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Literature review

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DOI

[10.1108/ECAM-04-2016-0098](https://doi.org/10.1108/ECAM-04-2016-0098)

Publication date

2017

Document Version

Final published version

Published in

Engineering, Construction and Architectural Management

Citation (APA)

Venselaar, M., & Wamelink, H. (2017). The nature of qualitative construction partnering research: Literature review. *Engineering, Construction and Architectural Management*, 24(6), 1092-1118.
<https://doi.org/10.1108/ECAM-04-2016-0098>

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The nature of qualitative construction partnering research: literature review

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Abstract

Purpose – The purpose of this paper is to investigate the nature of qualitative construction partnering research.

Design/methodology/approach – In total, 20 qualitative peer-reviewed papers about construction partnering research are reviewed.

Findings – The results show four methodological gaps. All identified gaps have in common that specific time and place dependent details that may have influenced understanding of studied individuals are underexposed.

Research limitations/implications – The main limitation of this study is that empirical-based papers are divided into either qualitative or quantitative research, but the boundary between those categories is not as black and white as it may look like in first instance.

Practical implications – The identified gaps are translated to recommendations for further study. This will help the reader to become more aware of the difficulties and decisions encountered by the researcher, and in that way the reader is more aware and gains more understanding of the context-related character of the study. Applying the recommendations will lead to different conclusions and recommendations to improve construction partnering in working practice.

Social implications – More focus on local time- and place-dependent factors of the studied individuals as well as the process of studying it, inevitably leads to encountering (and becoming more aware of) personal, subjective and unexplainable decisions and behavior. Describing and analyzing these personal, subjective and unexplainable points in the research process will improve the quality of the research.

Originality/value – This study contributes to the further development of academic research on this topic and increase effectiveness of partnering in the construction sector.

Keywords Research methods, Partnership, Supply chain management, Construction management, Collaboration

Paper type Literature review

1. Introduction

Professionals as well as scholars are interested in improving building processes in order to deliver higher quality to end users. A potential method to improve building processes is to strengthen collaboration between parties within the building supply chain. Forms of improved collaboration are often referred to as, for example, partnering, project partnering, supply chain partnering, supply chain integration, supply chain collaboration or supply chain management. In this paper, we use “construction partnering” as overarching concept of all its before mentioned concepts. Construction partnering promises improvement of working relationships and project performance in terms of quality, cost and time (e.g. Bresnen, 2009; Bygballe *et al.*, 2010; Hong *et al.*, 2012).

Over the past decades, a considerable number of peer-reviewed research papers related to construction partnering has been published, covering a wide scope and many perspectives and aspects of partnering (e.g. Bygballe *et al.* 2010; Hong *et al.*, 2012). Bygballe *et al.* (2010) show that construction partnering encompasses project-based as well as strategic-based relationships. Bygballe *et al.* (2010) also show that partnering studies may focus on the dyadic



relationship between client and contractor or may take into account multiple actors within the construction supply chain, such as consultants, designers and end users. Hong *et al.* (2012) show that peer-reviewed research papers about construction partnering cover a wide variety of topics, such as theory and model development, problems and barriers to implementation and review of development and application.

Different research approaches and methodologies are employed in studying construction partnering. According to Hong *et al.* (2012), "the core methodology used in partnering research primarily relied on empirical analysis of the industrial feedback and a hands-on partnering experience". Anvuur and Kumuraswamy (2007) suggest that empirical studies as well as "a plethora of anecdotal evidence support the espoused benefits of partnering". The observation that there is a considerable amount of qualitative peer-reviewed construction partnering research seems to support the statements by Hong *et al.* (2012) and Anvuur and Kumuraswamy (2007). Bygballe *et al.* (2010) show that approximately 34 percent of their set of 87 peer-reviewed construction papers consists of case studies (36 percent of the population consists of surveys, 17 percent were purely conceptual/literature review articles. "The remainder was a combination of other qualitative studies, simulations, etc.", Bygballe *et al.*, 2010). Bemelmans *et al.* (2012) reviewed partnering literature, specifically focusing on supplier-contractor collaboration in the construction industry. Although this study represents only a small part of partnering papers in the construction industry, Bemelmans *et al.* (2012) show that 15 articles of a total of 32 of the articles studied used a case study approach. These observations imply a close fit between construction partnering research with the actual practice and performance of construction partnering.

Other authors suggest that construction partnering research is somewhat abstracted from daily practice. Bresnen (2007) suggests that the effect of a more prescriptive approach of partnering research is that it promotes a model of partnering "that is stylised and abstracted from any immediate practical context in which it might be applied". According to Phua (2013), methods conducted by scholars in construction management often reflect a "hypothetic-deductive tradition," focusing on quantifying and determining "the relationships between variables of interest in context-specific situations". According to Pink *et al.* (2014) in construction research, in general there "has been an apparent reluctance to embrace the interpretative paradigm and qualitative methods more generally".

Thus, on one hand, construction partnering research seems to fit closely with actual practice and performance of construction partnering, and on the other hand, it is said to be hypothetic-deductive, stylized and abstracted from daily practice. This seemingly aberrant observation raise questions about the nature of qualitative construction partnering research. Therefore, by assessing peer-reviewed papers, this paper investigates the nature of qualitative construction partnering research.

Insight in the nature of qualitative construction partnering research is valuable, because it helps to identify gaps and/or saturation in methodology and content. Therefore, it can contribute to determining new directions and ideas for future research. However, no systematic research about the nature of qualitative construction partnering research has been conducted yet.

This paper is divided into five sections. Section 2 describes a theoretical framework in which we explain our understanding of the "nature of qualitative construction partnering research". Section 3 focuses on the methodology. Section 4 presents the results. Section 5 discusses the findings and describes our conclusions.

2. Theoretical framework

2.1 Construction partnering research

In order to be able to assess peer-reviewed papers about construction partnering research, we first needed to explore our understanding of "construction partnering research".

Construction partnering is a general concept, containing many synonyms and derivatives, such as supply chain collaboration, supply chain management, construction partnering, etc. Because construction partnering is seen as a general concept, it is difficult to define construction partnering.

Scholars like Vrijhoef (2011) and Yeung *et al.* (2012) have been involved in defining supply chain partnering and articulating differences between supply chain partnering and its synonyms and derivatives. However, among professionals in daily work life, these terms seem to be used in an arbitrary way and not in a strict sense as the definitions might imply. Moreover, there seems a general agreement about a lack of a unified understanding of the concept (Bygballe *et al.*, 2010).

Bresnen (2009) argues that supply chain partnering is an informal and emergent practice, arguing that it is best described as developing toward collaboration using various formal and informal tools. It can be seen as a “highly situated phenomenon” that, although informed by a wider discourse and institutional norms, manifestation in practice “owe as much to local sense-making and situated (experiential) learning processes” (Bresnen, 2009). That means that in practice it is manifested in various ways, depending on unique local and time-related circumstances. All in all, we consider supply chain partnering as a general concept referring to different kinds and processes of collaboration between agents within the construction supply chain, rather than a specific form of collaboration between partners in a construction supply chain.

Because we understand construction partnering as a general concept, boundaries of what construction partnering research is, are not delimited, but have some gray areas. For the authors of this paper, the most questionable boundary was whether research about public-private partnerships (PPP) is part of construction partnering research. According to Tang *et al.* (2010), PPP evolved in different generations and also knows several definitions that vary locally. One of the definitions is “contractual arrangement between a public sector agency and a for-profit private-sector development, whereby resources and risks are shared for the purpose of delivery of a public service or development of public infrastructure” (Li *et al.*, 2005; Tang *et al.*, 2010). The definition of PPP seems to overlap our understanding of construction partnering in terms of collaboration between parties within the construction industry. However, for the sake of this study about the nature of construction partnering, we consider PPP research as a different scientific community that holds different scientific traditions. For example, important literature reviews concerning construction partnering, such as Bygballe *et al.* (2010) and Hong *et al.* (2012), did not include PPP-oriented papers either. Therefore, in this study we do not take into account PPP-oriented research. For the same reasons, we decided to not take into account literature about (international) joint ventures.

