



# Designing for impact: the effect of rigor and case study design on citations of qualitative case studies in management

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## Abstract

One of the most highly cited papers in management is Eisenhardt's (Acad Manag Rev 14(4):532–550, 1989) piece on the importance of case study research, in particular multiple cases (versus single cases), for theory building. We focus on this distinction between multiple versus single cases in the context of rigor and impact of management case studies ( $N=173$ ) published during the period 1996–2006 in *Academy of Management Journal*, *Administrative Science Quarterly*, *Organization Science*, and *Strategic Management Journal*. We find that this distinction of multiple versus single only crudely captures the reality of case study designs in published article. For this we propose an alternative empirical classification of case study design that is *replication* and *non-replication*, in which case studies using a replication logic either in single cases (e.g. comparing teams within an organization, where the case is the organization) or, indeed, multiple cases (e.g. comparing teams across multiple organizations) are more rigorous and also more impactful than cases who do not use replication logic. However, unlike in quantitative research, rigor is not a driver of article citations in qualitative studies. In this regard, our finding makes important contributions to scientrometric research by discussing criteria under which different case study designs can be rigorous and impactful.

**Keywords** Case study · Rigor · Replication logic · Qualitative research · Citations

## Introduction

Eisenhardt's (1989) paper on building theories from case study research in *Academy of Management Review* is well-known for distinguishing multiple versus single case study designs. In fact, it is one of the most highly cited papers in the management discipline (over 50,000 citations on Google scholar), and by a large margin is the most highly cited paper on qualitative methods. It therefore comes to no surprise that case study research is

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considered the most popular qualitative research method in the field of management (Welch et al. 2013; Tsang 2014), and has provided the field with its most ground-breaking insights (e.g., Burgelman 1983; Chandler 1990; Doz 1996; Penrose 1960; Pettigrew 2014). However, the case study method, more than any other method, has attracted concerns regarding rigor (e.g. Bettis et al. 2014; Gibbert et al. 2008; Piekkari et al. 2009). This is worrying since a lack of rigor will affect the impact of a study's results (Bergh et al. 2006; Scandura and Williams 2000). In this paper, we examine the links between case study design (i.e. research design), rigor (i.e. quality of a research), and impact (i.e. citation counts).

We focus on impact as the main outcome variable since one of the key goals of any research publication is to be highly cited. This is because citations play a significant role in evaluating the reputation of a researcher, academic department, and journal (Aguinis et al. 2014; Judge et al. 2007; Mingers and Xu 2010). As a result, we have seen increasing scientometric interest in factors driving article citations across different disciplines (see Meyer et al. 2018 for accounting; see Hamermesh 2018 for economics; see Haslam et al. 2008 for psychology; see Stremersch et al. 2007 for marketing). In management, scholars have exhibited a rising interest in understanding drivers of article citations (see Mingers and Xu 2010; Ronda-Pupo 2017). For example, Bergh et al. (2006) look at factors affecting citation count of quantitative articles published in *Strategic Management Journal*. In the *Academy of Management Journal*, we have seen two editorials that explore factors driving article citations in management research (Conlon et al. 2006; Judge et al. 2007); and more recently Nair and Gibbert (2016) looked at title characteristics that drive citation counts in management. However, none of these studies focus specifically on qualitative case study research, and hence we do not know if the established rigor-impact link from quantitative research (e.g. in Bergh et al. 2006) generalizes to qualitative research.

To understand the interrelationships between rigor and case study design on article impact for qualitative case study research, we apply content analysis on all qualitative case study articles published from 1996 until 2006 in *Academy of Management Journal*, *Administrative Science Quarterly*, *Organization Science*, and *Strategic Management Journal* ( $N=173$ ). We then apply ordinary least squares and logistic regressions, with the aim of understanding the role of different rigor criteria and case study design on impact. We find that rigorous studies are not cited more (quite unlike in quantitative research). Instead, we find that case studies using a replication logic either in single cases (e.g. comparing teams within an organization, where the case is the organization) or multiple cases (e.g. comparing teams across multiple organizations) are more rigorous and also more impactful than cases who do not use replication logic.

Our study makes important contributions by offering a new empirical classification on case study design and also discusses seven key rigor criteria that can make qualitative case study designs more rigorous and impactful.

## Multiple versus single case study designs

Case study research is a qualitative method used for theory building, theory testing, and theory refinement (Bartunek et al. 2006; Eisenhardt and Graebner 2007; Gibbert et al. 2008; Ragin and Schneider 2011; Szulanski and Jensen 2011; Voss et al. 2002). In this study, we define case study research as a method that uses multiple data sources to develop a contextualized understanding of the phenomenon with the intention of confronting theory

by comparing it with empirical data (Piekkari et al. 2009). Therefore a case is seen as the unit of analysis, since it is the study's object of interest (Fletcher and Plakoyiannaki 2011).

