, this will be a sign of not mutually exclusive categories. While meta-analyses exist that use variables in several categories, such a procedure distorts conclusions. Similar as to why scholars conducting meta-analyses should eliminate duplicate samples (Wood, 2008), using data multiple times in a framework causes bias. We acknowledge that in an inductive approach authors seek to develop new theory, creating a case

for using data multiple times. However, meta-analyses — be it deductive or inductive — should be a representation of the state-of-the-art of a research topic (Cooper, 2009). Hence, we recommend that data should only feed one category. If no clear classification to a category is possible, we advise revisiting the category's definition and deciding whether adaptations are possible to arrive at mutual exclusivity. Ultimately, it is also possible to remove the variable or study from the database for which no category assignment is possible as suggested by Chamberlin, Newton, and LePine (2017).

Ensure construct/category validity. A lack of construct validity in primary articles, i.e., when variable labels are not consistent with the scale content (Chapman et al., 2005; Fassina, Jones, & Uggerslev, 2008), certainly also raises concerns for the validity of a meta-analysis. Construct invalidity occurs when authors of primary studies do not effectively measure what they intended to measure, i.e., when variable labels or definitions do not correspond with their operationalization (Churchill & Peter, 1984). As such, when coders develop categories solely based on variable labels and/or definitions, these results potentially in category invalidity and in turn, variance of meta-analytic results (see Table 6 & 7).

We advise coding variable labels, definitions, and measurement items as documented by the original authors. This 1:1 approach brings several advantages. First, coding the original information allows authors to reassure themselves at any point of the process of coding and analysis what authors of the original studies measured or intended to measure. Second, coding measurement items enables researchers to categorize on the basis of what has actually been measured rather than on the basis of what the original author intended to measure. This results in a higher degree of validity of the meta-analysis (Christian et al., 2010; Damanpour, 1991; Zhao et al., 2007). Third, coding original variable labels of primary studies allows detecting whether there is

more uniformity or rather variety in the use of variable labels when investigating the same phenomenon (Lipsey & Wilson, 2001). Informing the research community about the degree of uniformity or variety of variable labels can increase researchers' awareness to work towards greater construct consistency (e.g., functional diversity also labeled as multifunctional teams or expertise diversity).

For the scenario where the coded measurement items reveal that two different variables are measured under the same construct, we suggest adopting a two-third cutoff approach (Chamberlin et al., 2017). Thus, when analyzing the coded measurement items, we suggest that when two thirds of the items match the category, it should be coded as such. An alternative is also to classify such variables into a mixed or other category to enhance the meta-analysis' validity. In the case of team performance, researchers sometimes decided to aggregate team efficiency and team effectiveness under the same construct (e.g., Ancona & Caldwell, 1992b) which the authors of the meta-analysis example discussed above classified as mixed performance outcome.

4.4.4 Step 4: Reporting Coding Procedures

Methodological transparency has recently gained much attention from the research community as retractions of published studies have increased and findings are not reproducible (Aguinis et al., 2018). Indeed, coding decisions and explanations about 'How' authors coded articles remain mostly unreported in meta-analyses (see Table 4 & Appendix E). Hence, coder bias can remain unrevealed, which not only is detrimental for the single meta-analysis but also can potentially have impact on future research referring to the biased meta-analysis. As we have seen above, many aspects in the coding process require normative decisions or subjective judgement by scientists. These may vary substantially from coder to coder leading to variances in conclusions of the meta-analysis (Cooper, 2009). For other researchers to determine the credibility of a

meta-analysis and facilitating its replicability, the coding process needs to be reported transparently (Gibbert & Ruigrok, 2010).

Report decisions from steps 1-3. We recommend reporting the crucial aspects sensitive to impact the meta-analysis' findings which we have elaborated in the previous steps. Especially for high-inference parameters that were coded inductively, coding transparency can be further increased by reporting the main parameters and the related topics that were subject to discussion during coder meetings.

Specifically, this reporting entails for Step 1, the coding approach, documenting:

- how the meta-analysis' research goal informs the coding approach
- which parameters require deductive or inductive coding approaches

For Step 2, data extraction, we suggest reporting:

- in what respect / how the coding scheme evolved during the coding process (e.g., fine grained coding)
- how coders engaged in an iterative coding process
- if and how a pre-test was conducted and what its findings were leading to amendments to the coding scheme
- the coding scheme as an appendix to the meta-analysis

Step 3, categorization, is probably the most difficult to be reported in retrospect. For making it identifiable, which data went into a category, we recommend keeping records throughout the categorization process on the following information:

- which variables / type of data were aggregated and why
- how categories developed (e.g., in terms of scope and boundary conditions) and why they changed
- how validity of categories has been ensured

- inconsistency of variable labels and measurement items
- which variables were subject to inconsistencies between variable labels and measurement items and how coders decided to handle such issues of construct invalidity
- whether mixed variables were included into their meta-analysis and how coders categorized them (e.g., two-third cutoff criterion)
- whether the same data entries were subsumed among solely one or multiple categories, and if multiple, with which theoretical justification

Provide visual aids. We also suggest including visualizations representing the coding of studies. From our review of meta-analyses (see Table 4), we identified two best-practice evidence recommendations: the use of frequency tables (e.g., Jiang et al., 2012, see also Appendix E) and tables with key definitions, measurement items and selected references (e.g., Loignon & Woehr, 2018). An advantage of including a detailed frequency table representing the coding of the entire study sample is that it increases the transparency regarding how original authors grouped similar variables. Moreover, it also allows at a first glance the identification of highly researched variables as well as existing white spots in the research field (e.g., less research variables that might become crucial avenues for future research).

Another best-practice recommendation is to include a table displaying construct definitions and key measurement items derived from selected references (e.g., Heugens & Lander, 2009; Loignon & Woehr, 2018). Since coding is not always straightforward, such an operationalization table can offer additional guidance in the coding process to coders as well as increase the readers' understanding about how original authors proceeded with their coding .

Circumscribe intercoder reliability. It has become common practice to calculate intercoder reliability (e.g., Karna et al., 2016). The most frequently reported intercoder reliability measure is the agreement rate expressed in percent (agreed-on codes / total number of codes)

(Cooper, 2009). Another often-reported reliability measure is Cohen's Kappa. Instead of simply measuring the percent agreement, it considers that agreement can occur by chance (Cooper, Hedges, & Valentine, 2009). However, this measure is often criticized for how chance is integrated into the calculation as it assumes that coders simply guess when they are not sure what to code (Uebersax, 1987).

In our review of meta-analyses, we found that authors seem to use intercoder reliability measures as a mean to justify coding decisions or claim that their coding is valid. However, these statistics only report the degree of coding agreement and cannot disclose whether the coding has been 'correct' or biased. We argue that coding consistency between coders is not something that happens by accident and should then be rated by a number. Instead, coding consistency should be the natural product of close collaboration between coders and part of an iterative process. As such, the explanatory power of this single number is limited.

Additionally, we identified in our review of meta-analyses that predominantly aggregated intercoder reliability measures are reported instead of measures for single coding parameters (see Table 4). Aggregate measures calculated across all parameters regardless of their degree of inference obscure, which parameters have been subject to debate in the coding process. Thus, we recommend reporting intercoder reliability measures for single parameters, especially high-inference parameters. However, reporting the isolated statistic is of course not sufficient to claim valid coding. Often high-inference parameters involve complex back and forth between data and evidence and, hence, are exposed to many subjective judgements. As such, researchers should regard the intercoder reliability measure as an accompanying information knowing that by itself it cannot provide quality control.

Besides the intercoder reliability measures for single high-inference parameters, we advise providing insights disclosing how the reliability level has been achieved. This could involve

documenting how the initial coding scheme has been adapted in the course of coding and how the pre-test of the data extraction procedure has trained coders and shaped decision rules (see Step 2). Further, instead of only stating that regular coder meetings took place, we recommend reporting what the content of these discussions were. Specifically, what were problematic parameters, what were the difficulties coders faced, why did their codes not match, how did they decide in case of debate, in what way could these have been coded differently, which categories underwent heavy regroupings and why and, ultimately, how processual decisions potentially impact findings.

In our view, due to the limited explanatory power of intercoder reliability measures in general, we recommend using the simplest statistic (i.e., agreement rate in percentage) as it should only serve as an indicator. We suggest calculating reliability measures at the very beginning, e.g., after the pre-test, and as needed for coder meetings, as well as at the end of the coding process. Documenting an improvement of consistency and explaining where it stems from adds to the credibility and traceability of the coding process.

Finally, we suggest that authors of meta-analyses should put their coding decisions into context of extant similar meta-analyses. Demonstrating how similar or different their findings are from prior meta-analyses helps to understand how coding decisions adopted in other meta-analyses might diverge from the own coding and thus influence results. For example, Berry, Sackett, and Tobares (2010) decided to check for robustness of their meta-analytical results by analyzing how similarly they coded the same set of studies as James et al. (2005). By doing so, they realized that they coded most of the variables very similarly as James et al. (2005) and consequently obtained almost the same results. In order to perform such robustness tests, it is crucial that authors provide information about their coding process and the coding of their study sample, so that replicability of findings for future studies is guaranteed. Referring to our review of meta-analyses, we found that only a few authors provided their coding schemes (e.g., Knight,

Patterson, & Dawson, 2017). Therefore, we would like to encourage future scholars to include their coding schemes with the extracted data in the online Appendix, which would be the ideal way of providing coding transparency.

4.5 Conclusion

The present study found evidence for the lack of coding transparency, which blurs the rigorousness and credibility of reviews. Our analysis of 124 meta-analytic reviews published in leading journals demonstrated that authors are mainly concerned with the reporting of 'Who' conducted coding and 'What' information has been coded, instead of 'How' they proceeded with their coding of primary studies. Our sample consisting predominantly (72%) of studies published between 2005 until 2019 support prior researchers call that even today a high degree of undisclosed actions in review articles exist (Aguinis et al., 2018; Wanous et al., 1989). One explanation for this phenomenon could be that existing guidelines for conducting reviews (Tranfield et al., 2003; Wanous et al., 1989) limited their recommendations to the reporting of number of coders ('Who'), intercoder reliability and type of coded variables ('What').

With this article, we aim to initiate the discussion on this important topic and to create a shared awareness among scholars that coding is not a straightforward task. Indeed, we want to stress that coding is a task requiring a high degree of decision-making that needs to be transparently documented to facilitate the assessment of a meta-analysis' quality. We think that our coding guideline has the potential to enhance the methodological rigor in reviews as it provides a conceptual template that future researchers can use to guide their coding process and subsequent reporting. To work towards greater coding transparency in meta-analyses, we suggest that editors should encourage authors to make use of the conceptual template discussed in this article. Every meta-analysis adopting the suggested recommendations will testimony for the need of increased

coding transparency and at the same time shape the foundation on which the next generation of meta-analytic reviews builds upon.

5 GENERAL CONCLUSION

The overarching goal of my dissertation was to find out what we already know about ICVTs. In particular, I intended to clarify the conceptual boundaries of the ICVT phenomenon and to identify its respective success factors. For this purpose, I investigated the extant literature on ICVTs to depict the current state-of-the-art in a nomological IMO-framework presented in chapter 2. Systematically reviewing the ICVT literature allowed me to identify a set of variables that have been studied in the context of ICVTs. To verify to which extent a variable can be considered a success factor, I meta-analytically analyzed the data collected in primary studies in chapter 3. Conducting these analyses synthesizes the knowledge we have about ICVTs and helps to clarify the reasons of variability in empirical findings. Moreover, the systematic literature review (*Study 1*) and meta-analytic review (*Study 2*) served as a foundation for the conceptual article on coding (*Study 3*) presented in chapter 4. Together with my research colleagues, I conducted an analysis about the rigor of coding transparency applied in published meta-analyses on which basis we jointly elaborated a guideline that enhances the rigorousness of coding transparency in future meta-analytic reviews.

In *Study 1*, I provided a comprehensive overview of the different variables that have been studied about the ICVT phenomenon so far. Thus, *Study 1* addressed the question of 'Which input, mediator and outcome variables have been studied in the context of ICVTs?'. To answer this question, I applied a systematic literature review approach (Tranfield et al., 2003) that yielded a sample of 113 quantitative empirical articles. Overall, I identified 25 independent variables and six dependent variables that researchers used when studying the ICVT phenomenon (see Figure 2). In terms of popularity, I found that functional diversity is the most highly researched team input variable whereas team cohesion is a highly investigated emergent state. By systematically

reviewing the ICVT literature, I contribute to a holistic understanding of what key variables of the ICVT phenomenon are (i.e., team compositional inputs, team processes, emergent states and performance outcomes), and how they are related to a variety of performance outcomes. Most importantly by identifying different performance outcomes and allocating them on different level of analysis (team- vs. product-level performance) I also shed light onto the black box of performance measurement of innovative teams in the corporate context which has been less systematically addressed in team research (Ilgen, 1999; Mathieu et al., 2008). Therefore, *Study 1* guides future scholars interested in conducting research on ICVTs by providing clarity about the conceptual boundaries of what an ICVT is and how it is different from other team types. Moreover, *Study 1* also highlights several blank spots where future research is needed to unravel the true nature of the unconventional journeys of ICVTs.