2.1 The nature of research

In order to be able to gain insight in the nature of qualitative construction partnering research, we also needed to explore our understanding of the phrase “nature of research.” Understanding this phrase is necessary to be able to develop assessment criteria to assess qualitative construction partnering research. The remainder of this section explains what criteria we used, and why we used these criteria.

The phrase “nature of research” can be understood in several ways. The nature may be understood by examining the aspects of the position in the field that is addressed, as was done previously by Hong *et al.* (2012). The nature may also be understood by examining the approach and methodologies that are employed, as was done by Bygballe *et al.* (2010) and Bemelmans *et al.* (2012). We consider content and approach as intertwined and interrelated. Therefore, we included both aspects in our assessment.

To assess the nature of partnering research, we followed the standard structure of each peer-reviewed research paper. This structure was divided into three dimensions: the aim

and background of study, approach and methodology and conclusions. The remainder of this section describes the criteria that we used to assess those three dimensions:

- (1) First we assessed the aim of research, because the way in which the aim of research is formulated reveals something about the nature of the research. On one hand, as might be expected in qualitative research, the researcher might try to get better understanding of a certain phenomenon, with the underlying assumption that more understanding leads to improvement (Lange de *et al.*, 2011). These types of research often do not focus on producing the one and only (generalizable) truth, but put emphasis on in-depth and profound understanding of a specific situation. Those research aims and research questions often have a broad character. Not seldom words like “getting more understanding of [...]” or “get more insight in [...]” or “exploring [...]” are used in formulating an interpretative aim or research question. One the other hand, the researcher might attempt to find knowledge, with the purpose to explain, control or predict a phenomenon, sometimes with the purpose of prescribing behavior and/or actions for actors in this phenomenon. These aims are often more associated with quantitative research approaches. In that case, according to Baarda and de Goede (2006, p. 51), in general there are three types of research questions (frequency, differences and specific cause-effect relations) that may be asked. However, these types of questions might also be used in case study research. If that is the case, this might explain why some research is experienced as “positivistic,” “stylized” and “abstracted from reality.”
- (2) Second, we used the introduction and the aim of study (and if necessary other parts of the paper as well) to assess the position of the research in the field of qualitative construction partnering research. Inspired by Bygballe *et al.* (2010), Eriksson (2015) and Hong *et al.* (2012), we categorized each paper into: focus on dyadic or multi-player relationship (Bygballe *et al.*, 2010), focus on intra- or inter-organizational relationships (Eriksson, 2015), focus on project-based or strategic-based relationships (Bygballe *et al.*, 2010) and focus on new building or existing projects.
- (3) The third assessment criterion concerns employed methods of gathering data. This can be done in a plethora of ways. First, we identified whether or not a case study was conducted. If applicable, we also identified the type of case study, such as longitudinal or action research. Further, we identified ways of gathering data at a more practical level, which are often techniques such as different types of interviews, observations, or documents.
- (4) Fourth, we assessed how data were analyzed. This might be done in either a hypothetic-deductive way, or an inductive way, or a combination of the two. Also, we assessed what analysis techniques are used, for example pattern matching or explanation building (Yin, 2014).
- (5) Fifth, the role of the researcher in the research was assessed. Qualitative data are often gathered using techniques such as interviews and observations. These techniques require a close relationship between the researcher and his or her object of research, or the researcher actively holds distance to his or her object of study. Either way, in an ideal situation the researcher actively develops and communicates a strategy about managing this relationship. In qualitative research, it is important to show reflexivity on their role as a researcher in relation to the object of study (Maxwell, 1992). That means, in general, that the role of the researcher is problematized. According to Riley and Love (2000) on one hand, data can be presented “with no explanation about the process of analysis,” and on the other hand, these processes can be described particularly and precisely. We assessed

the role of the researcher by indicating to what extent the researchers problematized and/or were reflexive about their own role within the research process.

- (6) The sixth assessment criterion is the theoretical background on which the research is based. This issue was raised previously by Phua (2013). Phua (2013) addresses this topic, and argues that many theoretical lenses that are used in construction management research, such as transaction cost theory, resource dependency theory and agency and social exchange theory, "rest on the assumption that decisions are based on bounded rational choices that are driven by considerations for economic efficiencies." Those theoretical lenses are said to place "too little emphasis on individual-level constructs," while at the same time, the idea that people deliver projects and not the systems is widely recognized (Phua, 2013). We assessed the theoretical background of each paper on this point.
- (7) The seventh assessment criterion is related to data analysis, and concerns the level of analysis. Phua (2013) addresses the issue of level of analysis and observes that in construction management research individual-level constructs are seldom taken into consideration. Bernelmans (2012) observed that in the context of supplier-contractor collaboration in the construction industry, the inter-organizational level dominated over interpersonal level, claiming that in none of the articles in the field of study solely interpersonal relationships were considered and only four articles paid structural attention to both interpersonal and inter-organizational relationships. According to Phua (2013), by not adopting individual level, important insights from organizational studies are missing. "Research in management and organisational studies show that individual-level constructs in terms of individual beliefs, cognition, values and prepositions can have a significant effect on organisational-level decisions and performance" (Phua, 2013). We assessed our papers on level of analysis by identifying whether a country level, case level, case/individual level or individual level was adopted.
- (8) The eighth criterion concerns generalizations and is divided into three sub-criteria internal generalizations, statistical generalizations, and analytical generalizations. Generalizing qualitative data is often perceived as more complex than generalizing quantitative data, since generalizing quantitative data can rely on very specific prescribed statistical procedures. According to Maxwell (1992), generalizability refers to "the extent to which one can extend the account of a particular situation or population to other persons, times, or settings than those directly studied." Three main issues have to be considered in generalizability. First, Maxwell (1992) claims that for qualitative researchers, internal generalization (generalizing within the studied community, group or institution) is usually more important than external generalizations (generalizing to other communities, groups or institutions). We assessed to what extent internal generalizability is considered in the peer-reviewed papers. Further, as Maxwell (1992) claims, qualitative research is usually not designed to generalize the outcomes to wider populations, especially not in a statistical sense (Maxwell, 1992). In assessing the peer-reviewed papers, we looked at whether or not the authors externally generalize their findings, and if so, whether this is done in a statistical and/or analytical way. Concerning analytical generalizations, according to Yin's (2014) case study, the results "may shed empirical light" on the theories that "go beyond the specific case or experiment." Lessons learned in one case study "could be applied in reinterpreting the results of existing studies of other concrete situations [...] or to define new research focusing on yet additional concrete situations" (Yin, 2014). For this study, we assessed whether the authors generalized their findings in an analytical sense as Yin (2014) suggests. Figure 1 shows an overview of the assessment criteria.