A widely established way to categorize case study design is multiple versus single case study design. Yin's (1984, 2009) well-known typology further classifies case study research into four designs (single holistic, single embedded, multiple holistic and multiple embedded). Single holistic design denotes the situation when there is only one case; whereas in a single embedded design there are also sub-cases within the case of interest. These sub-cases are also known as embedded units. The same logic extends to multiple holistic and multiple embedded designs, the only difference being that here there is more than one case to be analyzed.

In management, case study research as a method gained traction after Eisenhardt's (1989) seminal paper on "Building Theories from Case Study Research". In this paper, she asserts the usefulness of multiple case study design over single case study design. This is because multiple case study design allows for 'replication' (Eisenhardt 1989; Yin 1984; Yin 2009). Replication is a process in which a researcher selects more than one dissimilar or/and similar cases for cross-case comparisons (Yin 2009). Although she acknowledges the usefulness of single embedded designs (Eisenhardt 1989), in her later papers on case study research, she reasserts her belief that multiple case study designs are inherently better than single case study designs (Eisenhardt 1991; Eisenhardt and Graebner 2007; Gehman et al. 2017).

Therefore we further probe this classification of multiple versus single case study designs, in light of published qualitative case study papers.

## Criteria to assess case study rigor

Rigor is an important aspect of research, because it ensures that a study's results and claims represent a sound basis for further elaboration in the research community. Therefore higher transparency on rigor allows for 'replicability' of results (Aguinis and Solarino 2019). Despite its acknowledged importance there is a lack of consensus on criteria that lead to rigorous qualitative research (Morse et al. 2002). Paradigmatic differences, especially between 'positivists' and 'interpretivists', have led to disagreements surrounding certain rigor criteria (especially external validity) that are seen as inappropriate for evaluating different qualitative approaches. Eventually Lincoln and Guba (1985) suggest a new set of rigor criteria (credibility, transferability, dependability, and confirmability), which they refer to as 'trustworthiness'. However, Morse et al. (2002) highlight that despite paradigmatic differences there is considerable overlap between the different components of rigor and trustworthiness. Furthermore more recently, an editorial note in the *Academy of Management Journal* (Eisenhardt et al. 2016) identifies a number of important commonalities in qualitative research concerning rigor. The editorial note proposes three broad criteria for assessing rigor. The first criterion is providing a detail explanation of the constructs and their relationships backed by data and logical reasoning. The second criterion is rooting the analysis in 'compelling data', and the third criterion is providing rich and novel theoretical insights. Nonetheless, lack of consensus still prevails as evident from a recent symposium held at the Academy of Management Meeting in 2016. In the symposium, notable experts in qualitative research discussed their view on qualitative research, and each scholar held very different views on how qualitative research should be conducted (Gehman et al. 2017).

Therefore, pluralism clearly is an asset to qualitative research (Gehman et al. 2017), and coincidentally the debate on pluralism helpfully suggests important commonalities when it comes to criteria concerning rigorous qualitative research. Our rigor criteria are based on such previous studies which have identified broad common categories for rigor (Morse et al. 2002; Eisenhardt et al. 2016), along with other method papers (Cook and Campbell 1979; Denzin 2017; Eisenhardt 1989; Eisenhardt and Graebner 2007; Eisenhardt et al. 2016; George and Bennett 2005; Gibbert et al. 2008; Gibbert and Ruigrok 2010; Lincoln and Guba 1985; Yin 2009) from which we propose seven common rigor criteria, which are necessary to undertake irrespective of the paradigmatic camp that the researcher belongs to. These rigor criteria are: providing the rationale for selecting the case, indicating the case(s) and sub-cases clearly, providing a rationale for data selection, doing data triangulation, identifying focal, identifying non-focal constructs, and discussing the context of the case (see Table 1). We explain each of these rigor criteria below.

(1) Rationale for selecting the case and indicating the case(s) and sub-cases(s) clearly:

John Stuart Mill pointed out that “we can either find an instance in nature suited to our purpose, or, by artificial arrangement of circumstances make one” (Mill 1875, p. 249). Since case study research by definition precludes manipulation, the emphasis here is on ‘finding’ the right case(s). Furthermore case study research designs are based on a small number of cases which are sampled purposefully (rather than randomly). Under ‘purposeful sampling’ only cases that will provide rich information on the phenomenon of interest are selected (Coyne 1997; Palinkas et al. 2015; Patton 1990; Suri 2011). This is an important rigor criterion, because a case that is well selected will lead to meaningful theoretical insights and contributions (Cuervo-Cazurra et al. 2016; Eisenhardt and Graebner 2007). Furthermore, only the right case(s) (and sub-cases or embedded units) will allow for “illuminating and extending relationships and logic among constructs” (Eisenhardt and Graebner 2007, p. 27). It is therefore important that a case study article clearly relates the reasons behind the selection of the case(s) and sub-cases. Furthermore, while providing the rationale for selecting the case is important, mentioning the case(s) and sub-cases explicitly is also important as it helps to determine the case study design of the research (Yin 2009).