With *Study 2,* I wanted to understand what team- and firm-level inputs, team processes, and emergent states are success factors for specific ICVT performance outcomes. Drawing on 70 independent empirical studies (8'731 teams) conducted over the past two decades I investigated why there is still equivocality among primary results despite the high scholarly attention of certain variables (e.g., functional diversity). For this purpose, I meta-analytically reviewed theoretically justified constructs identified in *Study 1* and showed which team inputs, emergent states and processes are most important for what type of performance outcome (e.g., team innovativeness, new product novelty etc.). In this regard, this meta-analysis is to the best of my knowledge one of the first attempts of meta-analytically analyzing on fine-grained performance outcomes such as team innovativeness or new product novelty (cf. Beal et al., 2003). Focusing on explaining the criterion variable of performance, I substantially extend team- and entrepreneurship literature by conceptually clarifying the black box of performance of highly innovative teams as I display key metrics for both the team- as well as product-level of analysis. Besides identifying success factors

for specific ICVT performance outcomes, I also investigated whether the perception of a success factor as such depended on the rater's perspective (team member, team leader or manager rating). For this purpose, I performed a subgroup analysis where I used rating source as a moderator. The analysis revealed that rating source moderated 10 of 24 bi-variate relationship suggesting that team members, leaders and managers differ in their perceptions about what a success factor is to them. Moreover, I also responded to researchers' calls (Bunderson & Sutcliffe, 2002; Sivasubramaniam et al., 2012) to test whether measurement differences of functional diversity, which is one of the core constructs in ICVT research, leads to substantial differences in magnitude and direction of relationships. Indeed, I found support for prior researchers' calls that depending on how the construct is measured (objective vs. perceived measurements) causes variance in meta-analytic results.

In *Study 3*, together with my research colleagues, I investigated with what rigor meta-analysts reported their underlined coding decisions. For this purpose, we analyzed 124 meta-analyses published in leading academic journals (e.g., Academy of Management, Journal of Management etc.) and found evidence for the lack of coding transparency provided by authors. Our findings document that meta-analysists were mainly concerned with the reporting of 'Who' conducted the coding (e.g., number of coders) and 'What' information has been coded (e.g., type of variables) instead of 'How' they actually proceeded with the coding of primary studies (e.g., choice of coding approach). On the bases of these results, we contacted the first authors of the meta-analyses considered in this research to learn more about how editors and reviewers addressed the questions of 'Who', 'What' and 'How' during their review process. The answers obtained from this inquiry indicate that the 'How' question was indeed less of an issue for the team of reviewers. To raise awareness for the importance of reporting 'How', we used *Study 2* to demonstrate that 'How' to code decisions can reveal crucial answers for the existing controversy

of findings in a research field as well as cause variance in meta-analytic results. With the aim to promote methodological rigor in meta-analyses, we finally developed a guideline for researchers suggesting how coding can be performed in a more rigorous, efficient, transparent, and replicable way.

5.1 Limitations

In the following, I would like to pinpoint at the limitations related to each of the three studies. In *Study 1*, I recognize limitations inherent to every systematic review, that are, a potential bias of the review's sample due to selection criteria for studies, the lack of information in the study samples due to inadequate details provided in primary studies about the characteristics of the studied teams and the limited ability to provide statistically based findings. To address the latter issue, I conducted *Study 2* where I meta-analytically regressed the identified relationships in *Study 1*.

Concerning the limitations of *Study 2*, I recognize that I am limited in making causal inference because the majority of primary studies included in the meta-analysis' sample used cross-sectional data. Second, the small number of correlations for some constructs makes the meta-analytic results also subject to second-order sampling error, which stem from the sampling of studies in the meta-analysis (Hunter & Schmidt, 2004). Moreover, despite the robustness of the results indicated by the high Fail-safe K, I recommend to interpret the meta-analysis' results with caution.

For *Study 3*, I would like to highlight that our recommendations for the coding process should not be used in the sense of a cooking recipe or a checklist to be ticked off. Rather, it should serve as an orientation of the main key points that need to be considered and provide a conceptual template for the coding process and the subsequent reporting. Depending on the spe-

cific research question of the meta-analysis, the research discipline, and the experience of the coders, the relevance of each of the sub-step in our guideline and the extent to which iterations are necessary vary. Further, our guideline cannot serve as a guarantee for meaningful meta-analytical results per se, as there are many other aspects influencing the quality of findings. Besides the 'How' of coding, the selection of studies in terms of the number, the accurateness, and the quality of the studies ('What' of coding), as well as the experience and diligence of the coders ('Who' of coding) are also important factors to the overall findings of the meta-analysis.

5.2 Contribution and Implications for Theory and Research

In the following, I am going to discuss the contributions related to each of the three research studies in greater detail. The initial challenge of my dissertation was the pertinent lack of conceptual foundation about what an ICVT is and what it is not. While searching for relevant ICVT literature for my systematic literature review, I found that scholars referred to a variety of terminologies such as innovation project teams (Weiss et al., 2011), cross-functional new product development teams (Slotegraaf & Atuahene-Gima, 2011), multidisciplinary teams (Van Der Vegt & Bunderson, 2005), autonomous teams (Patanakul et al., 2012), new product teams (McDermott & O'Connor, 2002), or product innovation teams (Taylor & Greve, 2006) to refer to teams performing internal corporate venturing activities (i.e., new product develompent, innovation , cross functional knowledge integration, or R&D; Sharma & Chrisman, 1999). Building on prior research on teams and internal corporate venturing (Burgelman, 1983; Crockett et al., 2013; Hill & Hlavacek, 1972; Management Review, 1967), this dissertation offers a multi-faceted definition of what an ICVT is: *a strategic mean of corporations to identify and explore new business opportunities that its existing business units are unable to address; a group of internally-staffed individuals from different functional units developing ideas that yet have no immediate commercial val-*

ue or organizational fit with existing routines and processes; and a project-based entity with a temporary life span where in case of venture success the ICVT will either transform into a new business unit for the corporation or be integrated into existing operations. With this definition, I provide future ICVT research the conceptual boundaries to distinguish their research phenomenon from other team types. Relatedly, this dissertation aims at the promotion of the terminological coherence in the research field suggesting that scientists interested in this team phenomenon should refer to the term ICVT when studying teams in the context of internal corporate venturing. Coherence in the application of the ICVT terminology would allow the research community to identify fellow scholars studying ICVTs more rapidly, building upon one another's knowledge and ultimately, create a more focused research stream.

With this dissertation, I also contribute to team- and entrepreneurship literature, which has predominately focused on the left hand side of the IMO framework (team inputs, processes and emergent states) resulting in a lack of clarity about how performance in highly innovative teams is measured (Ilgen, 1999; Mathieu et al., 2008). In this dissertation, I identify a set of performance outcomes on two levels of analysis (team- and product-level) and provide definitions, key metrics and selected references for each outcome. In *Study 2*, I meta-analytically regress each of the independent variables on single performance outcome. The results show that every performance outcome (e.g., team efficiency, team effectiveness, team innovativeness etc.) has a different set of success factors. For example, team learning, team reflexivity and team cohesion have the strongest relationship with team innovativeness whereas psychological safety and transformational leadership have the strongest relationship with team effectiveness. Hence, these findings suggest that scientists conducting primary research but also meta-analyses should use performance outcomes that are mutually exclusive (e.g., not aggregate team efficiency with team effectiveness) and ideally, use outcomes attributed to different level of analysis (e.g., individual-,

team-, product-, firm-level etc.). This would allow researchers to provide more specific managerial implications such as how team leaders can enhance team efficiency or team innovativeness, which are not only distinct theoretical constructs but also treated differently in practice.

Building on this, I furthermore demonstrate how the decision to opt for a fine-grained coding approach for the performance construct in *Study 2* revealed insightful answers to the ongoing scholarly debate about whether functional diversity in ICVTs is beneficial or detrimental for an ICVT's success. The findings in *Study 2* show that functional diversity only becomes a significant success factor for performance on the product-level of analysis but remains highly unrelated to team-level performance outcomes. Therefore, the decision to meta-analytically regress on fine-grained outcomes as suggested in our coding guideline (*Study 3*) was crucial to enlighten the debate about the controversy of findings about the impact of functional diversity on performance. This finding should also raise researchers' awareness about the added value that a fine-grained coding approach has when regressing on single performance outcomes (e.g., team innovativeness) instead on aggregated performance outcomes (e.g., performance). In fact, if I had coded outcome variables from primary studies as aggregated performance without delineating fine-grained performance outcomes, I would have not unraveled one explanation for the controversy of findings of the functional diversity-performance relationship as a broad-brush coding approach (e.g., only using one aggregated performance outcome as dependent variable) would have meant the loss of insightful information.

Besides identifying success factors for specific performance outcomes in ICVTs, this dissertation (*Study 2*) also provides answers to the question from whose perspective (team member, team leader, manager rating) a team facet is considered a success factor. My findings show that 10 of 24 bi-variate relationships are moderated by rating source. For example, the team tenure-performance relationship changes the direction of relationship depending on the rater's perspec-

tive. Whereas team members perceive team tenure as detrimental for performance, team leaders perceive team tenure as a crucial success factor for the ICVT's performance suggesting their interest in maintaining team stability. Manager ratings instead show their impartiality towards the role of team tenure for performance. This finding suggests that researchers who have the team as the unit of analysis should use rating source as a moderator to provide more nuanced findings about the importance that different people (team members, team leaders and managers) attribute to the same team facet.

Together with my research colleagues, I also address the topic of coding (*Study 3*). The purpose of *Study 3* is to contribute to the practice of coding in meta-analyses by shedding light on the question of 'How' the coding process can be conducted in the most coherent, efficient, reliable, valid an credible way. Based on our systematic review of 124 meta-analyses published in leading academic journals, we found evidence that meta-analysts predominantly report 'Who' conducted the coding and 'What' information was coded, but provide little information on 'How' they proceeded with their coding. Hence, this insufficient disclosure of the coding process and the underlined coding decisions ('How' of coding) affects the transparency, reproducibility and accuracy of a meta-analysis' findings. By means of *Study 2* (meta-analysis on ICVTs), we empirically illustrate the importance of 'How' for meta-analytic conclusions. Specifically, we demonstrate that coding decisions ('How') can unravel the heterogeneity of primary study findings as well as cause variances in meta-analytic results. With this empirical illustration, we aim to raise scholars' awareness about the crucial role that the task of coding plays and the necessity to transparently document their adopted coding process ('How') as it can drastically influence the meta-analytic conclusions upon which an entire research community builds upon.

Furthermore, we found support that extant guidelines for conducting meta-analytic research did not offer deep insights and suggestions concerning the coding process (e.g., Cooper et

al., 2009, Wanous et al., 1989), which might partially explain why scholars lack in diligently reporting their coding process ('How'). To address this issue, we developed a four-step coding guideline for researchers on 'How' to consciously design the coding process to arrive at a rigorous, efficient, transparent, and replicable coding. Hence, the main contribution of *Study 3* is our coding guideline that allows meta-analysts to better grasp what good coding practice entails, what the main pitfalls are, and to what extent the coding process should be reported. This should not only guide meta-analysts, but also inform reviewers and editors how to support meta-analysts to increase the quality of their coding and ultimately, elevate the validity of their meta-analytical review. As such, our study seeks to contribute to a higher quality standard for meta-analyses: A standard for the reporting of coding that should yield consistency between meta-analyses, potentially promoting an interdisciplinary dialogue, and making it easier for future research to be built upon.

5.3 Recommendations for Future Research

This dissertation provides several recommendations for future research. First, I suggest that researchers studying teams in the context of internal corporate venturing should agree on using the same terminology (e.g., ICVT) to define the research phenomenon. Second, the IMO-framework depicting the current state-of-the-art in ICVT research also identifies existing blank spots (e.g., the role of full vs. part-time members in ICVTs) where future research is needed for the continuing development of our understanding about how ICVTs function. Third, future research should use a variety of performance outcomes when studying the relationship with team inputs, processes or emergent states to assure the robustness of their results but also to be able to give precise managerial recommendations in terms of what beneficiates team efficiency rather than team innovativeness. Fourth, scholars studying ICVTs should take into consideration that

venture failure is rather the rule than the exception and thus, shift their focus from solely explaining the success of ICVTs towards what leads to venture failure. Fifth, I suggest scholars who are planning the coding procedure of their meta-analysis to consult our coding guideline, which offers numerous recommendations concerning the task of coding in meta-analytic research. In the following, I am going to elaborate these suggestions further.