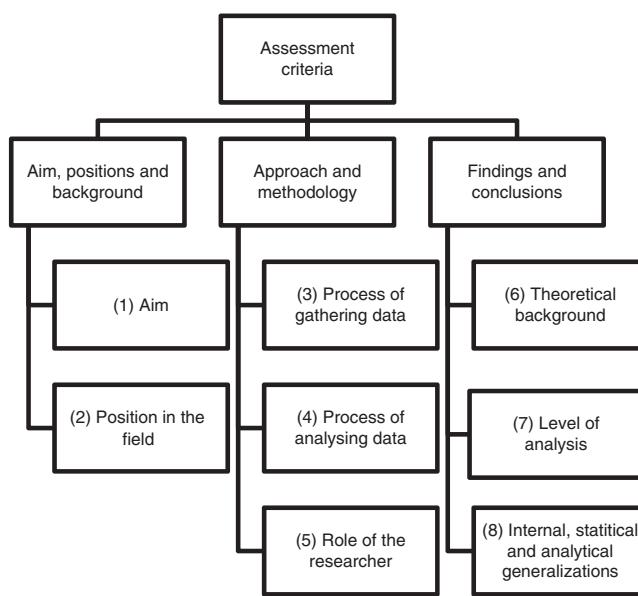


Figure 1.
Assessment criteria

3. Methodology

3.1 The process of selecting papers

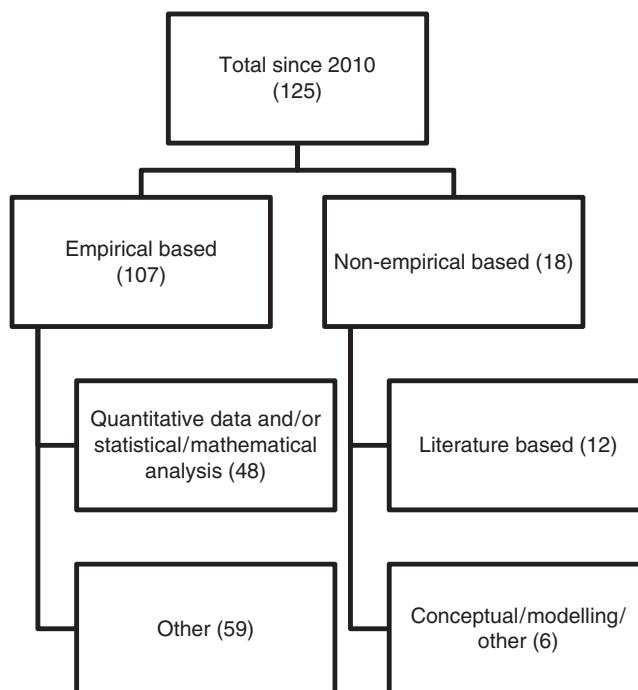
Before we got started with our analysis, we needed to select papers using keywords that cover the wide range of derivatives and synonyms related to construction partnering (since we consider supply chain partnering a general concept). We used two combinations of keywords: supply chain AND construction, and Partnering OR Partner OR Partnership AND Construction. Inspired by Bygballe *et al.* (2010) and Hong *et al.* (2012), we searched Business Source Complete and Scopus for papers. Since we are interested in describing the state of the art, instead of describing a complete historical development, we only searched these databases for papers published since 2010. This first phase resulted in a set of 176 peer-reviewed papers.

Based on abstract analysis, we excluded papers about PPP and joint ventures (see Section 2.1). Also, the selection contained papers that did not have construction partnering as the main topic. For example, we found papers on the evaluation of BIM software. The abstract mentioned that BIM could be used in partnering constructions, but that was not the main topic of the paper. After also excluding these papers, our final selection consisted of 125 papers.

At this point in the research, we analyzed abstracts from those 125 papers (and if necessary consulted the paper itself) to identify empirical and non-empirical papers such as literature reviews and conceptual studies. We had two reasons for doing this. The first was that literature-based studies are difficult to categorize into qualitative or quantitative research, and second, non-empirical studies are by definition abstracted from practice. Including these types of papers would lead to a discussion that reaches beyond the scope of this paper. Therefore, these types of papers were excluded.

Then we divided the empirical-based papers into two groups: quantitative empirical-based papers (which appeared to consist mainly of survey questionnaires, and papers that focus on developing a model, sometimes using simulation techniques to "test" the model, and which used empirical data to develop the model), and other. As shown in Figure 2, we identified 59 empirical-based papers in the latter category. Figure 2 shows the results of our abstract analysis.

Figure 2.
Overview results abstract analysis.
The numbers refer to the total amount of published peer-reviewed papers on construction partnering from 2010 to 2014



We considered 59 papers too large a data set for an in-depth qualitative investigation. To reduce this number of papers, we had to find the articles that represented the research community the best. Therefore, we decided to select the most cited papers. Because the publishing year influences the number of citations, simply because an "old" paper has more chance to be cited than a more recent one, we decided to select the top four cited papers of each year. This allowed us to reduce our initial selection to 20 papers that represent the research community most. We considered 20 papers sufficient to conduct proper qualitative analysis and also a manageable number in terms of practical feasibility.

3.2 The process of analyzing the papers

First, using a preliminary version of Table AI, the first author of this paper conducted a pilot study. The purpose of the pilot study was to refine and adjust the assessment criteria. This allowed us to make the step-by-step process of interpreting the papers more transparent. For this pilot study, papers from before 2010 were used. Thus, these papers were not included in our final data set. The first author assessed the papers deductively using an Excel sheet to get a quick overview of the results. In addition, analysis reports were written. General notes were reported, as well as the author's interpretations and ideas about the papers that could not be processed in our initial theoretical framework. Writing the analysis reports resulted in adding two important criteria: "level of analysis" and "generalization."

Second, the pilot study approach as well as the pilot study results were discussed with several experts, the second author of this paper and one of the co-authors of Lange *et al.* (2011). Furthermore, the provisional results were presented and discussed in an expert platform consisting of PhD students who are no experts on construction partnering, but with good knowledge of philosophy of science and differences in research paradigms.

Third, we processed the feedback and reduced, adjusted and refined our final assessment framework (Figure 1). The 20 papers were assessed by the first author using this final assessment framework. This involved reading the papers as a whole for the purpose of getting a basic understanding of them, and then carefully re-reading each paper for a more detailed assessment. Meanwhile, the second author assessed five of these papers as well in a similar way, using the final framework. Differences in interpretations were discussed and resulted in final adjustments of the framework. Finally, the first author went through all 20 papers again.

4. Results

Table AI shows the results of our assessment of the 20 most cited peer-reviewed papers on construction partnering since 2010. It needs to be emphasized that Table AI (and underlying explanation in the remainder of this section) should not be seen in isolation, but rather in the context of this study. Also, our results should not be taken as a definitive truth. Please be aware that this is our interpretation and we hope it inspires fellow researchers. The last part of this section is a step-by-step explanation of our assessment as shown in Table AI.

4.1 Aim of research

The way in which the aim of the research is formulated sometimes reveals something about the nature of the research. In 11 of the 20 papers, words like “explore,” “understanding,” “addressing,” “gain insight in” or “scrutinize” were used to describe the research aim. Badenfelt (2010), for example, formulated their aim as “The present paper seeks to deepen our understanding of the complex and dynamic relationship between aspects of trust and control in client-contractor interactions.” Here, the purpose is to gain a deep understanding of a specific situation.

Other formulations of the research aims seem to point at predicting and controlling a situation. For example, in their abstract, Hughes *et al.* (2012) formulate their aim as: “This research aimed to test the hypothesis ‘The use of incentivisation with a gain/pain share of about 15 percent is a precursor to the achievement of successful infrastructure partnering projects in South Wales.’” Testing such a hypothesis and investigating a cause-effect relationship indicates quantitative research, as suggested by Baarda and de Goede (2006). And indeed, a part of this study concerns quantitative research, processing quantitative data in statistical procedures.

Although there are clearly two directions research aim formulations can take, assessing them is not as black and white as that. In some cases, formulations can be interpreted in both ways. For example, Osipova and Eriksson (2011) formulate their aim as: “The aim of this study, therefore, is to investigate how procurement options influence risk management in construction projects.” This formulation does not explicitly reveal a quantitative or qualitative execution of the research. It needs to be emphasized that one direction is not “better” than the other. However, the second way of formulating an aim (which implicitly leads to predict and control a future situation) might lead to what Bresnen (2007) identifies as “stylised and abstracted from any immediate practical context in which it might be applied.”

4.2 Position in the field

The construction industry is a wide industry, including small and large, new and existing civil and building projects across the world. Supply chains in this industry can be large and complicated, involving many inter- and intra-organizational individuals and groups of individuals. Not surprisingly the peer-reviewed papers cover a wide range of projects and supply chains operating in this industry. Table AI shows an overview of the position of each paper within the field.