(2) Rationale for data selection and data triangulation:

Scholars in the qualitative community agree that it is extremely important to discuss the rationale behind data collection. This helps to confirm that the themes and theoretical insights emerging from case study research are in fact “grounded in compelling data” (Eisenhardt et al. 2016, p. 1120). In particular, the researcher should discuss the rationale for selecting similar or different data sources and how it adds to the theoretical understanding of the phenomenon. This also extends to justifying the time period for which the data is collected. Once the time frame and data sources have been justified the next step is to triangulate the data sources (Eisenhardt 1989; Denzin 2017; Yin 2009). Data triangulation is an important rigor criterion as it can either lead to the convergence of existing theoretical insights or to the generation of new theoretical insights.

**Table 1** Criteria for rigorous case study designs

Rigor criteria <sup>a</sup>	Description <sup>a</sup>	Rationale <sup>a</sup>	Examples
Giving rationale for selecting the case(s)	Using ‘purposeful sampling’ to select information rich case(s) that can provide meaningful theoretical insights	To establish that the case is indeed suitable or appropriate to provide valid information on the phenomenon of interest	“We constructed a two-by-two cell design to explore effects of stronger/weaker scientific evidence and the degree of innovation complexity on spread pathways... We undertook theoretical rather than random sampling, choosing a pair of innovations in all four cells, giving us a total of eight cases.” Fertie et al. (2005)
Clearly indicating case and sub-cases	Clearly label the object(s) or case(s) under scrutiny	Enables within or between case comparisons. It also ensures that reader can appreciate the empirical basis of emerging theory	“The SBU was selected as the unit of analysis because of its centrality in the product innovation process.” Brown and Eisenhardt (1997)
Providing a rationale for data selection	Providing a reason for selecting data from a particular data source and in a particular time period	Ensures that the study is using compelling data for theory building, which makes the theoretical insights and claims more convincing	In the study conducted by Bansal and Roth (2000) they justify the use of archival data by stating that “This information served to confirm the reliability of the interviewees’ responses and permitted more directed and detailed probing in the interviews.”
Data triangulation	Collecting data from multiple sources (e.g. interview transcripts, archives, field notes)	Enables validation and verification of theoretical insights and claims	“In collecting data for this study, we sought to obtain information both broad and deep enough to ensure a rich accumulation of data from which to draw inferences. To this end, we collected data from multiple sources, including in-depth inter-views, participant observations, and archival documents.” (Bansal and Roth 2000)

**Table 1** (continued)

Rigor criteria <sup>a</sup>	Description <sup>a</sup>	Rationale <sup>a</sup>	Examples
Identifying focal constructs Identifying non-focal constructs	Explanatory factors as well as expected outcomes to be clearly indicated and explicitly labeled. This also includes a discussion on non-focal constructs (i.e. constructs that are not of interest but might have an effect on the phenomenon of interest)	Allows to unravel causal processes and mechanisms that leads to rich and novel theoretical insights or claims for theory building.	The model linked customer demands and technological innovation. The causal construct here was “ <i>customer demands</i> ”. The outcome was “ <i>technological innovation</i> ” or “ <i>disruptive architecture</i> ” (Christensen and Bower 1996)
Providing details of case study context	Illustrate and explain the context that might not be directly relevant to the emerging theory	Ensures the selection of suitable case(s) and also enhances transferability of the findings to other similar cases	The authors provide detailed contextual information about the three teams they observed (Cco, Ico, and Hco). The details include physical condition of the offices, team composition, nature of work, and various kinds of software engineering tasks that each team undertook Perlow et al. (2002)

<sup>a</sup>The information provided for the column headings rigor criteria, description and rationale were informed by Cook and Campbell (1979), Denzin (2017), Eisenhardt (1989), Eisenhardt and Graebner (2007), Eisenhardt et al. (2016), George and Bennett (2005), Gibbert et al. (2008), Gibbert and Ruigrok (2010), Lincoln and Guba (1985), Morse et al. (2002) and Yin (2009)

### (3) Identifying focal and non-focal constructs:

In case study research, while some case study designs are more explanatory than exploratory (e.g. Gerring 2007), a common denominator is that the main theoretical constructs and their emerging relationships are explicitly illustrated and explained. This allows for new and rich theoretical insights (Eisenhardt et al. 2016). Therefore it is important to clearly relay the theoretical constructs, which includes an explanation of main focal constructs (the cause and outcome). It also includes an explanation of constructs that are not in the forefront of theoretical attention but can affect the phenomenon under investigation. We call such constructs as non-focal constructs.

### (4) Providing contextual information on the case:

Finally, precisely because the boundaries between case and case study context are sometimes not clearly evident, providing relevant details about the context of the case(s) is needed. This is because understanding the context helps to determine the suitability of the methodological choices (Bettis et al. 2014; Buchanan and Bryman 2007; Michailova 2011). It also provides a more nuanced understanding of the phenomenon. Furthermore, the provision of contextual detail allows for ‘theoretical generalization’ (Yin 2009), which allows for theories to extend to other case(s) that are contextually similar. Therefore, from a rigor standpoint providing details of the case study context is necessary.