One challenge that the ICVT literature currently poses is the lack of terminological consistency with authors referring to a variety of terminologies such as cross-functional new product development teams (Slotegraaf & Atuahene-Gima, 2011), multidisciplinary teams (Van Der Vegt & Bunderson, 2005) or product innovation teams (Taylor & Greve, 2006) to define the ICVT. Consequently, the search for ICVT literature is challenging and conclusions remain fragmented across multiple studies. This dissertation synthesized the conceptual boundaries of this team phenomenon, presents a unifying terminology (ICVT) and proposes a multi-faceted definition for ICVTs. Thus, I suggest that future researchers studying teams performing internal corporate venturing use the ICVT terminology and provide more detailed descriptions about their study sample in terms of how their research subject is different from other team types (e.g., R&D teams). Providing richer information about the peculiarities of the ICVT under examination would also enhance the further development of conceptual boundaries of this team phenomenon.

Systematically reviewing the extant literature allowed me identifying a set of variables that has been studied about ICVTs, determine which of these team facets have received more scholarly attention than others and elaborate fruitful avenues for future ICVT research. For example, even though functional diversity has received the most scholarly attention, I found that the construct is still measured with the most superficial measurement scale (number of functional roles present in a team; cf. Brown & Eisenhardt, 1995) despite suggested alternative conceptualizations (cf. Bunderson & Sutcliffe, 2002) that would capture the actual breadth and depth of

functional skills in a team (e.g., measure time spent of every team member in what type of functional areas during their careers). As shown in *Study 2* and prior team meta-analyses (Bell et al., 2011; Sivasubramaniam et al., 2012), measurement differences of functional diversity indeed lead to variances in meta-analytic results. Thus, researchers studying the role of functional diversity in teams should apply the suggested alternative conceptualizations by Bunderson and Sutcliffe (2002) to assure the robustness of their empirical results.

Another blank spot in ICVT literature is the relationship between team tenure and performance. I found that team tenure was very often treated as a control variable in primary studies but never as a focal construct. For example, a few studies investigated the role of part- vs- full-time membership in ICVTs (e.g., Carbonell & Rodriguez, 2006). Regarding the findings in *Study 2,* where I show that the team tenure-performance relationship is moderated by rating source (team members favoring membership turnover and team leaders keeping team stability) I suggest future research to investigate the following research questions: What are internal and external forces that drive members of the ICVT to leave the team? How are people elected to join the ICVT (is it on a voluntary basis, firm-internal boot camp, external hiring process)? Do part-time ICVT members feel pressure from their home functional units and if yes, how do they cope with this pressure while being on the ICVT project? Answering these questions would provide venture managers and leaders insight about the ecosystem in which ICVT members operate and help them to manage the complexity of these relationships. There are also blank spots related to team process variables, where I observed a tendency of scholars studying 'action processes' instead of 'transition' or 'interpersonal processes' (Marks et al., 2001). For instance, team adaptation (Burke et al., 2006) is likely to denote an important transition process in ICVTs as projects are characterized by high levels of risk and uncertainty (Keil et al., 2009) and require the team to adapt to given circumstances. Accordingly, future research on transition processes such as team adaptation could

enlighten venture managers and leaders how to steer their ICVTs to success despite high levels of incertitude.

With this dissertation, I delineated the different outcomes that have been used to measure an ICVT's performance. One of my findings is that team researchers often used a single performance outcome (e.g., team efficiency) to measure an ICVT's performance (e.g., Chen et al., 2013; De Dreu & West, 2001; Eisenbeiss et al., 2008). This is unfortunate as this decision limits an authors' ability to give managerial conclusions in a wider context such as to which extent a variable is beneficial for team efficiency but detrimental for team innovativeness. Thus, I suggest that team researchers should integrate a variety of performance outcomes ideally on different levels of analysis (e.g., team- and product-level) to ascertain the preciseness of their conclusions. In the context of meta-analytic research, this suggestion is very important as a fine-grained coding approach of performance and thus, regressing on a variety of performance outcomes might reveal crucial answers to existing controversy of findings in research (e.g., function diversity-performance relationship, see *Study 2*). Furthermore, I suggest that future research should identify performance outcomes through qualitative means that represent how venture managers and leaders today measure the performance of their ICVTs. Identifying performance outcomes targeting the specificity of the venturing activity would enhance the quality of ICVT studies as practitioners can more relate to a study's managerial implications.

Referring to outcome variables in ICVT research, I observed that scholars predominately focused on explaining positive ICVT outcomes such as new product financial success or new product novelty (e.g., Schulze & Hoegl, 2006; Song et al., 2006; Tsai, 2001). Considering the work context of ICVTs that is characterized by high levels of ambiguity and uncertainty (Covin et al., 2015), project failures mark a central outcome and are likely to be the rule rather than the exception (Keil et al., 2009). Most corporations are reluctant to share information on failed ICVT

initiatives (Garrett, 2010), so the corresponding knowledge gap in the literature might partly reflect the challenges of scholars to obtain adequate data on venture failure. Nevertheless, future research should put a greater emphasis on understanding what venture managers, team leaders and ICVT members perceive as failure, what drives these teams to fail and how failure might impact subsequent venture projects in a corporation.

Lastly, to work towards greater coding transparency in meta-analyses, we suggest that editors and the team of reviewers should encourage meta-analysts to make use of our conceptual template, which provides concrete recommendations on how to plan, conduct and report the coding process. Every meta-analysis adopting the suggested recommendations in our coding guideline will testimony for the need of increased coding transparency, promote an interdisciplinary dialogue and shape the foundation on which the next generation of meta-analytic reviews can build upon.

5.4 Summary

With this dissertation, I gained a comprehensive understanding about how scientists embraced the research phenomenon of ICVTs in team literature. In particular, I wanted to know what we already know and what we still do not know about these adventurous entities that reside within a corporation's boundaries but pursue unconventional ways for the identification of new businesses opportunities. For this purpose, I conducted a systematic literature review about ICVT research upon which I subsequently performed a meta-analysis to identify success factors for specific performance outcomes (e.g., team efficiency, team innovativeness, new product novelty etc.). Both reviews support scientists in the recognition of what aspects of ICVTs have already been investigated and where the blank spots for future research endeavors lay. For both reviews, I spent an extant amount of time coding and categorizing the extracted data from primary studies. Based on

this experience, I developed together with my research colleagues a coding guideline that helps scientist in planning, conducting and reporting their coding process in a more efficient, coherent, credible, valid and replicable way to overcome the existent lack of coding transparency present in meta-analytic research.

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APPENDICES

Appendix A: Details of the Studies included in the Systematic Literature Review

Author(s); *Journal*; Year	Number of teams	TEAM INPUTS								FIRM INPUTS			TEAM PROCESSES							EMERGENT STATES							TEAM OUTCOMES			PRODUCT OUTCOMES		
		Functional diversity	Team leadership	Team interdependence	Team proximity	Team autonomy	Team tenure	Prior experience	Full-/Part-time dedication	Firm support	Network position	Reward systems	Team learning	Team reflexivity	Team communication	Team collaboration	Team coordination	Team conflict	Goal clarity	Psychological safety	Team support for innovation	Job stress	Team cohesion	Transactive memory system	Team work excellence	Shared vision	Team efficiency	Team innovativeness	Team effectiveness	New product financial success	New product novelty	Speed to market
TOTAL	11005	33	28	7	5	10	24	7	2	24	6	2	22	22	38	13	13	14	11	12	15	12	31	4	5	7	39	36	28	29	25	21
Acikgöz; *IJIM*; 2017	133															X														X		X
Akgün, Byrne, Keskin, Lynn, Imamoglu; *I&M*; 2005	69				X		X						X		X		X							X						X		X
Akgün, Byrne, Keskin, Lynn; *IEEE*; 2006a	79												X										X	X						X		X
Akgün, Lynn, Byrne; *JoPIM*; 2006b	319												X	X	X							X								X		
Akgün, Keskin, Byrne; *JoPIM*; 2010	83												X							X	X									X		X
Akgün, Lynn, Yilmaz; *IMM*; 2006	165												X																	X		
Ancona, Caldwell; *ASQ*; 1992a	45													X									X				X		X			
Ancona, Caldwell; *OSci*; 1992b	45	X					X								X		X										X	X				
Atuahene-Gima; *AMJ*; 2003	-					X							X	X	X	X						X	X				X	X			X	X
Blindenbach-Driessen; *IEEE*; 2015	142	X				X				X	X				X															X	X	
Burningham, West; *SGR*; 1995	13																			X	X		X					X				
Cabrales, Medina, Lavado, Cabrera; *R&DM*; 2008	-	X								X		X																			X	
Caldwell, O'Reilly; *SGR*; 2003	29									X						X					X		X				X	X				
Carbonell, Rodriguez; *JoBR*; 2006	183	X			X		X	X	X																			X				X
Carbonell, Rodriguez; *IMM*; 2013	197		X																								X		X	X		
Chen; *CIM*; 2006	-																															
Chen; *IEEE*; 2007	102	X					X			X					X		X		X								X			X	X	X
Chen, Farh, Campbell-Bush, Wu, Wu; *JoAP*; 2013	95		X																		X							X				
Chen, Neubaum, Reilly, Lynn; *JoOM*; 2015	212					X		X					X		X	X											X			X	X	X

Note. This table contains all studies that were included in the systematic literature review (N=113). The number of studied teams is not always indicated. Rows represent the articles and columns the variables of our IMO framework. Crosses indicate that a variable was used in a respective article. Categorization of variables is based on our IMO framework and might vary from the original article.

Author(s); *Journal*; Year	Number of teams	TEAM INPUTS								FIRM INPUTS			TEAM PROCESSES							EMERGENT STATES							TEAM OUTCOMES			PRODUCT OUTCOMES		
		Functional diversity	Team leadership	Team interdependence	Team proximity	Team autonomy	Team tenure	Prior experience	Full-/Part-time dedication	Firm support	Network position	Reward systems	Team learning	Team reflexivity	Team communication	Team collaboration	Team coordination	Team conflict	Goal clarity	Psychological safety	Team support for innovation	Job stress	Team cohesion	Transactive memory system	Team work excellence	Shared vision	Team efficiency	Team innovativeness	Team effectiveness	New product financial success	New product novelty	Speed to market
Chen, Lim, Tan, Ling; *JGIM*; 2018	96	X					X																X							X	
Cheung, Gong, Wang, Zhou, Shi; *HR*; 2016	96	X													X													X				
Chi, Huang, Lin; *GOM*; 2009	67						X																					X				
Chong, Van Eerde, Chai, Rutte; *IEEE*; 2011	81						X										X					X	X			X	X	X			
Clegg, Unsworth, Epitropaki, Parker; *JoO&OP*; 2002	-		X							X																		X				
Covin, Garrett Jr., Gupta, Kuratko, Shepherd; *ET&P*; 2016	-									X			X		X				X							X			X		
Crockett, McGee, Payne; *JoPIM*; 2013	78	X				X				X													X			X				X	X	
Dayan, Di Benedetto, Colak; *R&DM*; 2009	107		X										X					X		X										X		X
Dayan, Di Benedetto; *RP*; 2011	155	X																													X	
Dayan, Elbanna; *JoPIM*; 2011	155					X																X		X						X		X
Dayan, Elbanna, Di Benedetto; *IEEE*; 2012	103	X																X	X												X	X
De Dreu, West; *JoAP*; 2001	49		X											X				X				X						X				
De Dreu; *EJoW&OP*; 2002	32													X														X	X			
De Dreu; *JoM*; 2006	50														X	X		X									X	X				
Denison, Hart, Kahn; *AMJ*; 1996	43		X			X				X			X	X			X		X				X				X	X	X			
Edmondson; *ASQ*; 1999	51		X				X			X			X	X						X									X			
Eisenbeiss, van Knippenberg, Boerner; *JoAP*; 2008	33		X																		X		X		X			X				
Eisenhardt, Tabrizi; *ASQ*; 1995	72	X																									X				X	X
Faraj, Sproull; *MSci;* 2000	69							X									X							X			X		X			
Fedor, Ghosh, Caldwell, Maurer, Singhal; *DSci; 2003*	48		X							X					X														X			
Garcia Martinez, Zouaghi, Marco; *R&DM*; 2017	-	X								X																				X		
Glynn, Kazanjian, Drazin; *JoPIM*; 2010	-																						X					X				
Gu, Wang, Wang; *R&DM*; 2013	151						X						X		X					X	X		X			X			X				
Haon, Gotteland, Fornerino; *ML*; 2009	-	X					X								X															X		
Hirst, Mann; *R&DM*; 2004	56		X											X	X				X	X							X					
Hirunyawipada, Paswan; *JoBR*; 2013	-	X						X											X									X			X	
Hoegl, Gemuenden; *Osci*; 2001	145														X	X	X						X				X		X			