Table AI shows three studies involve a case study focus on a dyadic relationship for the duration of one project. The list also shows that the main focus in most studies is on inter-organizational relationships. Only Ellegaard and Koch (2012), Eriksson (2010) and Sandberg and Bildsten (2011) focus on intra-organizational as well. Like inter-organizational aspects, intra-organizational supply chains are part of the supply chain as a whole, as emphasized by Flynn *et al.* (2010). Although it is acknowledged that the intra-organizational supply chains are an important factor in the supply chain as a whole, this intra-organizational focus is underexposed in qualitative construction partnering research.

Table AI also shows that most research focuses on new building projects. Of this list, only Eriksson (2010), Hughes *et al.* (2012), Jefferies *et al.* (2014) and Laan *et al.* (2011) (explicitly) focus on partnering in existing projects or situations. In the case study employed by Laan *et al.* (2011), new building and existing building are combined. Perhaps coincidentally, but the three studies mentioned concern civil projects. This means that, as far as we can assess (because in some papers it remains unclear whether the case study concerns an existing or new building project), none of the papers explicitly focus on renovation or maintenance of existing residential or non-residential buildings. However, for example in the Netherlands, this branch of the construction industry is becoming increasingly important. For example, Dutch social housing associations own 2.4 million residential units and their assets are increasing with each year (www.aedes.nl, accessed October 17, 2016). Partnering in maintenance and renovation in such social housing associations may lead to a decrease in costs and an increase in quality, and is therefore an important factor in the strategies of housing associations in the Netherlands. All in all, it seems that partnering in existing projects is underexposed in qualitative construction partnering research.

To summarize, we can say that this set of papers focus on multi-player, inter-organizational, project-based supply chains that collaborate in new building projects.

4.3 Process of gathering data

The set of papers can be divided into two groups: papers that are based on one or several case studies (17), and papers that are not (three). Data are gathered using different methods, such as interviews and expert panels, and different types of observations. Four studies are based on action research (Pan *et al.*, 2012; Taggart *et al.*, 2014; Smyth, 2010; Zimina *et al.*, 2012). Table AI shows an overview of the methods used for data collection.

Among the papers about case studies, the author most referred to was Yin (1994, 2003, 2009). Ten papers referred to one of Yin's works on design and methods of case study research (Badenfelt, 2010; Berente *et al.*, 2010; Ellegaard and Koch, 2012; Eriksson, 2010; Jefferies *et al.*, 2014; Johnson *et al.*, 2013; Laan *et al.*, 2011; Pan *et al.*, 2012; Sandberg and Bildsten, 2011; Ying *et al.*, 2014).

Further, the majority of the authors have their own unique approach, combining several existing approaches and data-gathering techniques provided by several authors that they refer to. Scholars that adhered strictly to the principles of an existing research approach are Fernie and Tennant (2013). Fernie and Tennant (2013) used a grounded theory strategy as proposed by Glaser and Strauss (1967). Lu *et al.* (2013) and Osipova and Eriksson (2011) do not base their research design on existing approaches by other authors.

To conclude, our assessment of the way in which data are gathered in qualitative construction partnering research does not specifically point at research that can be characterized as stylized and abstracted from daily work practice.

4.4 Process of analyzing data

Table AI shows that two of the assessed papers (Hughes *et al.*, 2012; Smyth, 2010) used statistical procedures to analyze data, while all other papers adopted an interpretative procedure to analyze data. Table I shows the numbers of words spent on the methodology

section and the number of words used to describe the process of analysis and the relationship between these two. In general, relatively little attention is paid to describe the process of analyzing data. Some authors do not describe this research phase at all. However, this phase is just as important as the method of data collection, especially when qualitative data are the object of analysis, and the researcher cannot rely on statistical procedures.

4.5 Do the researchers reflect on their role in the process?

In our assessment, we found that Fernie and Tennant (2013), Taggart *et al.* (2014), Pan *et al.* (2012) and Zimina *et al.* (2012) provide relatively more information, compared to other authors, on the researchers' relationship with the object of study. For example, Zimina *et al.* (2012) described that "previous professional experience of the researchers as quantity surveyors and cost engineers contributed to a better understanding of the current state of the industry." Also, Zimina *et al.* (2012) describes that in the process of gathering data "the researchers were directly involved and worked with the project teams almost on a daily basis." Taggart *et al.* (2014), for example, provide specific and concrete insight in the relationship between the researcher and his object of study. For example, they describe that "posters were placed on site explaining who the field researcher was and his intentions." Further "the field researcher (Author 1) spent time (typically one half day per week) over a four-month period on the project and 'participated' in the process of snagging data as a participative observer". Perhaps coincidentally, Taggart *et al.* (2014), Pan *et al.* (2012) and Zimina *et al.* (2012) all adopted an action research strategy. Fernie and Tennant (2013) based their extensive reflections on "six recognized tenets of grounded theory, namely: emergence and researchers distance, theory development, coding procedures, specific/non-optimal procedures, core category and evaluation criteria."

The ability to reflect on the role of the researcher in the research process and in relation to his object of study lacks substance, or is described in a somewhat unstructured, meager and scattered manner. Berente *et al.* (2010), for example, state that "the interviewers probed these differences to understand their significance to the participants as well as the probable impact on the firm or industry as a whole" (Berente *et al.*, 2010). Berente *et al.* (2010) also explain that the researchers "iterated through these analyses multiple times and compared findings to ensure that the examples and episodes were tightly grounded and consistent with the individual firm" (Berente *et al.*, 2010). However, these comments may cause confusion among readers, because, for example "iterating through data" is still rather vague and does not accurately describe specific action of the researchers. Questions about, for example, problems and dilemmas they faced and differences in interpretation of data, remain unclear but are potentially interesting to enrich findings.

4.6 Theoretical background

As mentioned earlier, Phua (2013) suggests that many theories on which the papers are based, "rest on the assumption that decisions are based on bounded rational choices that are driven by considerations for economic efficiencies." The content of the theoretical background is also

	Average	Minimum	Maximum	Median
Total amount of words spent on methodology section	880	330	2,885	700
Total amount of words spent on process of analysis	140	0	525	75
Words spent on process of analysis (Proportions in percentage)	17	0	18	16

Notes: Number of words spent on the methodology section and the process of analysis and the relationship between the two (numbers are rounded off)

Table I.
Analysis
methodology section

described in Table AI. It is very difficult to assess whether a theoretical lens “rests on the assumption that decisions are based on bounded rational choices,” because the theory itself as well as the interpretation of the theory depend greatly on the author and the reader of the paper. Therefore, it appeared impossible to categorize the theoretical background of each paper. However, one salient observation is explained by using an example.

For example, Ellegaard and Koch (2012) mention that they apply a “resource-based perspective” meaning that “business exchange is perceived as a process where buying and supplying companies actively access and influence their resource mobilization. This theory can be understood and applied as a theory that ‘rests on the assumption that decisions are based on bounded rational choices’ (Phua, 2013). However, as the study shows, the results of the research also describe non-rational behavior of actors in the field. Thus, although the theoretical background implies rational behavior, the execution of the research (as well as the findings) of studies with such a theoretical background does not necessarily imply rational behavior as well. Using those “rational” theories, however, could lead to a feeling that the research as a whole is stylized, predictive and abstracted from daily work practice.

4.7 Level of analysis

Table AI also shows that 15 papers analyze data at case level. In seven of these papers individuals are quoted to illustrate the case level. However, no specific individual level of analysis is used in any of the assessed papers. In-depth research of the position of an individual (in relation to the network in which he operates) is lacking. The emphasis on case level or higher, might explain why construction partnering research is perceived as being somewhat abstracted from individual experiences.

In our set of peer-reviewed papers, we identify a great interest in case study research. Obviously, case study research delivers different insights than non-case study research. In general, case studies give insight in local practice and the papers offer insight to a lesser or greater degree into what actually happens on the work floor and how participants give shape to their daily work routines.