## Factors affecting impact (article citations)

Numerous studies, in different fields, have tried to identify factors that affect scientific impact, largely because citations are used as a measure to appraise the reputation of a researcher, journal and even academic department (Aguinis et al. 2014; Cole and Cole 1972; Judge et al. 2007).

The literature classifies factors that affect article citations into two broad categories namely the ‘particularistic perspective’ and ‘universalist perspective’ (Judge et al. 2007; Meyer et al. 2018; Stremersch et al. 2007). According to the ‘particularistic perspective’, citations are driven by the reputation and other characteristics of the author(s). Therefore a more reputable author will be cited more, a phenomenon that has also come to be known as the ‘Mathew effect’ (Merton 1968).

On the other hand the ‘universalist perspective’ states that an article is cited because of its content. Therefore the quality of the research will determine whether the article is cited more or not. For example, Bergh et al. (2006) found that for quantitative studies published in *Strategic Management Journal*, methodological rigor attributes have a direct impact on citations. Furthermore other studies have also confirmed the impact of different ‘approaches’ and ‘method types’ on article citations (Haslam et al. 2008; Stremersch et al. 2007). In light of the ‘universalist perspective’ we want to explore the effect of rigor and case study design on citations of qualitative case study articles, which has not been explored before. This motivates the following two research questions of our study;

RQ1: What is the impact of rigor criteria and case study designs on article citations in qualitative case study research articles?

RQ2: How does the reporting of rigor criteria differ between case study designs?

## Methodology

We select all qualitative case studies which were published in four top management journals during the period 1996–2006: *Academy of Management Journal*, *Administrative Science Quarterly*, *Organization Science*, and *Strategic Management Journal*. Following prior studies on rigor and scholarly impact (e.g. Gibbert et al. 2008; Gomez-Mejia and Balkin 1992; Podsakoff et al. 2005; Pratt 2008; Tahai and Meyer 1999), we use purposeful sampling to select these journals, with the rationale that top management journals proxy best research practices. Furthermore we select the period from 1996 to 2006 because, first of all, it is long enough to construct a good sample of qualitative articles. Secondly, since citations accumulate slowly in the field of social sciences (Bergh et al. 2006; Walters 2011) this sample is old enough for the articles to have accumulated citations.

To identify articles using case study research from among these journals, we follow the criteria set forth by a previous study on case study rigor (Gibbert et al. 2008). In particular, we perform a search involving keywords: *qualitative, case study, grounded theory, triangulation, archival data, interview, observation, coding, theoretical sampling, and ethnography*. We exclude articles which use both qualitative and quantitative methods simultaneously (mixed methods articles).

For each article we compile the sum of citations and the *h-index* from the Web of Science during mid-August 2017. We collect the citation and *h-index* information for all articles on the same day. We then compile a candidate list of articles, which includes the author names, year of publication, *h-index* of the authors, gender of the first author, location base of the first author, proportion of female authors to the author team, journal name, and article citations. Our final sample consists of 173 articles, in which 40 article are from *Academy of Management Journal*, 39 article are from *Administrative Science Quarterly*, 68 article are from *Organization Science*, and 26 article are from *Strategic Management Journal*.

## Coding rules

In this study, we use the technique of content analysis. This technique focuses on textual analysis and its meaning (Hsieh and Shannon 2005; Nair 2018). In our first round of coding (Strauss and Corbin 1998; Patton 1990), we use the well-known classification of single versus multiple case study designs each of which can be either holistic or embedded (Yin 1984, 2009). As we refine our coding approach, we see that this distinction crudely captures the reality of case study designs in published articles. This is because single embedded designs in terms of analysis bears striking similarities to articles using multiple cases, as both use a ‘replication logic’ for comparative inference.

For example, as shown in Table 2, Tripsas and Gavetti (2000) investigate a single case that is Polaroid, and uses replication within the case to compare three different phases (sub-cases or embedded units) to understand how Polaroid shifted from analog to digital imaging. Similarly, Schweizer (2005) uses replication to select five cases to compare successful and unsuccessful deals. On the contrary replication is missing in articles that use single holistic design because these papers use a ‘process tracing’ logic for inference and therefore are void of any comparative analysis. For example, Burgelman’s (2002) conducts an in-depth study of Intel during the tenure of a CEO (Andy Grove).



**Table 2** Exemplars of case study designs (*replication* and *non-replication*)

#	Reference	Case study design	Research question/focus
1	Schweitzer (2005)	<i>Replication</i> design: there are five polar cases, i.e. successful and unsuccessful biotech and pharmaceutical company M and A deals	How (is) a biotech company integrated into a pharmaceutical company which is seeking to gain access to the former's technology, innovative capabilities and know-how?
2	Tripsas and Gavetti (2000)	<i>Replication</i> design: One company (Polaroid), but with three different phases (sub-cases) illustrating how it shifted from analog to digital imaging, as well as the corresponding changes in the outcome variable (organizational capabilities and adaptation)	How does managerial cognition affect the adaptive intelligence of organizations?
3	Grant (2003)	<i>Replication</i> design: ten similar cases, i.e. vertically integrated, diversified, large multinational (oil and gas) companies in a turbulent environment	(How) do companies perform strategic planning in increased environmental turbulence?
5	Brusoni and Prencipe (2006)	<i>Non-replication</i> design: One organization (Pirelli tires), no sub-cases	How does new knowledge enable technological and organizational evolution?
6	Burgelman (2002)	<i>Non-replication</i> design: longitudinal study of a company (Intel) during the tenure of a CEO (Andy Grove)	What are the implications of extraordinary success and co-evolutionary lock-in for organizational adaptation?