Author(s); *Journal*; Year	Number of teams	TEAM INPUTS								FIRM INPUTS			TEAM PROCESSES							EMERGENT STATES								TEAM OUTCOMES			PRODUCT OUTCOMES		
		Functional diversity	Team leadership	Team interdependence	Team proximity	Team autonomy	Team tenure	Prior experience	Full-/Part-time dedication	Firm support	Network position	Reward systems	Team learning	Team reflexivity	Team communication	Team collaboration	Team coordination	Team conflict	Goal clarity	Psychological safety	Team support for innovation	Job stress	Team cohesion	Transactive memory system	Team work excellence	Shared vision	Team efficiency	Team innovativeness	Team effectiveness	New product financial success	New product novelty	Speed to market
Hoegl, Parboteeah; *R&DM*; 2006	145													X													X		X			
Hoegl, Weinkauf, Gemuenden; *OSci*; 2004	39																X						X				X		X			
Howell, Shea; *GOM*; 2006	41	X					X								X																	
Hülsheger, Anderson, Salgado; *JoAP*; 2009	-	X		X			X																					X				
Im, Montoya, Workman; *JoPIM*; 2013	206																		X		X		X								X	
Janz, Wetherbe, Davis, Noe; *JoMIS*; 1997	27					X				X				X			X						X				X		X			
Joshi, Sharma; *JoMA*; 2004	165	X								X			X		X	X														X	X	
Keller; *AMJ*; 1986	32						X						X										X				X		X			
Keller; *JoM*; 1992	66		X																			X					X					
Keller; *AMJ*; 2001	93	X					X								X							X	X				X					
Keller; *JoAP*; 2006	118		X																								X		X			X
Keller, Julian, Kedia; *IEEE*; 1996	658		X														X											X			X	
Kock, Lynn, Dow, Akgün; *EJoIS*; 2006	462												X				X															
Lee, Sukoco; *R&DM*; 2011	77												X	X						X		X								X	X	
Leenders, Van Engelen, Kratzer; *JoPIM*; 2007	44						X								X			X										X				
Li, Li, Lin; *PR*; 2018	56		X			X	X							X							X							X				
Li, Mitchell, Boyle; *G&OM*; 2016	56		X																									X				
Liu, Chen, Tao; *JoPIM*; 2015	96		X				X								X	X											X			X		
Lovelace, Shapiro, Weingart; *AMJ*; 2001	43	X	X												X			X		X							X	X				
Lynn, Skov, Abel; *JoPIM*; 1999	95									X			X		X				X											X		X
Miron-Spektor, Erez, Naveh; *AMJ*; 2011	41																	X										X				
Nerkar, McGrath, MacMillan; *JBV*; 1996	168													X													X		X			
Nguyen, Chen, De Cremer; *APBR*; 2017	320												X			X		X														
Park, Lim, Birnbaum-More; *JoPIM*; 2009	62	X						X							X												X				X	
Patanakul, Chen, Lynn; *JoPIM*; 2012	555							X		X									X											X		X
Pearce, Ensley; *JoOB*; 2004	71													X		X	X						X			X						X
Pelled, Eisenhardt, Xin; *ASQ*; 1999	45	X					X											X									X	X				

Author(s); *Journal*; Year	Number of teams	TEAM INPUTS								FIRM INPUTS			TEAM PROCESSES							EMERGENT STATES							TEAM OUTCOMES			PRODUCT OUTCOMES		
		Functional diversity	Team leadership	Team interdependence	Team proximity	Team autonomy	Team tenure	Prior experience	Full-/Part-time dedication	Firm support	Network position	Reward systems	Team learning	Team reflexivity	Team communication	Team collaboration	Team coordination	Team conflict	Goal clarity	Psychological safety	Team support for innovation	Job stress	Team cohesion	Transactive memory system	Team work excellence	Shared vision	Team efficiency	Team innovativeness	Team effectiveness	New product financial success	New product novelty	Speed to market
Peltokorpi, Hasu; *JBP*; 2014	124														X					X											X	
Peters, Fletcher; *JoMM*; 2004	42																X			X			X				X		X			
Pinto, Pinto, Prescott; *MSci*; 1993	62			X	X											X													X			
Pirola-Merlo, Härtel, Mann, Hirst; *LQ;* 2002	54		X																	X	X		X		X	X			X			
Pirola-Merlo; *JoO&OP*; 2010	33																			X	X		X			X		X	X			X
Pushpa, Mathew; *IJoIM*; 2012	73															X															X	
Qiu, Qualls, Bohlmann, Rupp; *JoPIM*; 2009	50																			X			X				X		X			
Reuveni, Vashdi; *EJoW&OP*; 2015	55	X	X				X							X		X							X								X	
Rickards, Chen, Moger; *BJoM*; 2011	1103		X										X		X						X		X				X	X				
Rodriguez, Carbonell, Munuera-Aleman; *JoPIM*; 2010	-																	X				X					X		X	X		
Sarin, Mahajan; *JoMA*; 2001	65											X										X					X		X	X	X	X
Sarin, McDermott; *DSci*; 2003	52		X										X		X																X	X
Sarin, O'Connor; *JoPIM*; 2009	64		X												X			X														
Schulze, Hoegl; *JoM*; 2006	94												X	X	X												X			X		
Scott; *JoETM*; 1997	42	X	X							X					X								X				X					
Scott, Bruce; *AMJ*; 1994	-		X							X																		X				
Sethi; *JoMa*; 2000a	141	X													X							X								X		
Sethi; *JoAMSci*; 2000b	118			X	X	X	X				X												X							X		
Sethi, Nicholson; *JoPIM*; 2001	141			X	X		X			X	X														X					X		
Sethi, Smith, Park; *JoMR*; 2001	141	X								X											X		X								X	
Sivasubramaniam, Liebowitz, Lackman; *JoPIM*; 2012	-	X	X				X								X								X									X
Slotegraaf, Atuahene-Gima; *JoMA*; 2011	208						X			X				X				X													X	
Smith, Collins, Clark; *AMJ*; 2005	-	X								X	X				X						X										X	
Somech; *JoM*; 2006	136	X	X											X														X	X				
Somech, Khalaili; *G&OM*; 2014	60	X													X													X				
Song, Dyer, Thieme; *JoAMSci*; 2006	-																	X												X		
Spanjol, Tam, Qualls, Bohlmann; *JoPIM*; 2011	62																									X	X	X				X

Author(s); *Journal*; Year	Number of teams	TEAM INPUTS								FIRM INPUTS			TEAM PROCESSES							EMERGENT STATES							TEAM OUTCOMES			PRODUCT OUTCOMES		
		Functional diversity	Team leadership	Team interdependence	Team proximity	Team autonomy	Team tenure	Prior experience	Full-/Part-time dedication	Firm support	Network position	Reward systems	Team learning	Team reflexivity	Team communication	Team collaboration	Team coordination	Team conflict	Goal clarity	Psychological safety	Team support for innovation	Job stress	Team cohesion	Transactive memory system	Team work excellence	Shared vision	Team efficiency	Team innovativeness	Team effectiveness	New product financial success	New product novelty	Speed to market
Stoker, Looise, Fisscher, de Jong; *IJoRM*; 2001	-		X																			X						X			
Swink; *JoOM*; 1999	91								X	X																	X			X	
Thamhain; *JoPIM*; 1990	-					X		X		X					X			X	X			X					X		X			
Tjosvold, Tang, West; *G&OM*; 2004	100			X										X	X																	
Tsai, Ghoshal; *AMJ*; 1998	-										X				X											X						
Tsai; *AMJ*; 2001	-										X				X														X			
Van der Vegt, Janssen; *JoM*; 2003	41	X		X																								X				
Van der Vegt; Bunderson; *AMJ*; 2005	57	X											X	X	X								X				X	X	X			
Vera, Crossan; *OSci*; 2005	38	X													X						X											X
Watson, Kumar, Michaelsen; *AMJ*; 1993	36	X					X																						X			
Weiss, Hoegl, Gibbert; *JoPIM*; 2011	94									X				X							X	X					X		X			
West et al.; *LQ*; 2003	98		X											X							X				X		X	X				
Wong, Tjosvold, Liu; *BJoM*; 2009	101			X																					X							
TOTAL	**11005**	**33**	**28**	**7**	**5**	**10**	**24**	**7**	**2**	**24**	**6**	**2**	**22**	**22**	**38**	**13**	**13**	**14**	**11**	**12**	**15**	**12**	**31**	**4**	**5**	**7**	**39**	**36**	**28**	**29**	**25**	**21**

Appendix B: Details of Studies included in the Meta-Analysis

Author(s)/Journal/Year	Number of teams	TEAM & FIRM LEVEL INPUTS									TEAM PROCESSES										EMERGENT STATES				TEAM & PRODUCT LEVEL PERFORMANCE						
		Functional diversity	Transformational leadership	Participative leadership	Transactional leadership	Prior experience	Team interdependence	Team autonomy	Team tenure	Firm support	Team learning	Team reflexivity	Intra team communication	Inter team communication	External communication	Team collaboration	Team coordination	Task conflict	Relationship conflict	Goal clarity	Task complexity	Psychological safety	Team climate for innovation	Job stress	Team cohesion	Team efficiency	Team innovativeness	Team effectiveness	New product financial success	New product novelty	New product quality	Speed to market
Acikgöz; *IJIM*; 2017	133			X												X					X								X			X
Akgün, Byrne, Keskin, Lynn, Imamoglu; *I&M*; 2005	69								X		X		X				X			X	X								X			X
Akgün, Lynn, Byrne; *JoPIM*; 2006	319										X	X												X					X			
Akgün, Keskin, Byrne; *JoPIM*; 2010	83			X							X										X		X						X			X
Ancona, Caldwell; *OSci*; 1992	45	X												X			X									X	X						
Atuahene-Gima; *AMJ*; 2003	104							X			X	X	X	X										X	X	X	X			X	X		
Blindenbach-Driessen; *IEEE*; 2015	142	X						X		X				X															X	X			
Burningham, West; *SGR*; 1995	13																					X	X		X		X						
Caldwell, O'Reilly; *SGR*; 2003	29									X						X							X		X	X	X						
Carbonell, Rodriguez; *JoBR*; 2006	183	X				X			X												X												X
Chen; *IEEE*; 2007	102	X		X					X	X			X				X			X									X	X		X
Chen, Farh, Campbell-Bush, Wu, Wu; *JoAP*; 2013	95		X																			X				X						
Chen, Neubaum, Reilly, Lynn; *JoOM*; 2015	212					X		X																	X				X	X		X
Chen, Lim, Tan & Ling; *JGIM*; 2018	96	X							X																X					X		
Cheung, Gong, Wang, Zhou, Shi; *HR*; 2016	96	X											X													X						
Chi, Huang, Lin; *GOM*; 2009	67					X			X																		X						
Chong, Van Eerde, Chai, Rutte; *IEEE*; 2011	81								X								X				X			X	X	X	X	X				
Covin, Garrett Jr., Gupta, Kuratko, Shepherd; *ET&P*; 2016	145							X		X	X									X													
Crockett, McGee, Payne; *JoPIM*; 2013	78					X		X		X										X					X				X	X		
Dayan, Di Benedetto, Colak; *R&DM*; 2009	107		X	X	X		X				X								X		X								X			X
Dayan, Elbanna, Di Benedetto; *IEEE*; 2012	103	X																X		X										X		X
De Dreu, West; *JoAP*; 2001	21			X			X											X						X		X						
Denison, Hart, Kahn; *AMJ*; 1996	43		X				X	X		X	X	X					X			X					X	X	X					
Edmondson; *ASQ*; 1999	51			X					X	X		X										X			X			X				
Eisenbeiss, van Knippenberg, Boerner; *JoAP*; 2008	33		X																			X			X							

Note. Appendix contains all studies included in the meta-analysis (n=70). Rows represent articles and columns the constructs of the IMO framework. Crosses indicate the presence of a construct in a respective article.