The knowledge and insight that is gained through conducting case studies varies in level of abstraction. In some papers, the actual voice and behavior of participants is apparent through quotes from participants and by providing detailed descriptions of actual situations and behaviors. Other papers tend to present data in a more abstracted way, such as through constructing models and abstracted theories.

An example of a paper in which the actual voice and behavior of participants is represented written by Taggart *et al.* (2014). Taggart *et al.* (2014) identified that electrical design drawings usually give no “dimensional layout” of placing sockets and that the electricians executing the work “randomly decided themselves on what spacing to use,” resulting in many defects and thus rework. Taggart *et al.* (2014) also identified that this rework is generally accepted as “simply” part of the job. Another example is provided by Badenfelt (2010). Badenfelt (2010) describes that a client of a construction project put a web camera at the building site with the purpose – as claimed by that client – to keep track of the construction process. However, the contractor says that the client every now and then called about “a pile of dirt in one of the corners” and how this type of behavior affects the trust-relationship between those parties. Also Berente *et al.* (2010) stay close to their empirical data and use “vignettes” to show the collaboration between architect, contractor and sub-contractor and how collaboration practices are adjusted with each sub-contractor. However, these examples are few.

4.8 Internal, statistical and analytical generalizations

We assessed that Smyth (2010) considers internal generalization, by mentioning that the used sample represents 33 percent of the population, which is, according to Smyth (2010, p. 259)

reasonable. As Table AI suggests, other papers do not problematize internal generalizations (the extent to which the findings can be generalized within the studied community, group, or institution Maxwell, 1992), although most papers do list the respondents that were involved in the study.

For example, Ellegaard and Koch (2012) provide a clear overview of studied companies and their 20 interviewees who are, according to Ellegaard and Koch (2012), "the most central production and purchasing employees" of the main organization and their direct partners. However, the total number of individuals who were active in their case is unclear. Therefore, it remains unclear to what extent the individuals represent the case study. Thus, in this example, it is clear who participated in the case, but the internal generalization was not problematized. Therefore, we can only conclude that focus on internal generalization in qualitative construction partnering research is underexposed.

We also assessed the use of statistical analysis. Hughes *et al.* (2012) and Smyth (2010) used statistical procedures to analyze their data. Hughes *et al.* (2012) combined questionnaires and interviews "to gather both breadth and depth of data" from two infrastructural case studies and used statistical procedures to analyze the data gathered with the questionnaires. Also Smyth (2010) combined his qualitative approach with a quantitative component. The quantitative part entails categorizing and ranking 150 demonstration projects, of which 20 projects were selected for further qualitative analysis. Two of the assessed papers (namely Ellegaard and Koch, 2012; Ying *et al.*, 2014) literally recommend to perform a quantitative study in order to be able to generalize results in a statistical manner. Assessment criteria 3 already showed that not much quantitative data were gathered. Thus, we conclude that qualitative construction partnering research make little use of quantitative data gathering and analysis procedures.

Table AI shows that Berente *et al.* (2010), Ellegaard and Koch (2012), Eriksson (2010) and Gottlieb and Haugbølle (2013) literally refer to possibilities for analytical generalization. For example, Ellegaard and Koch (2012) argue that the single case study "also represents a limitation as broader analytical generalizability has traded off with detailed insight."

Most of the other authors do consider opportunities and limitations for (analytical) generalizations. A difficulty is that authors point at limitations and/or opportunities for external generalizations, but are not always clear about what exactly these opportunities and limitations are. We observe a highly varied list of projects that served as case study, in many cases the possibility for generalizing results analytically from one case to another remains questionable, also when the cases are similar in terms of type of relationship studied and type of project that served as case study. When partnering is considered an emergent practice, local and personal circumstances may have influenced the results and also analytical generalizations might become problematic.

The assessment of generalizations, especially analytic or "external" generalizations, gave rise to discussion and debate among assessors. We observed that papers sometimes lack transparency about the assumptions on which the (suggestions and limitations of) generalizations are based. We also observed that papers can be ambiguous about generalizing results. Ambiguity is when on one hand it is suggested that it is not possible (or one should be careful with) generalizing results, while on the other hand, results and conclusions are formulated in such a way that the authors imply generalization at a high level. The process in which construction partnering research is generalized is sometimes opaque and/or ambiguous.

5. Discussion and conclusion

The aim of this study was to analyze the nature of qualitative construction partnering in order to find gaps and/or saturation in position in the field as well as the methodologies that are used. The study shows that since 2010, 125 papers about construction partnering have

been published, of which 59 papers are empirical and non-quantitative. We cannot conclude that qualitative construction partnering research is saturated, but we do think that qualitative construction partnering research has matured over time. Based on an abstract analysis (as shown in Figure 2), we conclude that peer-reviewed construction partnering research is not biased toward quantitative nor qualitative research.

We assessed 20 qualitative empirical peer-reviewed papers, covering a broad range of case studies in different fields and with different focus areas. Although not all papers are transparent about whether their case study concerns an existing or new building project, most papers focus on multi-player, inter-organizational relationships in supply chains that collaborate in new building projects. Intra-organizational relationships collaborating in existing projects are underexposed.

Observing the list of case study projects, we found that the case study projects vary in size and type of construction and place. This raises questions about whether or not it is appropriate to speak of “a construction industry.” After all, individuals working on an infrastructural project in the Netherlands will probably encounter different problems than individuals building a tower block in New Zealand. Therefore, readers should be careful to apply the insights gained in one situation to another situation.

In the 20 analyzed papers, we identified four methodological gaps: insight in the process of data analysis is underexposed; reflection on the role of the researcher(s) in the research process is underexposed; the individual level of analysis is underexposed; and the way in which the results are generalized remain somewhat opaque, especially reflection on internal generalization is underexposed.

All identified methodological gaps have in common that specific place- and time-dependent details that may have influenced understanding of studied individuals are underexposed. Local situations are often chaotic, messy, unruly, capricious, intuitive and unpredictable. The process of studying that local situation may be characterized the same. Underexposing that character may contribute to a feeling that construction partnering research can be stylized and abstracted from individual experiences.

We think that the chaotic character of working practice and studying that working practice can be represented more in the peer-reviewed papers. The above-mentioned four methodological gaps are easily transformed into recommendations for further study. The first recommendation is to problematize and elaborate more on the way in which data are analyzed. It is recommended to explicate important decisions that are made in the process of analysis. The second recommendation is to be more explicit and detailed about the role of the researcher in the research process. There is an opportunity to enrich qualitative research by involving researchers and participants, and by explicating the researchers’ role, the participant’s role and the relationship between these two roles within the research process. The third recommendation is to conduct an individual level of analysis, although that choice highly depends on the exact object of study. The fourth recommendation is to be more explicit about the extent to which the results of the particular study can be generalized, or what local and personal circumstances may prevent from generalization to other situations. Special focus should be placed on the extent to which the studied individuals represent the group or community.

Following the recommendations (which are one-on-one related to the identified gaps) will result in research that better represents the chaotic characteristics of ordinary working practice and the process of studying that working practice. Adopting the recommendations will increase awareness in the working field of the difficulties and decisions encountered by the researcher, and in that way the reader is more aware and knowledgeable of the context-related character of the study. This will reduce the chance that the reader takes away insights from the study that are irrelevant to his own working practice. Applying the recommendations will lead to different conclusions and recommendations to improve construction partnering in working practice.

Also, adopting the recommendations will lead to the questioning of objectivity of knowledge. More focus on local time and place dependent factors of the studied individuals as well as the process of studying them, inevitably leads to encountering (and becoming more aware of) personal, subjective and unexplainable decisions and behavior. Describing and analyzing these personal, subjective and unexplainable points in the research process will improve the quality of the research, although it sometimes may seem contrary to what is commonly considered scientific research (namely objective and rational). Taking these unexplainable points in the research process seriously may lead to opportunities for further improvement of research and construction partnering practice.