Using this insight from our first round of coding session, we contend that while replication logic in the literature is typically used for multiple case study design (Eisenhardt 1989; Eisenhardt and Graebner 2007; Yin 2009), it can also extend to single embedded case study. This is because replication is happening within the case, in which comparison is being done within the case (i.e. between sub-cases or embedded units). From this perspective replication can occur either on the level of the case (as in a multiple holistic design), on the level of the embedded unit of analysis (as in a single-embedded design), or both (as in a multiple embedded design). On the other hand, the single holistic design is the design with no replication as there is only one case.

Therefore in our study, any case study design that compares more than one (sub-) case by default is using a *replication* logic. Thus irrespective of whether there is one or several cases, we have a *replication* design as long as at least two (sub-) cases are being compared. Hence we believe that this empirical classification of design, *replication* and *non-replication*, better captures the reality of case study designs in published articles, see Fig. 1.

Furthermore, we use prior studies to operationalize concrete rigor criteria (Cook and Campbell 1979; Denzin 2017; Eisenhardt 1989; Eisenhardt and Graebner 2007; Eisenhardt et al. 2016; George and Bennett 2005; Gibbert et al. 2008; Gibbert and Ruigrok 2010; Lincoln and Guba 1985; Morse et al. 2002; Yin 2009). In total we have seven codes to assess rigor of a qualitative case study paper (see Table 3). In light of previous studies, we use dichotomous codes, which means that if an article reports a particular code it is marked 1, otherwise it is marked 0 (Bergh et al. 2006; Gibbert et al. 2008; Gibbert and Ruigrok 2010; Nair and Gibbert 2016). Furthermore a binary coding scheme ensures objectivity when assessing the disclosure of the rigor criteria.

Following Gibbert et al. (2008), we read and code the whole article (rather than just the methods section). This is necessary since some authors either present their methodology in the appendix (this practice is common, for instance, in *Organization Science* articles prior to 2000), or discuss considerations in other sections of the article (e.g. many authors discuss generalizability issues in the limitations section).

Overall, two researchers independently code 173 articles. This leads to two individual coding sheets, after which we compare our codes. To ensure inter-rater reliability of the coding process, we use a consensus coding approach, which leads to a final consensus coding sheet.

	SINGLE CASE	MULTIPLE CASE
NO EMBEDDED UNIT	SINGLE HOLISTIC DESIGN	MULTIPLE HOLISTIC DESIGN
MULTIPLE EMBEDDED UNITS	SINGLE EMBEDDED DESIGN	MULTIPLE EMBEDDED DESIGN

- - - - *Replication being used in our study informed by content analysis*      — *Replication being used in the literature*

Fig. 1 The difference in the usage of the term replication in our study and current literature

**Table 3** Frequency count of codes on rigor criteria and case study designs

Codes on rigor criteria and case study designs	Frequency of the code when it is present in non-replication design articles	Frequency of the code when it is present in replication design articles
Code 1: Rationale for selecting the case(s) given	13	82
Code 2: Case and sub-cases clearly indicated	21	78
Code 3: Rationale for selecting the data given	30	107
Code 4: Data triangulation	33	108
Code 5: Focal constructs identified	6	40
Code 6: Non-focal constructs identified	2	58
Code 7:Details on case study context given	39	108
Code 8: Non-replication design	58	0
Code 9: Replication design	0	115

The inter-rater agreement before consensus coding is 87.9%, which reaches 100% after consensus coding (Larsson 1993).

In Table 3, code 1 captures whether an article clearly motivates the selection of the case, i.e. provides a clear rationale for selecting the case. Code 2 captures whether authors indicate clearly the case(s) and sub-cases (if any). Codes 3 and 4 capture, respectively, whether articles provide a rationale for data selection and perform data triangulation. Code 5 captures whether the article identifies the focal constructs, and code 6 captures whether articles identify non-focal constructs. Code 7 measures articles that explicitly discuss and provide rich contextual information on the case(s). Code 8 and 9 capture case study designs, in which code 8 applies to *non-replication* design, and code 9 pertains to *replication* design.

### Ordinary least squares regression

To understand the impact of rigor and case study design on article citations, we run a simple ordinary least squares regression (OLS). The outcome variable for this regression is the sum of citations until mid-August 2017. To reduce the skewness of citation counts it is log-transformed (Conlon et al. 2006; Dezsö and Ross 2012; Manning and Mullahy 2001).