Eisenhardt, Tabrizi; *ASQ*; 1995	72	X																							X				X		X
Faraj, Sproull; *MSci;* 2000	69					X											X									X		X				
Gu, Wang, Wang; *R&DM*; 2013	151								X		X		X									X	X		X		X					
Haon, Gotteland, Fornerino; *ML*; 2009	142								X																				X			
Hirst, Mann; *R&DM*; 2004	56		X	X	X							X		X						X		X				X						
Hirunyawipada, Paswan; *JoBR*; 2013	195	X				X														X									X	X		
Hoegl, Gemuenden; *OSci*; 2001	145												X			X	X								X	X		X				
Hoegl, Weinkauf, Gemuenden; *OSci*; 2004	39																X								X	X		X			X	
Howell, Shea; *GOM*; 2006	41	X	X						X						X										X							
Park, Lim, Birnbaum-More; *JoPIM*; 2009	62	X				X							X												X				X			
Im, Montoya, Workman; *JoPIM*; 2013	206																			X			X		X				X	X		
Janz, Wetherbe, Davis, Noe; *JoMIS*; 1997	27						X	X		X		X					X			X					X	X		X				
Joshi, Sharma; *JoMA*; 2004	165	X								X	X					X													X	X		
Keller; *AMJ*; 1986	32								X		X														X	X		X			X	
Keller; *JoM*; 1992	66		X	X	X																				X	X					X	
Keller, Julian, Kedia, *IEEE*; 1996	658		X														X										X			X	X	
Keller; *AMJ*; 2001	93	X							X				X		X									X	X	X					X	
Lee, Sukoco; *R&DM*; 2011	77											X									X	X		X				X	X			
Leenders, Van Engelen, Kratzer, *JoPIM*, 2007	44								X				X					X								X						
Li, Li, Lin; *PR*; 2017	56			X			X	X	X			X											X			X						
Liu, Chen, Tao; *JoPIM*; 2015	96			X					X				X			X									X							
Lovelace, Shapiro, Weingart; *AMJ*; 2001	43	X	X										X					X				X			X	X						
Lynn, Skov, Abel; *JoPIM*; 1999	95									X	X			X						X								X		X	X	
Miron-Spektor, Erez, Naveh; *AMJ*; 2011	41																	X							X		X					
Nerkar, McGrath, MacMillan; *JBV*; 1996	168											X													X		X					
Nguyen, Chen, De Cremer; *APBR*; 2017	320										X					X		X	X													
Patanakul, Chen, Lynn; *JoPIM*; 2012	555					X				X										X								X			X	
Pearce, Ensley; *JoOB*; 2004	71											X				X	X								X							
Pelled, Eisenhardt, Xin; *ASQ*; 1999	45	X							X									X	X		X											
Peltokorpi, Hasu; *JBP*; 2014	124						X						X									X							X			
Peters, Fletcher; *JoMM*; 2004	42																X					X			X	X		X			X	
Pirola-Merlo, Härtel, Mann, Hirst; *LQ;* 2002	54		X	X																		X	X		X			X				
Pirola-Merlo; *JoO&OP*; 2010	33																					X	X		X		X	X				
Reuveni, Vashdi; *EJoW&OP*; 2015	55	X	X						X			X				X								X					X			
Rickards, Chen, Moger; *BJoM*; 2001	1103		X		X						X				X								X		X	X						
Rodriguez, Carbonell, Munuera-Aleman; *JoPIM*; 2010	197																	X			X			X		X		X	X		X	
Sarin, Mahajan; *JoMA*; 2001	65						X														X			X		X		X	X	X	X	X
Schulze, Hoegl; *JoM*; 2006	94										X	X		X	X											X			X		X	
Scott; *JoETM*; 1997	42	X	X							X				X							X				X	X					X	
Sethi, Smith, Park; *JoMR*; 2001	141	X								X													X		X					X		
Slotegraaf, Atuahene-Gima; *JoMA*; 2011	208								X	X		X						X													X	
Somech, Khalaili; *G&OM*; 2014	60	X					X						X	X													X					
Stoker, Looise, Fisscher, de Jong; *IJoRM*; 2001	21/61		X	X	X																							X				
Van der Vegt; Bunderson; *AMJ*; 2005	57	X										X		X											X							
Weiss, Hoegl, Gibbert; *JoPIM*; 2011	94									X		X											X	X		X		X				
Total	**8731**	**20**	**14**	**12**	**5**	**8**	**8**	**8**	**18**	**15**	**14**	**15**	**13**	**9**	**4**	**8**	**12**	**9**	**3**	**12**	**10**	**11**	**13**	**9**	**28**	**25**	**20**	**16**	**17**	**18**	**15**	**12**

Appendix C: Variables, Definitions, Key Metrics and Selected References

VARIABLE	DEFINITION	KEY METRICS	SELECTED REFERENCES
Team-level performance outcomes			
Team efficiency	The degree to which the team adheres to schedule and budget objectives (Ancona & Caldwell, 1992b)	Team did a good job adhering to budget and meeting all of the schedule deadlines Team's project duration met the planned time schedule	Sarin & Mahajan, 2001 Atuahene-Gima, 2003
Team effectiveness	An overall measure of the team's current productivity and future capability to continue working together (Hackman, 1987)	Team met or exceeded customer expectations Satisfaction of the team with its own project performance Team has a reputation of work excellence Performance of our team advanced our image to the customers	Edmonson, 1999 Pirola-Merlo et al., 2002 Faraj & Sproull, 2000 Hoegl & Gemuenden, 2001
Team innovativeness	Extent to which the team makes use of its potential to innovate (own definition)	Degree of radicalness of the innovation developed by the team The team developed innovative ways of accomplishing work targets Number of suggested and actually implemented new ideas by the team Number of innovations introduced by the team Extent to which the team is considered an innovative team Number of creative accomplishments by the team in the generation of new ideas, methods or approaches The team produced knowledge that did not exist before The team made an outstanding contribution to scientific or technical development in its field	Miron-Spektor et al., 2011 Somech & Khalaili, 2014 Eisenbeiss et al., 2008 Lovelace et al., 2001 De Dreu & West, 2001 Leenders et al., 2007 Denison et al., 1996 Keller et al., 1996
Product-level performance outcomes			
New product financial success	An overall measure of financial success of the product in terms of relative profits, sales objectives or return on investment (Cooper & Kleinschmidt, 1987)	New product met or exceeded overall sales expectations, return on investment expectations or profit expectations Relative to our main competitors our product is less, equal or more profitable Degree to which the corporate parent would agree the ICVT to have met milestones such as cost reduction or market share	Akgün et al., 2010 Joshi & Sharma, 2004 Crockett et al., 2013
New product novelty	Novelty of the product in terms of newness to the market or product newness to the firm (both market and technological) (Kleinschmidt & Cooper, 1991)	Degree to which the product is new to the firm or industry Degree to which the product is considered radically different from industry norm This new product is very innovative compared with other products in terms of technology or market Number of team patents received	Joshi & Sharma, 2004 Hirunyawipada & Paswan, 2013 Park et al., 2009 Peltokorpi & Hasu, 2014
New product quality	An overall measure of the degree to which the product delivers value to the customer and meets the quality control standards laid out by the team/organization (Sarin & Mahajan, 2001)	The consumers of this product perceive our product to be better than our competitors The product had fewer technical problems The product fully met the quality expectations of our customers	Sarin & Mahajan, 2001 Lynn et al., 1999 Schulze & Hoegl, 2006
Speed to market	Time span between idea conception and product launch (Dayan & El-banna, 2011)	The product was developed and launched in less time than what is considered normal for our industry The product was developed much faster than other comparable products developed by our organization Top management team was very pleased with the time it took us to bring this product to market	Acigöz, 2017 Sarin & Mahajan, 2001 Lynn et al., 1999
Team-level inputs			
Functional diversity	Functional diversity is a highly job related diversity attribute that refers to the degree of functional diverse composition of the team (Webber & Donahue, 2001)	Number of functional areas represented on the team whose members are fully involved in the project (simple count, Blau or Teachman Index) Number of years of work experience in different functional areas Percentage of multi-knowledgeable team members with both marketing and technological knowledge to complement other team members Expertise diversity/ number of specialists on the team Perceived degree to which team members had diverse expertise or represented all the different work functions required to deliver the new product	Eisenhardt & Tabrizi, 1995 Cheung et al., 2016 Park et al., 2009 Van der Vegt & Bunderson, 2005 Hirunyawipada & Paswan, 2012

Transformational leadership	Transformational leadership is a person-oriented leadership style where leaders inspire their followers and stir them to look beyond their own self-interest for the good of the team (Bass, 1990)	Leader expresses enthusiasm and confidence about the success of the innovation Team leader challenges team assumptions about problems to ensure the best solution Our team leader is effective in going to bat with upper management to get what is needed for the team	Howell & Shea, 2006 Hirst & Mann, 2004 Denison et al., 1996
Participative leadership	Participative leaders consult with employees and take their ideas into consideration before making decisions (Chen & Tjosvold, 2006)	Team leader engages in activities to build relationships within the team Leader and members collectively exchange their points of view for taking decisions Team leader is available for consultation on problems	Pirola-Merlo et al., 2002 Liu et al., 2015 Edmonson, 1999
Transactional leadership	Transactional leaders is a task oriented leadership style and focuses primarily on task accomplishment (Burke, 2006)	Team leader schedules the work to be done and monitors the meeting of deadlines Leader establishes standards and priorities for task accomplishment Team leaders tend to keep the team focused on tasks that are necessary for success	Keller, 1992 Hirst & Mann, 2004 Rickards et al., 2001
Prior experience	Prior experience refers to the team's experience in using a similar a technology (Crockett et al. 2013), developing a similar product or operating in a similar market (Chi et al. 2009).	Team members had prior experience with using similar technology or developing similar products Aggregated industry experience in number of years Number of years performing specific tasks (experience)	Park et al., 2009 Chi et al., 2009 Crockett et al., 2013
Team interdependence	Team interdependence reflects how team member rewards and goals are linked to the performance of the team (outcome interdependence; Wageman, 1995) and how team members depend on each other to complete their task (task interdependence; Hackman, 1969).	Degree to which rewards are distributed uniformly among team members Team member's performance depends upon the performance of the team Our job is not finished until everyone on the team has finished his job Extent to which team members are dependent on one another to carry out their tasks and perform effectively	Sarin & Mahajan, 2001 Denison et al., 1996 Janz et al., 1997 Peltokorpi & Hasu, 2014
Team autonomy	Team autonomy reflects the autonomy of a project team to make decisions about operational goals and tasks (Atuahene-Gima, 2003)	Degree of the team's planning autonomy regarding setting of venture goals or timetable for achieving milestones Extent to which the team requires approval from the top management of the parent company to take decisions in different areas such as HR or strategy	Covin et al., 2016 Crockett et al., 2013
Team tenure	Team tenure refers to the average number of years each member had worked in the team (Edmonson, 1999).	Average number of years team members had been part of the team Team members who were on the team remained on it through completion	Leenders et al., 2007 Carbonell & Rodriguez, 2006
Firm-level inputs			
Firm support	Firm supports entails provision of financial resources to the team (Weiss et al., 2011) as well as top management team support (Scott, 1997)	Senior management is very actively involved in the project Senior management expresses verbal commitment to the venture success Rank of the venture on the company's overall business agenda Adequate resources were provided to the team when they were required Innovation expenditure share of sales	Sethi et al., 2001 Covin et al., 2016 Crockett et al., 2013 Patanakul et al., 2012 Martinez et al., 2017
Team processes			
Team learning	Team learning refers to how members of a team learn within the context of their own team (Lynn et al., 1999).	Team monitors and learns about new technology developments Team learns a lot from their mistakes The project involved numerous failed experiments and the actual new product that we took to market was very different from our initial expectation Team did an outstanding job discovering technical shortcomings of this product	Atuahene-Gima. 2003 Gu et al., 2013 Joshi & Sharma, 2004 Lynn et al., 1999
Team reflexivity	Team reflexivity is defined as the extent to which team members collectively reflect upon the team's objectives, strategies and processes (West, 1996)	Team finds alternative solutions for each problem Team experiments frequently with alternative ways to carry out their work Team modifies their objectives in the light of changing circumstances Team regularly takes time to figure out ways to improve the team's work processes Team steps back from daily routines to consider whether the methods used are the best available	Atuahene-Gima, 2003 Denison et al., 1996 Lee & Sukoco, 2011 Edmonson, 1999 Hirst & Mann, 2004
Intra team communication	Intra team communication describes the extent to which team members share information within the team	Team members keep each other informed at all times Members routinely share ideas and best practices within the team	Atuahene-Gima, 2003 Cheung et al., 2016 Gu et al., 2013