We have attempted to provide more insight into the nature of qualitative construction partnering research. However, our study is limited to some degree. First, by the fact that this paper divides empirical-based papers into either qualitative and quantitative research, but the boundary between those categories is not as clean cut as it may appear. This is because studies may combine qualitative and quantitative approaches. Moreover, studies that are based on surveys (and in this study are identified as quantitative), may be less quantitative as they may initially seem. The data that were gathered in a quantitative study may be the object of a more interpretative analysis by the researcher.

Another limitation is that this study took into account peer-reviewed papers only. However, peer-reviewed papers are just one of many possible sources of information. Although these papers are quite formal, they are produced by a much more informal research community. Discourse analysis of (parts of) that global informal research community could be interesting to get to know more about why the nature of qualitative construction partnering research is as it is. It could make implicit underlying (conscious or subconscious) power dynamics explicit, which in turn could play a role in educating and emancipating of scholars.

Finally, comparing the nature of construction research to the nature of qualitative research in other fields of study could increase our understanding of both fields. In this case, for example, comparing qualitative construction partnering research to partnering research in other – not so technical – fields of studies may be interesting, such as education or the medical field. Also comparison with fields of study that are perceived as innovative, such as marketing or ICT, could be interesting.

Despite these limitations, our research explicates “gaps” that lead to opportunities for scholars studying construction partnering. These opportunities may also be valuable for reviewers, supervisors and other actors that shape and at the same time are being shaped by the academic research discourse on construction partnering. By applying these opportunities, we hope to contribute to the further development of academic research on this topic and to increase effectiveness of partnerships in the construction sector.

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Appendix

Anvuur <i>et al.</i> (2011)	Aim	"This paper addresses the above needs by exploring the major issues in developing RIVANS"
	Position in the field	Multi-player, inter-organizational, both project- and strategic-based relationships
	Gathering data	In an extensive literature review key-issues of RIVANS are identified and validated conducting a "focus group approach"
	Data analysis	There are no concrete indications what analysis techniques are used
	Role of the researcher	The role of the researcher is not explicated
	Theoretical background	Extensive literature review on value networks in business, the RIVANS framework and building blocks of operational RIVANS
	Level of analysis	Country level
	Internal generalization	"Two workshops provide the forum for the groups. They brought together a representative group of built environment professionals from industry and academia in Hong Kong and two international research collaborators"
	Statistical generalization	No
	Analytical generalization	No explicit reference to possibilities of analytical generalizations
Badenfelt (2010)	Aim	'The present paper seeks to deepen our understanding of the complex and dynamic relationship between aspects of trust and control in client-contractor interactions (pp. 301)
	Position in the field	Dyad, inter-organizational, project based, new non-residential building
	Gathering data	A three-year longitudinal case study (referring to Yin, 1994) about a large €32 million laboratories for a high-tech company in Sweden. "The main data sources were, besides contract documents, non-participative observations of 26 project meetings held on the building site" (p. 303). This was complemented with interviews with key respondents from both client and contractor
	Data analysis	Badenfelt (2010) refers to Strauss and Corbin, 1997) "The analysis was guided by a coding process in which data were categorized using qualitative analysis methods"
	Role of the researcher	There is no reflection on the role of the researcher
	Theoretical background	The theoretical background provides an overview of recent research trends on trust and control
	Level of Analysis	Case level with individual quoting to support understanding at case level
	Internal generalization	There is no reflection on the internal generalization
	Statistical generalization	No
	Analytical generalization	No explicit reference to possibilities of analytical generalizations. Badenfelt (2010) does suggest that "the findings of this study are expected to contribute not only to construction management theory and practice, but also to all types of inter-organizational projects in which contracting parties struggle with problems related to risk allocation and relational risks" (p. 309)

(continued)

Table AI.
Results of our assessment of the 20 most cited peer-reviewed qualitative papers on construction partnering since 2010

Berente <i>et al.</i> (2010)	Aim	"By using these concepts, we articulate a framework <i>in situ</i> of how ICT enabled inter-organizational knowledge creation takes place during the design and construction of a highly complex building" (p. 570)
	Position in the field	Multi-player, inter-organizational, project based, new non-residential building
	Gathering data	A multi-level case study about Peter B. Lewis Building at Case Western Reserve University carried out by Gehry Partners. "The data were collected primarily through open-ended interviews using a semi-structured questionnaire near the end and shortly after completion of the building" (p. 575)
	Data analysis	The authors iterated through these analyses multiple times and compared findings to ensure that the examples and episodes were tightly grounded and consistent with the individual firm, the project as a whole, and where applicable with pre- or post-Gehry projects in which the firm may have been involved' (p. 576)
	Role of the researcher	There is no reflection on the role of the researcher
	Theoretical background	The theoretical background discusses inter-organizational knowledge creation and information technology, information pooling, physical interaction and object worlds
	Level of Analysis	Case level with individual quoting to support understanding at case level
	Internal generalization	There is no reflection on the internal generalization
	Statistical generalization	No
	Analytical generalization	Explicit reference to analytical generalizations at p. 574. Berente <i>et al.</i> (2010) suggest that "it can also apply to other contexts across functional disciplines" (p. 586)
Ellegaard and Koch (2012)	Aim	"How does internal integration between purchasing and operations in the buying company affect suppliers" recourse mobilization?" (p. 149)
	Position in the field	Multi-player, intra- and inter-organizational, strategic-based relationships
	Gathering data	A qualitative single case study' (p. 149) about a constructor collaborating with subcontractors that produce windows, trade wooden floors, and contract electrical installations. Data were gathered with "twenty semi-structured interviews" with employers from the construction company and suppliers. Also key-documents are used
	Data analysis	Miles and Huberman (1994, Chapter 4 and 5) are used. "We relied on various coding procedures and tools for within cases analysis." [...] The coding process involved a high level of iteration and switching back and forth between interview data from the informants (p. 150)
	Role of the researcher	Reflection on the role of the researcher is not explicated
	Theoretical background	A brief theoretical background about elements of internal integration and effects of internal integration on external integration and supplier recourse mobilization (pp. 150-151)
	Level of analysis	Individuals are quoted in the appendix. The level of analysis in the main text concerns small groups of people, such as "the purchasers," thus: case level
	Internal generalization	There is no reflection on internal generalization
	Statistical generalization	The authors suggest – amongst other recommendations – that future research may involve survey methodology in order to generalize findings to broader populations

Table AI.

(continued)

Eriksson (2010)	Analytical generalization	Ellegaard and Koch (2012) argue that the single case study "also represents a limitation as broader analytical generalizability has traded off with detailed insight"
	Aim	"The following three interconnected research questions will therefore be investigated: (1) What is partnering? (2) When should partnering be used and to what extend? And (3) How should partnering be implemented?" (p. 906)
	Position in the field	Multi-player, intra- and inter-organizational, project and strategic-based relationships in existing civil projects
	Gathering data	Data are gathered using "four case studies of partnering projects produced by a Swedish mining company" (p. 909). In total, 50 semi-structured interviews and document analysis
	Data analysis	Several data analysis techniques are applied, such as: cross-case pattern analysis (Eisenhardt, 1989), and pattern-matching analysis (Yin, 2003)
	Role of the researcher	Reflection on the role of the researcher is not explicated
	Theoretical background	The theoretical background is about what partnering is, when it should be used and to what extend and how partnering should be implemented?
	Level of analysis	Case level, with individual quotes
	Internal generalization	The internal generalization is not problematized
	Statistical generalization	No
Fernie and Tennant (2013)	Analytical generalization	A reference is made to analytical generalizations (Yin, 2003): "Case study should however aim for analytical rather than statistical generalizations" (p. 909). According to Eriksson (2010), the main findings [...] are probably valid for other settings as well'
	Aim	"The research strategy has [...] adopted a grounded theory approach (Glaser and Strauss, 1967) as a way to develop substantive theory to explain the development and diffusion of supply chain management in the construction industry" (p. 1039)
	Position in the field	Multi-player relationships in UK construction industry
	Gathering data	A grounded theory approach in which data are gathered using "orientation interviews were largely informal meeting with interested stakeholders" in UK (p. 1045)
	Data analysis	Profound description of analysis techniques, using a grounded theory approach
	Role of the researcher	Extensive description of the researchers' own role in the research process
	Theoretical background	In the theoretical background supply chain management theory and construction supply chain management are discussed
	Level of Analysis	Country level
	Internal generalization	Extensive overview of participants, but no reflection to what extend the participants represent the field
	Statistical generalization	No
Fulford and Standing (2014)	Analytical generalization	No explicit reference to possibilities of analytical generalizations. In this context, research findings are generalizable in so far as they provide a wide-ranging statement on the action, reaction and transaction of supply chain practice in construction (p. 1048)
	Aim	"The objective of this study is to identify factors inhibiting collaboration and determine how collaboration might be improved in the CI" (p. 316)

(continued)

Table AI.