In accordance with prior studies, we include in the regression individual rigor criteria and case study design (Haslam et al. 2008; Conlon et al. 2006; Bergh et al. 2006; Judge et al. 2007; Meyer et al. 2018; Mingers and Xu 2010; Stremersch et al. 2007). We control for the productivity of the author by using the *h-index*. We calculate the *h-index* of the author during mid-August 2017 from Web of Science. If there are multiple authors, we use the highest *h-index*. Additional control variables are number of authors, gender of the author, ratio of female authors in the author team, journals (captured as dummy variables), and article age. After running the regression we rerun the regression with regional controls (i.e. the location base of the first author), which were *North America*, *South America*, *Europe*, *Asia* and *Oceania*. The interpretation of our results with the inclusion of regional variables did not change much from the previous results. Our OLS model is represented by the following equation.

$$\text{Log}(\text{Citation})_i = \delta_0 + \delta_1 CD_i + \sum_{k=2}^8 \delta_k RC_{ki} + \sum_{m=9}^j \delta_m Z_{mi} + \varepsilon_i$$

$\delta_0$  is the intercept.  $CD_i$  is the dichotomous variable capturing case study design (i.e. *replication* vs. *non-replication*) and  $RC_{ki}$  are the seven individual rigor criteria for the individual articles.  $Z_{mi}$  are controls of the model. For the model without regional controls  $j=16$ , since there are eight controls in the model, which are three dummy variables for journal (Organization Science as the base journal), four additional author characteristics variables (*h-index*, gender, number of coauthors, female ratio), and article age. For the model with regional controls  $j=20$ , since there are 12 controls in the model, which are three dummy variables for journal (Organization Science as the base journal), four regional variables (North America region as the base), four additional author characteristics variables (*h-index*, gender, number of coauthors, female ratio), and article age.  $\varepsilon_i$  is the error term.

### Logistic regression

Our results from the OLS show that none of the rigor criteria have a direct impact on citations, whereas case study design does. We now investigate whether reporting different

rigor criteria differ significantly between *replication* and *non-replication* designs, and identify whether rigor has any indirect effect on citations through case study design for which we run a logistic regression.

Logistic regression belongs to the family of generalized linear models, and is most suitable when the outcome is a qualitative binary variable. Since our outcome variable  $y_i$  is a dichotomous variable on case study design, a simple ordinary least squares regression would not serve our purpose as it will ignore the “discreteness of the dependent variable” and would not “constrain predicted probabilities between 0 and 1” (Cameron and Trivedi 2005, p. 464). We, therefore, model the probability ( $\pi$ ) of case study design being *replication* on the rigor codes from one to seven.

$$\pi = \text{Pr}[y = 1|x] = F(x'\beta)$$

$x$  is a regressor vector ( $8 \times 1$ ). It includes the rigor criteria, which are codes one to seven, and the constant term.  $\beta$  is a vector ( $8 \times 1$ ) of unknown parameters.  $F(\cdot)$  is the cumulative distribution function of the logistic distribution.

## Results

We find that mean citation count of articles present in our sample is high that is 252.76. However, we also see high level of variability since the standard deviation is 256.93 (See Table 4). We run a simple ordinary least squares using STATA version 14 (see Table 5). We find our dichotomous case study design variable to be significant ( $p=0.011$ ), whereas on average the citation count of articles using a *replication* design is 66.53% higher than those using a *non-replication* design. The *h-index* is also highly significant ( $p=0.002$ ), where one unit increase in the *h-index* leads to an expected increase of citations by 3.05 percent. Number of co-authors is highly negatively significant ( $p=0.005$ ), where an increase in one coauthor leads to an expected decrease of citations by 24.61 percent. Furthermore, gender of the first author (female = 1) is positively significant ( $p=0.019$ ), where on average citations for a female author is 62.74 percent higher than for a male author.

Regarding rigor, we find that none of the individual rigor criteria have a significant impact on article citations. To confirm our results, we run a separate regression with regional controls, however the interpretation of our results do not change (see Table 5).

In light of this, we suspect that case study design (*replication* and *non-replication*), which has a significant positive impact on citations, might in fact differ on the disclosure of different rigor criteria. To understand this, we run a logistic regression analysis. Table 6 reports both the coefficients and odds ratio for the logistic regression. The coefficients give us a sense of the relationship (i.e. negative or positive) that different rigor criteria share with case study design, while the odds ratio allows for a better comprehension of the effect that rigor has on different case study designs.