	(Park et al., 2009)	Members often exchange information and knowledge to capture new ideas	
Inter team communication	Inter team communication refers to the effort of the team to build relationships with other functions of the organization (Autahene-Gima, 2003)	Team puts effort into building relationships with other functions Team members frequently talk to members of other teams in the organization Weekly team staff meetings are held that include all department heads	Atuahene-Gima, 2003 Van der Vegt & Bunderson, 2005 Lynn, Skov & Abel, 1999
External communication	External communication refers to task related communication outside the corporation with external parties such as customers or experts (Keller, 2001)ke	Team members are good at networking with key individuals outside the formal organizational system Team spends time interviewing competent people about ideas or solutions	Rickards et al., 2001 Schulze & Hoegl, 2006
Team collaboration	Team collaboration describes the team's ability to work together (Caldwell & O'Reilly, 2003)	Members are contributing to the achievement of the team's goal Team leaders and members are ready to cooperate closely and to mutually support one another Team members are always ready to lend a helping hand to those around them (Altruism) Presence of shared team mental models where all members on the team try to solve the problems together	Hoegl & Gemuenden, 2001 Liu et al., 2015 Pearce & Ensley, 2004 Reuveni & Vashdi, 2015
Team coordination	Team coordination reflects a team's ability to organize task accomplishments in a manner that members know who is responsible for which task (Janz et al., 1997)	Team's ability to define goals, develop workable plans and prioritize work Team had very few misunderstandings about what to do Team members coordinate their efforts with each other Team knows who is responsible for important tasks	Ancona & Caldwell, 1992b Chong et al., 2011 Pearce & Ensley, 2004 Janz et al., 1997
Task conflict	Task conflict describes task-oriented debates about how to best achieve certain objectives (Amason, 1996)	Team had frequent conflicts about ideas in the team Team had frequent task disagreements on how to use state of the art technologies Team members had heated debates/showed dissent over the objectives of the project	DeDreu & West, 2001 Lovelace et al., 2001 Slotegraaf & Atuahene-Gima, 2011
Relationship conflict	Relationship conflicts refer to personality clashes between team members (DeDreu & Weingart, 2003)	Team experiences relationship tensions with their supervisor Team perceives the presence of negative emotions within the team	Dayan & Di Benedetto, 2009 Chen, 2006
Goal clarity	Goal clarity describes the degree to which goals were clear to the team as well as the degree to which the target customers' needs were clear to the team (Lynn et al., 1999)	Goals were clear to the team prior to project start Team has a clear understanding of target customer's needs Team has a clear overall purpose Team has a precise timetable for completing plans	Lynn et al., 1999 Patanakul et al., 2012 Janz et al., 1997 Im et al., 2013
Task complexity	Task complexity refers to the technological complexity of the project (Sarin & Mahajan, 2001)	Project involves technology that was new to the organization Team had to use non-routine methods to accomplish tasks Exceptions frequently arise that require substantially different methods The product developed by our team was technically complex to develop	Scott 1997 Chong et al., 2011 Pelled et al., 1999 Sarin & Mahajan, 2001
Emergent states			
Psychological safety	Psychological safety is defined as a shared belief by members of the team that the team is safe for interpersonal risk taking (Edmonson, 1999)	Members of this team are able to bring up problems/People of this team reject others for being different Differences of opinion are tolerated by the team The team feels that the group is interpersonally non-threatening and encouraging of involvement (participative safety) Team members are able to express their views and feelings (procedural justice) People feel free to challenge management opinion Team members experience freedom to express doubts that challenge the feasibility of what is being done	Edmonson, 1999 Peters & Fletcher, 2004 Pirola-Merlo et al., 2002 Dayan et al., 2009 Lee & Sukoco, 2011 Lovelace et al., 2001
Team climate for innovation (TCI)	TCI describes team member's perceptions of climatic dimensions related to work group innovation (Anderson & West, 1998)	Team feels safe to innovate and solve problems differently Encouragement to take risk/ Firm's tolerance of failure Tolerance for mistakes/Mistakes are accepted as a normal part of the job Support for innovation/ members of the team display supportive behaviors aimed at facilitating the development and implementation of new ideas Members are supportive of trying out new ways of doing things and are supportive of change	Pirola-Merlo et al., 2002 Im et al., 2013 Caldwell & O'Reilly, 2003 Eisenbeiss et al., 2008 Gu et al., 2013
Job stress	Job stress reflects workload pressure	Extent to which the team feels time pressure in develop-	Atuahene-Gima, 2003

	of the team in finishing their tasks (DeDreu & West, 2001) as well as a team's anxiety towards the pressure from executives (Akgün et al., 2006)	ing the product Team's perception of amount of workload that makes it difficult for them to finish their tasks Team feels great pressure from company executives to succeed with this project Our project involved a high level of uncertainty	De Dreu & West, 2001 Rodriguez et al., 2010 Weiss et al., 2011
Team cohesion	Team cohesion reflects the degree to which team members feel a sense of belonging (Bollen & Hoyle, 1990) as well as share a notion of group pride (Mullen & Copper, 1994).	Team members feel emotionally attached to the team Everyone on the team cares about the team and works to make it one of the best, core team members give the team's work highest priority Members behaved like departmental representatives who are not driven by their respective departmental agenda Team members have great confidence that the team can perform effectively In the team there are shared group norms for excellence of task performance Members have a shared vision of purpose and responsi-bility	Chen et al., 2018 Denison et al., 1996 Im et al., 2013 Miron-Spektor et al., 2011 Eisenbeiss et al., 2008 Rickards et al., 2001

Appendix D: Inquiry about How Editors and Reviewers Ascertain the Quality of Coding

One explanation for the lack of reporting of 'How' in meta-analyses could be that editors and reviewers already ascertained the quality of coding during the review process. Despite editor's and reviewers' important role in assuring research quality, we argue that it is insufficient that only they are informed about 'How' authors coded their primary studies. On the contrary, for purposes of replicability of findings and intersubjectivity of knowledge it is equally important to provide this type of information to the entire research community. Recent developments in academic journals suggest (e.g., special issue on contemporary meta-analyses at the Journal of Management Studies (2019)) that editors' mindsets have already begun to shift from considering information on the coding process as not imperative to pivotal for a meta-analysis's quality. Hence, information on 'How' authors proceeded with their coding is more and more provided (e.g., Karam et al., 2019).

To verify whether and how editors and reviewers ascertained the quality of coding, we sent an inquiry to the first authors of all included meta-analyses in our sample. From the 124 meta-analyses we excluded the above-mentioned special issue articles of the Journal of Management Studies (n=7) as they might bias the inquiry's results. We launched the inquiry at the beginning of July 2019 and sent two reminder mails within an interval of two weeks to the 117 authors. In total, 35 authors filled out the questionnaire representing a response rate of 30%. The inquiry questions were based on the categories discussed in Table 4, its structure and findings are displayed below.

Findings

From the 35 authors participating in the inquiry, 20 claimed that coding was a topic that editors and reviewers addressed during the review process and 15 stated that the task of coding was

not addressed during the review process. Referring to the question of whether a lack of coding transparency exists 14 respondents stated that it is a pertinent problem in research, 12 scholars pertained it is not a problem and nine researchers had no clear opinion about it. Interestingly, respondents highly agreed on a scale from 1 (not important) to 7 (very important) about the importance of authors reporting how they coded their primary studies (Mean=6.31; N=35). Concerning the reasons why coding transparency is important, respondents mainly mentioned the replicability of findings or that there is a lot of subjectivity to the coding process and that the coding of the same data can lead to different meta-analytic conclusions.

The 20 authors who stated that editors and reviewers ascertained the quality of their coding were also asked to indicate which coding issues were addressed during the review process. Based on the categories of our review of meta-analyses (see Table 4) respondents could choose from a list of 22 potential coding issues that editors and reviewers addressed during the review process. The following coding issues were the most often addressed: selection of inclusion criteria (n=17), reporting of intercoder reliability (n=13), selection of exclusion criteria (n=12), procedure of how authors performed the coding (n=11), covered time span (n=10) and sample size (n=10). According to what we observed in our review of meta-analyses (see Table 4), we found that there is a tendency among editors and reviewers to address more often coding issues belonging to the questions of 'Who' (n=43; 27.92%) and 'What' (n=76; 49.35%) and less of 'How' (n=35; 22.72%). This might partially explain why the question of 'How' remains largely unreported in the method sections of meta-analyses.

Additionally, respondents also formulated crucial questions that editors and reviewers should raise during the review process and how they personally assess the quality of coding in a meta-analysis. To assess the quality of coding, respondents answered that the following elements should be requested: provision of a complete coding scheme and meta-analytic database, infor-

mation about the rigor of coders' training and degree of coders' expertise in the research field, authors' involvement in the coding process, intercoder reliabilities for single coding categories, whether a pre-test of coding was performed and provision of a table displaying coding decisions that accompanied the research project as an online Appendix. When asked if they knew a guideline for coding, 21 respondents did not know any coding guideline. On a scale from 1 (not relevant) to 7 (very relevant) they emphasized that it would be relevant (Mean=5.34; N=35) to have a methodological guideline providing recommendations on 'How' to code for the field of management, suggesting the pertinence of our article.

Overall, our inquiry demonstrated that editors and reviewers ascertained the quality of coding in meta-analyses. However, our analysis showed that editors and reviewers often focused on coding issues belonging to the questions of 'Who' and 'What' instead of 'How'. With editors and reviewers recommending our coding guideline, we would like to contribute to the change where the question of 'How' will become a quality standard in meta-analytic research such as the reporting of 'Who' and 'What'.

Findings of the Inquiry

Regarding your meta-analysis, was "coding" a topic that editors and reviewers addressed in their decision letter (e.g., reviewers wanted to know how you proceeded with the coding of primary articles for your meta-analysis)?

Yes=20 (57.14%); No=15 (42.86%); N=35

Do you think that there is a lack of coding transparency regarding how authors code the primary articles of their meta-analyses?

Yes=14 (40.0%); No=12 (34.29%); Can't Answer=9 (25.71%); N=35

On a scale from 1 (not important) to 7 (very important), how important is it that scholars report how they coded their primary studies (e.g., report the decisions that they took during the coding process)?

Mean=6.31; SD=0.78; Var=0.62; Min=4; Max=7; N=35

Please, think about your editor's and reviewers' comments. Which of the following topics did they address?

WHO: n=43 (27.92%)

1) number of coders involved in coding (n=9)
2) identity of coders (e.g., who coded the primary studies, authors or students) (n=6)
3) background of coders (e.g., coders experience in coding) (n=4)
4) reporting of intercoder reliability (n=13)
5) content of discussion meetings during the coding process (e.g., how you solved coding disagreements between coders) (n=6)
6) whether a second coding was performed (n=5)

WHAT: n=76 (49.35%)

7) selection of inclusion criteria for primary articles (n=17)
8) selection of exclusion criteria for primary articles (n=12)
9) choice of inclusion of grey/unpublished literature (n=8)
10) choice of exclusion of grey/unpublished literature (n=7)
11) selection of included journals (e.g., comments regarding the quality of journals included in your meta-analytic review) (n=6)
12) choice of databases for your literature search (e.g., Google Scholars, EBSCO) (n=6)
13) covered time span of your meta-analysis (e.g., justification why you decided to look at a specific time span) (n=10)
14) sample size of your meta-analysis (e.g., comments regarding number of studies in your meta-analysis) (n=10)

HOW: n=35 (22.72%)

15) procedure of how you performed the coding of primary articles (e.g., reviewers asked to report the decisions that you took during the coding process) (n=11)
16) choice of coding approach for extracting information from your primary articles (e.g., reviewers wanted to know whether you used a theory-driven/deductive coding approach or data-driven/inductive coding approach) (n=5)
17) whether you coded measurement items of variables (e.g., reviewers wanted to know if you extracted the measurement items as used in a primary study) (n=3)
18) request to see your coding scheme (e.g., reviewers asked for your coding scheme to see what information you coded from

Note. Answers to open-ended questions (see structure of inquiry, e.g., Why is coding transparency in meta-analyses important?) are provided upon request. [1]Only authors responding that coding was addressed by editors and reviewers answered this question (N=20). A total of 154 coding issues were indicated (Who, What and How).

your primary articles) (n=1)

19) clarification how you developed the categories of your coding scheme (n=5)

20) pre-test of coding scheme (e.g., reviewers asked if you ran a pre-test with your coding scheme to check whether your coding categories were appropriate for the research subject) (n=0)

21) request to integrate visual aids such as 'frequency tables' where you show what variables you extracted from which article (see for example Sivasubramaniam et al., 2012: 820) (n=4)

22) request to integrate visual aids such as tables where you indicate key definitions, measurement items and selected references for every key construct of your meta-analysis (n=6)

Do you know any coding guideline for meta-analyses?

Yes=11 (31.43%); No=21 (60.00%); Can't Answer=3 (8.57%); N=35

On a scale from 1 (not relevant) to 7 (very relevant), how relevant is it to have a guideline that explains how to conduct coding in meta-analyses?

Mean=5.34; SD=1.58; Var=2.51; Min=1; Max=7; N=35

Design of the Inquiry

Regarding your meta-analysis, was "coding" a topic that editors and reviewers addressed in their decision letter (e.g., reviewers wanted to know how you proceeded with the coding of primary articles for your meta-analysis)?

NO

Do you think that there is a lack of "coding" transparency regarding how authors code the primary articles of their meta-analyses?

(Yes, No, Can't Answer)

On a scale from 1 to 7, how important is it that scholars report how they coded their primary studies (e.g., report the decisions that they took during the coding process)?

((Likert scale, 1 (not important) to 7 (very important))

Why is coding transparency in meta-analyses important?

(Comment box, free text)

What are crucial questions in the review process concerning "coding" that reviewers and editors should ask an author?

(Comment box, free text)

When evaluating the quality of coding in a meta-analysis, to what do you pay special attention to (e.g., what does your checklist for ensuring coding quality look like)?

(Comment box, free text)

Do you know any coding guideline for meta-analyses?

(Yes, No, Can't Answer)

On a scale from 1 to 7, how relevant is it to have a guideline that explains how to conduct coding in meta-analyses?