Gottlieb and Haugbølle (2013)	Position in the field	Gathering data	Multi-player, inter-organizational, strategic-based relationships Three mini-cases about a (1) Constructor that does government or company tenders, (2) infra-structure projects, (3) commodity provider. Data are gathered using semi-structured interviews and expert panels
	Data analysis		Six steps of Mishler (1990) are applied. No further research-specific aspects about de analyzing process are explicated
	Role of the researcher		Reflection on the role of the researcher is not explicated
	Theoretical background		The theoretical background is about fragmentation in the supply chain, small enterprises in the supply chain, construction supply chains and types of relations
	Level of Analysis		Case level
	Internal generalization		There is no reflection on internal generalization
	Statistical generalization		No
	Analytical generalization		No explicit reference to possibilities of analytical generalizations
	Aim		"We analyze the underlying dynamics of construction through activity theory based on a case study of the first Danish examples of partnering" (p. 119)
	Position in the field		Multi-player, inter-organizational, project based, new non-residential building
Hughes <i>et al.</i> (2012)	Gathering data		Paradigmatic case study about a €22 million building of headquarters for a central organization of a Danish trade union It concerns a longitudinal case study in which data are gathered through a "combination of questionnaire surveys, interactive workshops, semi-structured qualitative research interviews and onsite observations" (p. 119)
	Data analysis		The way in which data are analyzed is not explicated
	Role of the researcher		The role of the researcher in the research process is not explicated
	Theoretical background		The theoretical background is about "activity theory." The researcher's view on partnering is that it is not a fixed definition that exactly describes what it is and what it entails in practice, but it is "a fluid concept, which emerges from the specific circumstances of activities"
	Level of analysis		Case level that is generalized to country level
	Internal generalization		There is no reflection on internal generalization
	Statistical generalization		No
	Analytical generalization		"The aim of the present study is not "to test specific hypotheses or produce statistically generalizable results, but to use the case study in an exploratory way to contribute further towards theory development by developing analytical generalizations" (Bresnen, 2010, p. 619)
	Aim		"The research aims to test the hypothesis "The use of incentivisation with a gain/pain share of about 15 percent is a precursor to the achievement of successful infrastructure partnering projects in South Wales" (p. 306)
	Position in the field		Dyad, Inter-organizational, project bases, existing infra project Two case studies about rail infra projects in South Wales of £200 million and £3 million are conducted. "Questionnaires and interviews were used to gather both breadth and depth of data from within these two case projects" (p. 309)
	Gathering data		

Jefferies <i>et al.</i> (2014)	Data analysis	Statistic procedures are applied. The results are supported and nuanced with interviews with key figures
	Role of the researcher	The role of the researcher in the research process is not explicated
	Theoretical background	The theoretical background is about incentives in partnering
	Level of analysis	Case level
	Internal generalization	There is no reflection on internal generalization
	Statistical generalization	Statistical procedures are used to analyze data
	Analytical generalization	No explicit reference to possibilities of analytical generalizations
	Aim	“The aim of this paper is to investigate factors that influence the successful implementation of Project Alliancing and therefore establish a framework of critical success factors (SCF’s)” (p. 465)
	Position in the field	Multi-player, inter-organizational, strategic-based relationships in an existing civil project
	Gathering data	Single case study about an operations and maintenance of a sewage system in Australia, whereby senior managers from the six partners from the alliance are interviewed following a semi-structured interview protocol
Johnson <i>et al.</i> (2013)	Data analysis	Short description about how a “content analysis approach” was used to “group and compare the findings from both the review of literature and the case study project” (p. 471)
	Role of the researcher	The role of the researcher in the research process is not explicated
	Theoretical background	In the theoretical background existing critical success factors are identified
	Level of Analysis	Case level. Individuals are quoted to increase understanding and ground the findings
	Internal generalization	There is no reflection on internal generalization
	Statistical generalization	No
	Analytical generalization	No explicit reference to possibilities of analytical generalizations
	Aim	The purpose of this paper is to determine if an IPD contract can effectively be utilized in federal construction and, if so, to create a framework under which federal organizations can take advantage of IPD’ (p. 481)
	Position in the field	Dyadic, inter-organizational-, strategic-based relationships
	Gathering data	An embedded single case study design. “This type of study is appropriate to test a hypothesis with a clear set of propositions, as well as clear circumstances within which they are believed to be true” (p. 483). Further, the “Delphi method was utilized for data collection,” using a group of reviewers
	Data analysis	This paper’s analysis was developed from a combination of the reviewers’ findings and interpretations, the author’s own research and interpretations, and respondent validation performed during data collection and after completion of early drafts (p. 481)
	Role of the researcher	Except that it is acknowledged that the researcher’s interpretation played a role in analyzing data, the role of the researcher within the research process is not explicated
	Theoretical background	The theoretical background is about key practices of using a contract
	Level of Analysis	Different “units of analysis” in this case are object of study – case level

(continued)

Table AI.

Laan <i>et al.</i> (2011)	Internal generalization	There is no reflection on internal generalization
	Statistical generalization	No
	Analytical generalization	No explicit reference to possibilities of analytical generalizations. The findings seem to apply for all federal construction alliancing projects, because the authors conclude that "If the preceding steps are followed, an effective alliancing contract can be used in federal construction without major difficulty" (p. 487)
	Aim	In this paper we aim to generate insight into the process of establishing and maintaining cooperative, trusting relationships in partnering projects (p. 99)
	Position in the field	Multi-player, inter-organizational, project-based relationships, in a both new and existing infra project
	Gathering data	Longitudinal case study about a €40 mln rail infra project in the Netherlands. Doubling the number of tracks in the domain of a medium-sized city over a length of about 5 km. Some new and existing related buildings and infrastructure is involved. Data are gathered in three rounds of interviews with key respondents, using a protocol that was based on literature study about "risk, trust, control and performance" (p. 101)
	Data analysis	In one paragraph it is explained how the authors reduced and categorized data, using Swanson and Holton (2005) and Miles and Huberman (1994)
	Role of the researcher	The role of the researcher in the research process is not explicated
	Theoretical background	The theoretical background is about the concept of trust, and dimensions and resources of trust and the role of trust in the governance of inter-organizational relationships. Also, the interview protocol is based on literature study
	Level of analysis	Case level with individual quoting
Lu <i>et al.</i> (2013)	Internal generalization	There is no reflection on internal generalization
	Statistical generalization	No
	Analytical generalization	It is not literally suggested that the findings can be generalized analytically. It is recognized that "we have to be careful in generalizing our findings (p. 106)
	Aim	The research 'aims to add new insights to the knowledge body on Construction Professional Services by situating Chinese construction professional services (CCPSs) within the international context (p. 303)
	Position in the field	Multi-player, inter-organizational relationships
	Gathering data	Data-triangulation is applied, gathering quantitative as well as qualitative data, using "yearbooks, annual reports, interviews, seminars, and interactions with managers in major CCPS companies" (p. 306)
	Data analysis	Two of the authors analyzed the data separately, and agreement of the analysis was achieved through multiple interactions between the two authors' (p. 307)
	Role of the researcher	The role of the researcher in the research process is not explicated
	Theoretical background	The theoretical background is about the history and current state of construction professional services in China
	Level of analysis	Country level
	Internal generalization	There is no reflection on internal generalization