**Table 4** Descriptive statistics for citation, author’s *h-index* and rigor scores

Variables	Mean	Standard deviation
<i>Citation</i> <sup>a</sup>	252.76	256.93
<i>Log(Citation)</i>	5.08	1.01
<i>h-index</i> <sup>a</sup>	16.01	10.14

<sup>a</sup>Web of Science

**Table 5** Results of ordinary least squares

	<i>Log(Citation)</i>			<i>Log(Citation)</i>		
	Coefficient	Standard error <sup>a</sup>	<i>p</i> value	Coefficient	Standard error <sup>a</sup>	<i>p</i> -value
Case study designs	0.506**	0.195	0.011	0.504**	0.197	0.012
Rationale for selecting the case(s) given	0.124	0.181	0.497	0.146	0.184	0.430
Case and sub-cases clearly indicated	0.081	0.182	0.659	0.090	0.184	0.625
Rationale for selecting the data given	-0.080	0.235	0.734	-0.108	0.245	0.660
Data triangulation	0.065	0.283	0.819	0.092	0.300	0.759
Focal constructs identified	-0.308	0.178	0.085	-0.314	0.182	0.087
Non-focal constructs identified	-0.221	0.173	0.203	-0.244	0.176	0.168
Details on case study context given	0.212	0.265	0.425	0.257	0.274	0.350
<i>h</i> -index (WoS)	0.025***	0.008	0.002	0.025***	0.008	0.003
Number of co-authors	-0.218***	0.077	0.005	-0.254***	-0.087	0.004
Gender of the first author (female = 1)	0.487**	0.204	0.019	0.480*	0.221	0.032
Article age	0.010	0.025	0.734	0.005	0.026	0.838
Ratio of female authors in the team	-0.474	0.270	0.082	-0.484	0.281	0.086
Journal dummy variables	Included	Included	Included	Included	Included	Included
Regional dummy variables	-	-	-	Included	Included	Included
Constant	3.946***	0.508	0.000	4.079***	0.549	0.000
Observations	173	173	173	173	173	173

<sup>a</sup>Robust standard errors\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$

**Table 6** Results of binary logistic regression

	Case study designs					
	Coefficients	Standard errors <sup>a</sup>	<i>p</i> -value	Odds ratio	Standard errors <sup>a</sup>	<i>p</i> -value
Rationale for selecting the case(s) given	0.901**	0.451	0.046	2.463**	1.111	0.046
Case and sub-cases clearly indicated	0.448	0.454	0.324	1.566	0.712	0.324
Rationale for selecting the data given	1.488***	0.573	0.009	4.426***	2.537	0.009
Data triangulation	0.908	0.603	0.132	2.478	1.495	0.132
Focal constructs identified	0.909	0.622	0.144	2.482	1.544	0.144
Non-focal constructs identified	2.365***	0.821	0.004	10.646***	8.738	0.004
Details on case study context given	0.248	0.866	0.775	1.281	1.110	0.775
Constant	-2.757***	0.912	0.003	0.063***	0.058	0.003
Observations	173	173	173	173	173	173

<sup>a</sup>Robust Standard errors  
 \*\*\**p* < 0.01, \*\**p* < 0.05

As shown in Table 6, we find that the odds of providing a rationale for selecting the case is 2.463 times higher in a *replication* design than in a *non-replication* design (keeping all other covariates fixed). However, we see no reporting differences between *replication* and *non-replication* design articles when it comes to indicating the case.

Furthermore we find that the odds of providing a rationale for selecting the data sources is 4.426 times higher for *replication* design articles than *non-replication* design articles (keeping all other covariates fixed). However our results do show that there are no reporting differences between *replication* and *non-replication* design articles when it comes to indicating data triangulation.

Furthermore regarding the theoretical constructs we find no reporting differences between *replication* and *non-replication* design articles when it comes to indicating focal constructs. However we do find significant differences in reporting non-focal constructs, where the odds of discussing non-focal constructs is 10.646 times higher in *replication* than *non-replication* design articles. Finally we find no reporting differences between different case study designs when it comes to providing the details of the context.

Overall, we find significant reporting differences between *replication* and *non-replication* design, in which *replication* design articles are doing better at reporting explicitly the rationale for selecting the case, rationale for selecting the data, and identifying non-focal constructs.

## Discussion

The objective of this study is to understand the relationship of rigor and case study design on scientific impact (citations) for qualitative case studies. Our results show three key findings that have several theoretical implications.

First, we find that the existing case study design classification of multiple versus single case study design crudely captures the reality of case study designs in published articles. In particular, we find that the single embedded design is indeed very similar to multiple designs. This observation resonates with Eisenhardt's belief that "some single-case studies are actually multicase because the authors actually do break up the case and compare" (Gehman et al. 2017, p. 11). However, unlike Eisenhardt, we do not endorse the debate between multiple versus single case study designs, where multiple case study design are seen as the superior design (Eisenhardt 1989, 1991; Eisenhardt and Graebner 2007; Gehman et al. 2017). Furthermore this former distinction of case study design does not account for within case comparison as being a similar design to between case comparisons (i.e. multiple case study design). Therefore, we propose to re-focus the debate on design from multiple versus single, to *replication* and *non-replication*. A *replication* design adopts a logic of comparison for inference. On the other hand, *non-replication* design is interested in a more nuanced contextualized understanding of the phenomenon, which is void of comparison (Dyer and Wilkins 1991; Siggelkow 2007). Our study clearly shows that our alternative empirical classification of design, *replication* and *non-replication*, better captures how case study designs are being treated in published articles. Furthermore unlike the current debate where multiple case study designs are pitched against single case study designs, we advocate for more pluralistic designs where the merits of each design should rest on rigor. This is because each design offers a unique inferential lens to understand the phenomenon of interest, and this can play a significant role in developing scientific knowledge.