((Likert scale, 1 (not relevant) to 7 (very relevant))

YES

Please, think about your editor's and reviewers' comments. Which of the following issues did they address?

WHO: (is not displayed in the inquiry) Yes/No/Can't Answer

1. number of coders involved in coding
2. identity of coders (e.g., who coded the primary studies, authors or students)
3. background of coders (e.g., coders experience in coding)
4. reporting of intercoder reliability
5. content of discussion meetings during the coding process (e.g., how you solved coding disagreements between coders)
6. whether a second coding was performed

WHAT: (is not displayed in the inquiry)

7. selection of inclusion criteria for primary articles
8. selection of exclusion criteria for primary articles
9. choice of inclusion of grey/unpublished literature
10. choice of exclusion of grey/unpublished literature
11. selection of included journal (e.g., comments regarding the quality of journals included in your meta-analytic review)
12. choice of databases for your literature search (e.g., Google Scholar, EBSCO)
13. covered time span of your meta-analysis (e.g., justification why you decided to look at a specific time span)
14. sample size of your meta-analysis (e.g., comments regarding number of studies in your meta-analysis)

HOW: (is not displayed in the inquiry)

15. procedure of how you performed the coding of primary articles (e.g., reviewers asked to report the decisions that you took during the coding process)
16. choice of coding approach for extracting information from your primary articles (e.g., reviewers wanted to know whether you used a theory-driven/deductive coding approach or data-driven/inductive coding approach)
17. whether you coded measurement items of variables (e.g., reviewers wanted to know if you extracted the measurement items as used in a primary study)
18. request to see your coding scheme (e.g., reviewers asked for your coding scheme to see what information you coded from primary articles)
19. clarification how you developed the categories of your coding scheme
20. pre-test of coding scheme (e.g., reviewers asked if you ran a pre-test with your coding scheme to check whether your coding categories were appropriate for the research subject)
21. request to integrate visual aids such as "frequency tables" where you show what variables you extracted from which article (insert graphic, *Sivasubramaniam et al. 2012: 820*)
22. request to integrate visual aids such as where you indicate key definitions, measurement items and selected references for every key construct of your meta-analysis

All questions from "No" section will be included here

Appendix E: Detailed Overview of Coded Meta-Analyses

Author(s); Year	WHO									WHAT									HOW												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
	Number of coders [1]	Intercoder reliability [2]	Intercoder reliability for single constructs [3]	Experienced/trained coders [4]	Knowledgeable coders [5]	Students as coders [6]	Authors/coder ratio [7]	Second coding [8]	Discussion meetings [9]	What has been coded [10]	Coding section [11]	Inclusion criteria [12]	Exclusion criteria [13]	Databases for literature search [14]	Keyword/search term combinations [15]	Unpublished/grey literature [16]	Sample size [17]	Covered time span [18]	How they coded primary articles [19]	Coding as not straightforward [20]	Coding as iterative process [21]	Coding based on measurement items [22]	Type of coding approach [23]	Coding scheme [24]	Pre-test of coding scheme [25]	Coding scheme included [26]	Coding scheme upon request [27]	Frequency table [28]	Detailed table with definitions and measures [29]	Methodological references [30]
Total	93	88	10	18	13	13	79	87	81	103	81	96	74	113	101	95	120	59	49	20	15	46	24	35	14	2	15	14	18	5
Allan et al., 2019	2	X		X	X	X*	1	F	X		X	X	X	18	X	X	44				X									X
Allen et al., 2004	2	X				X*	1	F	X	X	X	X	X	2	X	X	43													
Anseel et al., 2015	2	X				X*	1	P	X	X	X	X	X	4	X	X	69	21-30												
Badura et al., 2018	7	X		X			0.3	P	X	X	X	X	X	5	X	X	168			X					X					
Balkundi et al., 2006	2	X								X		X	X	13	X	X	37		X			X		X	X					
Bamberger et al., 1999										X	X	X	X			X	59	1-20	X			X								
Banks et al., 2014	2	X				X*	1	F	X	X		X	X	9	X	X	33	21-30												

Author(s); Year	WHO									WHAT									HOW											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Barrick et al., 1991	6	X		X	X	X	0	P		X			X	2		X	117	31-40	X			X	T				X			
Bauer et al., 2007	4	X			X			F	X	X	X	X	X	1	X	X	70	31-40												
Bell et al., 2011	2	X				X*	1	F	X	X	X	X	X	3	X	X	92	21-30												
Berry et al., 2012	2			X	X	X*	1	F	X	X		X	X	2		X	36										X			
Beugelsdijk et al., 2018	3	X				X*	1	P		X				3	X	X*	156	21-30												
Bhaskar et al., 2005											X	X	X	9	X	X	64		X			X	B							
Bilgili et al., 2017	2					X*	1			X	X	X	X	4	X	X	112	21-30						X						
Blume et al., 2010	3	X				X*	1	P	X	X	X	X		2	X	X	93	1-20	X			X		X	X					
Bono et al., 2004										X		X		1	X		26		X			X	T							
Carnes et al., 2019	3	X				X*	0.7	F	X	X	X	X	X	2	X	X	146		X			X	T					X	X	
Carney et al., 2011										X	X			5	X	X	141							X						
Cawley et al., 1998	2	X						F	X	X		X	X	1		X	27	21-30	X	X		X						X		
Chamberlin et al., 2017	2	X				X*	1	P	X	X	X	X	X	3	X	X	166		X		X	X		X	X		X			
Chang et al., 2012	5					X*	1	F	X	X		X		5	X	X	149													
Chapman et al., 2005	2	X				X*	1	F	X	X	X		X	3	X		71	31-40	X	X		X	B							
Christian et al., 2010	2	X					1	F	X	X	X	X	X	4		X	84		X	X		X								
Combs et al., 2003	2	X				X*	1	F	X			X		3		X	44	21-30	X			X		X					X	
Combs et al., 2006		X						F	X	X	X	X		3	X	X	92													

Author(s); Year	WHO									WHAT									HOW											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Dalal et al., 2005	2	X			X	X	0	F	X			X		1	X	X	38	1-20												
Damanpour et al., 1991	2	X		X		X	0.5	F	X	X	X	X	X			X		21-30	X			X	T					X	
Donovan et al., 1998	2	X				X*	1	F	X	X	X	X	X	3	X		12	21-30												
Dulebohn et al., 2012	3	X					0.3	F	X	X	X	X	X	4	X	X	247			X										
Fainshmidt et al., 2016	3			X	X	X*	1		X	X	X		X	2	X	X	79	1-20	X			X						X		
Fassina et al., 2008	2	X						F	X	X	X		X	3	X		45	31-40	X	X		X		X						
Frazier et al., 2017		X						F	X	X	X	X		4	X	X	117		X			X	B	X			X			
Gerstner et al., 1997	2	X				X	0.5	F	X	X	X	X		3	X	X	79	21-30									X			
Geyskens et al., 2006	3	X				X*	1	P	X	X		X		2	X	X		21-30											X	X
Gilboa et al., 2008		X						P		X	X	X	X	6		X	169	21-30	X			X					X			
Griffeth et al., 2000										X		X		2				1-20												
Grijalva et al., 2015	2	X	X				1		X	X	X	X	X	2	X	X	42	> 40										X		
Gully et al., 2002	4	X				X*	1	F		X	X	X	X	3	X	X	67		X			X								
Hancock et al., 2013	2	X				X*	1	F	X	X	X	X	X	3	X	X	54													
Harrison et al., 2006												X		3	X	X	44	21-30												
Heugens et al., 2009	1	X				X*	1	P		X				2	X	X	90	21-30		X				X					X	
Hoch et al., 2018	2	X				X*	1	F	X	X	X	X	X	5	X	X														
Horwitz et al., 2007					X			P	X	X		X	X	5	X	X*	35	21-30						X						

Author(s); Year	WHO									WHAT									HOW											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Hosoda et al., 2003	2	X				X*	1	F	X	X	X	X	X	3	X	X	27	31-40												
Hüffmeier et al., 2014	2	X					0.5	P	X	X	X	X		4		X	60				X			X					
Jenkins et al., 1998	2	X			X	X	0	F	X	X		X			X		39	21-30		X							X		
Jeong et al., 2017									X	X		X	X	7	X	X	146												
Jiang et al., 2012	2	X				X*	1	F	X			X	X	3	X	X	116							X	X		X		
Jiang et al., 2018	2	X				X*	1	P		X	X	X	X	4	X	X	457												
Jones et al., 2017	2	X				X*	1	F	X	X	X	X		3	X	X	83										X	X	
Joshi et al., 2009	4	X					0.5		X		X	X	X	4	X	X	39	1-20			X			X	X				
Judge et al., 2002a		X						F	X			X	X	1	X	X	65		X			X	T						
Judge et al., 2002b													X	1	X	X	163		X			X	T	X					
Judge et al., 2004	1	X					0.5	P		X			X	1		X	96		X					X					
Karam et al., 2019										X	X	X		4	X	X	145	21-30	X	X	X	X	T	X				X	X	X
Karna et al., 2016	2	X				X*	1	F						2	X	X	115	21-30	X	X			T						X	
Ketchen et al., 1997	4	X				X	0.3	F	X	X				2			33	21-30												
Kirca et al., 2011	2	X			X			F	X	X		X	X	2	X	X	111				X			X					
Kirca et al, 2012	2	X			X			F	X	X	X		X	3	X	X	145	31-40			X			X	X				
Klier et al., 2017	2	X						F	X	X	X	X	X	3	X	X	31	31-40	X	X		X								X
Knight et al, 2017	2	X	X	X	X	X*	0.5	F	X	X	X	X		6	X	X	27				X			X		X			

Author(s); Year	WHO									WHAT									HOW											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Kong et al., 2014	2					X	0.5		X	X	X	X		8	X	X	38													
Kooij et al., 2011	3	X				X*	1	P	X	X		X		7	X		86	31-40	X			X	T						
Kossek et al., 2011	2	X	X			X	0	F	X	X	X	X		3	X	X	58	> 40	X			X	T						
Krishnan et al., 2016	2	X					0.5		X	X	X	X		6	X	X	82	21-30	X			X							
Kristof -Brown et al., 2005	3	X				X*	1	F	X	X	X	X	X	3	X	X	172		X			X							
Lee et al., 2000	2	X				X*	1	F	X	X	X	X	X	3	X	X*	77		X			X							
Lee et al., 2017		X		X				F		X		X	X	4	X	X	67				X			X	X				
LePine et al., 2002													X	1	X	X	37	1-20	X			X							
LePine et al., 2005	3					X*	1	P	X			X		2	X	X	82		X	X		X	T						
LePine et al., 2008	3	X						F	X	X	X	X	X	1	X	X	138		X			X		X			X		
Leslie et al., 2014	2	X				X	0.5	P	X			X		4	X	X	35											X		
Loignon et al., 2018		X	X	X				P	X	X	X			3	X	X	530		X			X		X				X	
Lux et al., 2011										X	X	X		5	X	X*	78	31-40										X	
Maas et al., 2019	3					X*	1			X	X	X	X	4	X		91							X					
Mackey et al., 2017	2	X	X	X		X*	1	F		X	X	X		5	X	X	112							X			X		
Marcus et al., 2013	2	X				X*	1	P	X	X	X	X	X	13	X	X	201				X			X	X				
Martin et al., 2016	2	X	X			X*	1	P	X	X	X	X	X	4	X	X	195				X		T	X	X				
Michel et al., 2011		X				X*	1	F	X	X	X	X		4	X	X	142										X		X	

Author(s); Year	WHO									WHAT									HOW											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Miller et al., 1986										X			X			X*	47													
Miller et al., 1991													X				31													
Miller et al., 1994	2												X	1			26													
Montano et al., 2017	2	X		X		X	0	F	X	X	X		X	5		X	144	1-20	X	X		X		X		X	X	X	X	
Mueller et al., 2013										X	X	X	X	4	X	X	46		X			X								
Mutlu et al., 2018	2	X					0.5	P						6	X	X	84	1-20											X	
Ng et al., 2005	2	X				X*	1	P	X	X			X	2	X		140	21-30	X			X								
Ng et al., 2008										X				3	X	X	199		X	X			T						X	
Ng et al., 2010										X		X	X		X	X	802	31-40												
Parker et al., 2003	5	X				X*	1	F	X	X	X	X		1	X		94		X			X	T	X						
Post et al., 2015	2	X				X*	1	P	X	X	X	X	X	2	X	X	140													
Quiñones et al., 1995	2	X						F	X	X	X	X		2		X	22		X			X	T		X				X	
Riketta et al., 2002	2	X					0.5	F	X	X	X	X	X	3	X	X*	93		X			X					X			
Robertson et al., 1993	3	X			X	X	0.7					X				X*	52							X						
Rosenbusch et al., 2013										X	X	X	X	2	X	X	83		X	X		X	T				X		X	
Rosenbusch et al., 2019	3	X				X*	1		X	X	X	X	X	4		X	46											X		
Samba et al., 2017	4	X					0.5		X	X	X	X		4	X	X	78		X	X		X		X						
Schommer et al., 2019													X	2	X	X	267	> 40												