Osipova and Eriksson (2011)	Statistical generalization	No
	Analytical generalization	It is not literally suggested that the findings can be generalized analytically. The results apply for the Chinese market
	Aim	The aim of this study is to investigate how procurement options influence risk management in construction projects (p. 1150)
	Position in the field	Multi-player, inter-organizational, project-based relationships
	Gathering data	Data are gathered in 11 cases about building as well as civil engineering projects in small and large cities in Sweden. Data are gathered in several round using interviews with experts in the cases and questionnaires
	Data analysis	The process of data analysis is not explicated
	Role of the researcher	The role of the researcher in the research process is not explicated
	Theoretical background	The theoretical background is about risk management in general and risk allocation through construction contracts
	Level of analysis	Case level
	Internal generalization	There is no reflection on internal generalization
Pan <i>et al.</i> (2012)	Statistical generalization	No
	Analytical generalization	It is not literally suggested that the findings can be generalized analytically. It is suggested that "future surveys should aim to target a wider range of procurement options in a larger sample of construction projects" (p. 1156)
	Aim	This paper scrutinizes the processes through which off-site technologies were adopted and utilized in house building (p. 1332)
	Position in the field	Multi-player, inter-organizational, strategy based relationships in new residential building
	Gathering data	Action research in two cases of residential buildings in the UK in which the researcher was "proactively" engaged "in the use of off-site production at three distinct but interrelated levels of governance". Data were collected using, a questionnaire survey, interviews, focus groups, informal discussions and meetings, "which were supported by observations, site visits, and document analysis" (p. 1334)
	Data analysis	The analytical model (Miles and Huberman, 1994) was used for data analysis, which included three concurrent flows of activity: data reduction, data display, and conclusion drawing and verification (p. 1334)
	Role of the researcher	The research approach was based on the collaboration between the researcher and the organization, using a coproduction model in creating new knowledge (p. 1333)
	Theoretical background	The theoretical background is about classifying off-site production technologies and off-site production in house building
	Level of analysis	Case level
	Internal generalization	There is no reflection on internal generalization

(continued)

Table AI.

Sandberg and Bildsten (2011)	Aim	The purpose of this paper is to explore the relationship between the coordination of activities and resources on the one hand, and the occurrence of different types of waste on the other' (p. 77)
	Position in the field	Multi-player, intra-organizational, strategic-based relationships in new building
	Gathering data	Case study about a Swedish manufacturer that produces Timber Volume Elements, operating on the Swedish and Norwegian market. Interviews were held with different employers in different aggregation levels of this company
	Data analysis	There are no concrete indications what analysis techniques are used
	Role of the researcher	The role of the researcher is not explicated
	Theoretical background	The theoretical background is about coordination and waste and the question what exactly coordination is. It is also about value and waste in the lean concept
	Level of analysis	Case level
	Internal generalization	Short reflection on the representativeness of the case: "The case company has been chosen not for being representative of the whole construction industry or the industrialized housing concept, but because it is expected to replicate or extend the emergent theory" (p. 81)
	Statistical generalization	No
	Analytical generalization	No explicit reference to possibilities of analytical generalizations
Smyth (2010)	Aim	While many have felt that there has been little or no progress (e.g. Green, 2006), yet scant empirical research has been put forward to support success or failure of these initiatives. This paper has the overall aim of helping to address this gap (p. 256)
	Position in the field	Inter-organizational relationships in the UK
	Gathering data	"The so-called 'Continuous Improvement' program in the UK is evaluated as a case study through an analysis of demonstration projects' (pp. 255). According to Smyth (2010), primarily an action research method was applied. Two types of evidence are used in this study: "aggregate data over a 10-year period and qualitative data over a two-year period at the end of the first decade since the Egan Report in order to identify in greater depth trends for the future"
	Data analysis	The analyzing procedure involved several steps of categorizing data. No reference to an existing method of analyzing is made
	Role of the researcher	The role of the researcher is not explicated
	Theoretical background	The theoretical background discusses attempts to evaluate performance improvement programs
	Level of analysis	Country level
	Internal generalization	The sample is 150 demonstration projects, representing 33% of the population, selected for reasons that industry actors had written these up in short report format. This is a reasonable sample, yet the fact that only one-third has been written up is itself a constraint upon demonstration and dissemination, even before adoption is addressed (p. 259)
	Statistical generalization	Statistical procedures are used to analyze data
	Analytical generalization	Possibilities for analytical generalization is not literally referred to, yet limitations and opportunities of generalizing results to other contexts are discussed

Taggart <i>et al.</i> (2014)	Aim	The purpose of the research and empirical work described herein was twofold. First to assist a small/medium enterprise to improve its productive processes toward the elimination/reduction of rework and defects. Second, the work seeks to contribute to theory in the area of defects elimination and management through dissemination of the research findings (Baskerville, 1999; Roson, 2002) This involved work in the following areas: (1) understanding the improving defects identification and management system, (2) providing an understanding of the costs involved, (3) providing root cause analysis into defects with the aim of avoiding future repetition, (4) training and learning" (p. 830)
	Position in the field	Multi-player, inter-organizational, project-based relationship in non-residential building
	Gathering data	Action research case study about a health department with a project value of €1.4 million in UK. And, "a substantial amount of diverse qualitative data was produced" (p. 831)
	Data analysis	No explanation about how data were analyzed
	Role of the researcher	Some indications about the role of the researcher in the research process, such as this research is part of a wider PhD-project, and the field researcher attended site "during the latter part of the construction phase" (p. 835)
	Theoretical background	The theoretical background is about defects causation, cost of rework and defects, and collaboration in the supply chain
	Level of Analysis	Case level, with individual quoting
	Internal generalization	There is no reflection on internal generalization
	Statistical generalization	No
	Analytical generalization	No explicit reference to possibilities of analytical generalizations
Ying <i>et al.</i> (2014)	Aim	"The objective of this research sought to address how construction logistics efficiency can be improved through optimizing vehicle movements to the construction site" (p. 262)
	Position in the field	Multi-player, inter-organizational, project-based relationships
	Gathering data	Case study about a 13 level tower block with roof top plant room surrounded with lecture theater and student facility in Auckland, New Zealand. Data are gathered using interviews and observations
	Data analysis	"These data were analyzed as a whole, reduced to focus on the main questions of how these challenges occur. The causes of the problem were analyzed, and generalization of the causes were carried out using principles of supply chain management" (p. 267)
	Role of the researcher	The role of the researcher is not explicated
	Theoretical background	The theoretical background discusses theoretical perspectives of construction logistics
	Level of analysis	Case level
	Internal generalization	There is no reflection on internal generalization
	Statistical generalization	No, suggestions for quantitative research in the future
	Analytical generalization	No explicit reference to possibilities of analytical generalizations
Zimina <i>et al.</i> (2012)	Aim	Is Target Value Design really different from current practice and why? (p. 384)
	Position in the field	Inter-organizational, project-based relationships

(continued)

Table AI.

Table AI.

Gathering data	Action research in 12 cases amongst which Fairfield Medical Office, and The Cathedral Hill Hospital
Data analysis	The process of analyzing data is not explicated
Role of the researcher	Some indications about the role of the researchers are given. For example, "The researchers were directly involved and worked with the project teams almost on a daily basis, acting as informers of the theory of target costing, helping with the execution of the practical trials, making adjustments and collecting data" (p. 384)
Theoretical background	The theoretical background is about target costing, target costing in construction and target value design
Level of analysis	Case level
Internal generalization	There is no reflection on internal generalization
Statistical generalization	No
Analytical generalization	No explicit reference to possibilities of analytical generalizations

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