Author(s); Year	WHO									WHAT									HOW											
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Schweiger et al., 2019	2				X	X*	1		X	X	X	X	X		X		202	31-40	X		X	X	T	X	X					
Shao et al., 2013		X		X				F		X		X		4	X	X	409												X	
Shaw et al., 2003	3					X*	1		X	X	X		X	4	X		54	1-20										X		
Shockley et al., 2011	2	X				X*	1	P		X	X	X	X	4	X	X	153													
Sihag et al., 2019	2	X				X*	1	F	X	X	X	X	X	5	X	X	108		X	X		X	T					X	X	X
Sleesman et al., 2012				X				P	X	X	X	X	X	3	X		166	31-40		X	X			X	X					
Stajkovic et al., 1997	2	X		X			0.5	F		X	X	X		5	X	X	19	1-20												
Stajkovic et al., 2003	2	X		X			0.5	F		X	X	X	X	6	X	X	72	> 40												
Sturman et al., 2003	1					X*	1			X							115	21-30	X			X								
Taylor et al., 2005	4	X	X	X		X	0.3	F	X	X	X	X	X	3	X		40				X									
Tett et al., 1991	2	X	X	X				F		X	X		X	1	X	X	86	21-30												
Thatcher et al., 2012	3	X	X			X	0.3	F	X	X	X	X		7	X	X*	96	1-20	X			X	T	X						
Van den Broeck et al., 2016	3					X*	1		X	X	X	X		4	X	X	99		X			X	B							
Vanneste et al., 2014												X		2	X	X	39													
Vinchur et al., 1998	2	X				X*	1	F	X		X			6		X	98	> 40		X										
Wagner et al., 1987	2	X	X			X*	1	F	X	X	X					X*	70											X		
Wang et al., 2019	4					X*	1	P	X	X	X	X		5	X	X	297	31-40												
Wegman et al., 2018	2	X		X				F	X	X	X	X		3	X	X	102	31-40												

Author(s); Year	WHO									WHAT									HOW										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Whitman et al., 2010	3	X				X*	1	F	X	X	X	X		2	X	X	60							X						
Wilkin, 2013	2	X						F	X	X		X		2	X	X	72													
Williams et al., 2006	3	X					0.7	P		X	X	X	X	2	X		200	> 40												
Willness et al., 2007	2						0.5	F	X	X	X	X	X	8	X	X	41													
Wofford et al., 1992	2	X						F		X	X	X		2	X		78	21-30									X			
Wood et al., 1987	2	X						F	X			X	X			X	125	1-20												
Yu et al., 2018		X							X	X	X		X	4	X	X	39		X			X	T	X	X					
Zhao et al., 2007	2	X				X*	1	F	X	X	X	X	X	4	X	X	51	1-20	X	X	X	X					X			
Zhao et al., 2010										X	X	X	X	6	X	X	60	21-30									X			
Total	93	88	10	18	13	13	79	87	81	103	81	96	74	113	101	95	120	59	49	20	15	46	24	35	14	2	15	14	18	5

Note. Crosses indicate that a variable was coded in a review (n=124). No crosses mean that the category is not present in the review. If an author published a meta-analytic review more than once using the same dataset, we included all publications as they reflect each journal's position concerning the topic of coding transparency. [1]Do authors indicate the number of coders in the review? And how many coders are involved in the coding process?; [2]Do authors indicate intercoder reliability in the review?; [3]Do authors indicate intercoder reliabilities for single constructs (not only aggregated intercoder reliability)?; [4]Are coders experienced in coding or trained to do the coding?; [5]Do authors state that there is (at least) one coder who is knowledgeable in the research field?; [6]Are students involved in the coding of studies? X*=no students are involved, no cross=coders are anonymous; [7]What is the ratio of authors who coded/total number of coders? Could only be calculated if authors stated who (themselves, students etc.) performed the coding. An author/coder ratio of zero means that authors stated to have not coded any of the articles articles (e.g., students coded the entire sample); [8]Was a second coding performed? Moreover, to which extent did the second coder code the sample? F = full second coding, P = partial second coding; [9]Do authors state that discussion meetings took place?; [10] Do authors report what has been coded (e.g., variables, hypotheses, relationship signs, effect sizes etc.)?; [11]Is there a section in the review entitled "Coding of Studies", "Coding Procedure", "Coding" or "Coding of Variables"?; [12]Do authors elaborate inclusion criteria for their literature search?; [13]Do authors elaborate exclusion criteria for their literature search?; [14]Do authors state what type of databases they used for their literature search? And how many databases do authors state to use for their literature search?; [15]Do authors indicate the keyword combinations or search terms used for their literature search?; [16]Does the review include unpublished/grey literature? X* = explicitly excluded; [17]Do authors specify the total number of included articles?; [18]What time span does the review cover?; [19]Do authors explain in any way "How" they coded primary articles (e.g., how they developed coding categories or how they extracted information from articles)?; [20]Do authors state that coding is not always straightforward?; [21]Do authors state that the coding process was undertaken iteratively?; [22]Do authors state that their coding decisions were based on measurement items (thus, not only on variable labels)?; [23]Which coding approaches do authors mention to adopt? T = theory-driven/deductive approach, D = data-driven/inductive approach, B = both; [24] Is the coding scheme with the coded information included in the review?; [25]Do authors state that they performed a pre-test with the coding scheme (before the actual coding of articles)?; [26]Is the coding scheme with the coded information included in the review?; [27]Do authors state that they provide their coding scheme upon request?; [28]Is a frequency table of coded variables included in the review?; [29]Is a detailed table included in the review displaying key definitions, measurement items and selected references of constructs?; [30]Do authors indicate methodological references when describing their coding procedure?

Appendix F: Identification and Coding of Studies

Time span	The seminal special issue on corporate entrepreneurship published in the Strategic Management Journal (Guth & Ginsberg, 1990) is the starting point of the literature search. Since then a rise in publications about innovative teams in the corporate context can be observed.
Conceptual boundaries	Authors draw on the central dimensions of corporate entrepreneurship (internal corporate venturing and strategic renewal, cf. Guth & Ginsberg, 1990; Narayanan et al., 2009; Phan et al., 2009) and specific internal corporate venturing activities (i.e., new product development, innovation, cross-functional knowledge integration, and R&D) to define search terms for their literature search.
Literature search	Authors searched for 'team OR group AND internal corporate ventur* OR innov* OR strategic renewal OR new product development OR knowledge integration OR R&D' in EBSCO, JSTOR, ProQuest, and Google Scholar. The final sample of this review did not contain unpublished articles because the search on ProQuest did not reveal any results. Overall, the final sample contains 70 quantitative articles representing a variety of variables studied about innovative teams in the corporate context. Of this final sample, 20 articles investigated the relationship between functional diversity and performance of innovative teams.
Inclusion criteria	A study should have: (1) identified the team or project as the unit of analysis, (2) focused on teams that reside within corporations, (3) investigated teams in the context of innovation, internal corporate venturing or strategic renewal, (4) used quantitative empirical methods, (5) reported correlations between at least one team-level variable and one performance variable and (6) used a unique rather than converging sample.
Exclusion criteria	Authors manually excluded articles: (1) about external corporate venture teams (e.g., joint venture teams, Johnson, Korsgaard, & Sapienza, 2002), (2) using businesses or divisions as unit of analysis (e.g., Wenpin Tsai, 2001) and (3) with individual-level performance outcomes (Miron et al., 2004; Scott & Bruce, 1994).
Coding process	*Coding Approach:* The research goal of this meta-analysis was to investigate what kind of input, process and outcome variables had been studied about innovative teams in the corporate context (meta-analysis of themes). In the attempt to create a synthesis of this topic, the authors adopted both a deductive and inductive coding approach. The first author coded all variables studied in primary articles by extracting the original text passages (inductive coding
Coding process (continued)	approach). To ensure construct validity, the first author coded variable labels and measurement items as provided by the original authors. Applying an inductive coding approach allowed the authors to remain open for the identification of a wide spectrum of variables studied about the research phenomenon. Especially, outcome variables required an inductive coding approach as the authors noticed a lack of detail and disaggregation pertaining to the outcome measures of the primary studies. Specifically, most meta-analyses referred to outcomes such as "performance" rather than acknowledging a fine-grained portfolio of types of outcomes pertaining to different levels of analysis (i.e., product, team, business unit, or firm). Unlike other team meta-analyses (e.g., Hülsheger et al., 2009), the authors of this meta-analysis focused on explaining the criterion variable of performance, which has been less systematically addressed in team research (c.f., Ilgen, 1999; Mathieu et al., 2008). By doing so, the authors substantially extend team- and entrepreneurship literature by conceptually clarifying the black box of performance measurement of highly innovative teams as they display key metrics for both the team- and product-level of analysis (see Table 6).

Coding process (continued)	*Data Extraction & Categorization*: Once the first author coded all articles, the entire author team analyzed the coded information in terms of frequency of appearance to create representative coding categories for their coding scheme. The authors used the theoretical Input-Mediator-Outcome-framework (Mathieu et al., 2008) which is commonly used in team research to classify the coded variables into broad coding categories (e.g., team inputs, processes and outcomes). Based on the extracted measurement items, the author team grouped and classified the coded variables. To enhance the consistency of coding, the authors created example codes where synonymous variable labels and important key measures of constructs were indicated in the coding scheme. Functional diversity, a heavily studied team input variable, was a parameter of interest at the outset and the authors knew that it would be an important coding category (deductive approach). However, the authors found evidence that even though most scholars agreed on using the same measurements for functional diversity, they highly differed in the labelling of the construct: cross-functional diversity (e.g., Lovelace et al., 2001), expertise diversity (e.g., Van Der Vegt & Bunderson, 2005) or multi-knowledgeable teams (e.g., Park, Lim, & Birnbaum-More, 2009). To test the adequacy of the coding categories a pre-test was conducted where two authors coded a sub-sample of 25 articles. Since the construct of team performance is still a black box (cf. Ilgen, 1999; Mathieu et al., 2008) most coding disagreements arose concerning the coding of outcome variables. For example, coders experienced that in some cases two different variables were measured under one construct (e.g., Van Der Vegt & Bunderson, 2005). In such cases where authors aggregated different performance outcomes, the authors decided to opt for a "mixed" performance category to enhance their meta-analysis' validity. After pre-testing the coding scheme, the second author performed the second coding of the entire study sample. In circumstances where the two coders could not find agreement, the third author took the final decision about the categorization of a variable based on the reported measurement items. A total of 24 independent variables and seven performance outcomes were identified. After performing the word coding, the two authors extracted the relevant data (e.g., sample size, Cronbach's alphas, effect sizes/correlation coefficients, rating sources and measurement differences) for computing the bi-variate relationships.
Meta-analytic procedure	To test the set of 24 independent variables as potential success factors for performance of innovative teams in the corporate context, the authors applied the artifact-corrected meta-analytic approach by Hunter and Schmidt (2004) to adjust for sampling and measurement error. This methodological choice seems to be justified, because the majority of included studies relied on self-reported psychometric data. To account for sampling error, the authors used a random effect model to measure corrected mean effect sizes between the independent variable and performance outcomes. Weighting the effect sizes by sample size prevents studies with very big samples to inflate the mean effect (Hunter & Schmidt, 2004). They also checked for converging samples and retained only one study whenever authors published articles using the same sample to assure that their sample is not artificially inflated. Robustness of results are indicated by fail-safe K (see Table 6), which provides an estimate of the number of studies with null results needed to make the reported mean effects insignificant (Rosenthal, 1979). As inputs for their estimations, the authors used correlation coefficients along with sample size and Cronbach's alpha. In cases where Cronbach's alpha was not reported, authors substituted the missing value with the mean alpha based on all studies that measured the specific variable (Geyskens et al., 1998). If one study reported multiple correlations for the same independent variable, the average of these correlations was taken (e.g., impact of functional diversity on team innovativeness rated by team members and managers). The authors computed 95% confidence intervals to determine the significance of relationships. A confidence interval that did not include zero indicated that the corrected correlations were significant at the level of $p<.05$ (two tailed) (Lipsey & Wilson, 2001).

STATEMENT OF AUTHORSHIP

I hereby declare that this thesis represents my original work and that I have used no other sources except as noted by citations. All data, tables, figures and text citations which have been reproduced from any other source, including the internet, have been explicitly acknowledged as such. I am aware that in case of non-compliance, the Senate is entitled to withdraw the doctorate degree awarded to me on the basis of the present thesis, in accordance with the "Statut der Universität Bern (Universitätsstatut; UniSt)", Art. 69, of 7 June 2011.

Bern, 20.03.2020