Second, unlike quantitative articles (Bergh et al. 2006), we find no direct causal relationship between rigor and article citations for qualitative case study papers. This is



counterintuitive, since we would expect rigor to drive citation impact, also for qualitative papers. However, we find no such relationship which means that in terms of garnering citations, an article that is more transparent on different rigor criteria will not be cited more than an article which does a poorer job at disclosing these actions. This is problematic, primarily because higher disclosure on rigor should signal a higher quality of research. However this is not translating to higher citations, something which researchers in the quantitative camp tend to benefit from. In light of this finding, we might infer that consumers of research are not valuing the quality of qualitative case study articles, since articles that discuss rigor criteria more, are not being cited more. However the other more probable reason is the lack of general agreement on the evaluation criteria of what constitutes a high ‘quality’ qualitative article. Even though the literature may suggest otherwise (as our article is able to identify generic rigor criteria for qualitative case study articles), there is a possibility that this lack of agreement in qualitative research prevents a direct relationship between rudimentary rigor criteria and citations from materializing.

Furthermore, in light of the fact that the reputation of the author (i.e. the *h-index*) plays an important role when it comes to citations, the finding that rigor has no direct impact on citations can be problematic for researchers who are in the early years of their academic career. This is because in academia citations play an important role in determining the reputation of the author as the expert in the field (Aguinis et al. 2014). From this standpoint aspiring academics, early in their career, may not garner as many citations even if they do a better job at discussing the different rigor criteria of their article. This can have serious and unfair consequences in getting promotions and securing tenure tracks. It might even discourage doctoral students from pursuing a career in qualitative research. Moreover researchers might pay less attention to the quality of their research thereby stifling meaningful scientific knowledge-creation from qualitative research.

To rectify this, journal editorial boards and reviewers can play a crucial role at bridging and propagating foundational rigor criteria that would be acceptable to all, by introducing special issues and more editorial notes that can address this matter in greater detail. While we do not suggest that there should be a boilerplate template, we can all agree that there are certain aspects of qualitative case study methodology that needs to be discussed. Therefore, even beyond disagreement with regard to individual rigor criteria, agreement on foundational rigor criteria is important, because in due time it will allow more rigorous case study articles to be cited more. In this spirit our study suggests to report the seven rigor criteria identified in this study, which includes reporting the rationale for selecting the case(s), indicating the case(s) and sub-case(s), indicating the reason for data selection, triangulating the data, identifying focal and non-focal constructs and finally indicating the context of the case. Both researchers and reviewers can use these seven rigor criteria to conduct and evaluate qualitative case study research.

Third, we find in this study that *replication* designs are cited more than *non-replication* designs. Without further probing, one could reach to the wrong conclusion that *replication* design is being unduly favored. However upon investigating which criteria of rigor are significantly being over or underreported for the two designs; we find that *replication* design is doing a better job than *non-replication* design. This is alarming, since one would expect that there should be equal reporting of all rigor criteria for both designs. However, we find that *replication* design articles are being more explicit when it comes to indicating case selection, data selection, and non-focal constructs than *non-replication* design articles. This lack of disclosure on different rigor criteria from *non-replication* design articles might in fact be the reason why these articles are being cited less.

Starting with case selection, one cannot stress enough the importance of this rigor criterion when compared to other rigor criteria. For most researchers it is the first step or decision that a researcher has to make when conducting a case study research. It would be an understatement to say that case selection is the ‘foundational stone’ for ensuring the rigor of a qualitative case study article. This issue becomes even more relevant for *non-replication* design as they contain just one case. Therefore, to be able to discern whether the case is indeed well selected, indicating the rationale behind the selection of the case becomes imperative.

Furthermore, *non-replication* articles lag behind *replication* articles when it comes to giving an explicit reason for selecting the data. It is surprising as to why *non-replication* design papers are not being more explicit about this rigor criterion, because this rigor criterion ensures that theoretical insights of the study are indeed grounded in data that has been carefully and well selected (Eisenhardt 1989; Eisenhardt et al. 2016; Gibbert et al. 2008; Gibbert and Ruigrok 2010).

Lastly, *non-replication* design papers are also being less explicit on indicating non-focal constructs than *replication* design articles. A probable reason could be that *replication* design papers are concerned about ‘theoretical generalizability’ where theoretical explanations on the constructs are offered so as to be able to transfer findings onto other similar cases (Tsang 2014). Hence this might be a reason why *replication* articles tend to discuss non-focal constructs more than *non-replication* articles. Nonetheless, discussing non-focal constructs is necessary for both designs to establish the validity of theoretical insights and claims. Not being explicit about non-focal constructs could seriously harm one of the main aims of qualitative research (including case study research) which is “to make a contribution to a specific research conversation or open a new one by providing fresh insights not easily discernible from existing theoretical and empirical work” (Eisenhardt et al. 2016, p. 1121). Furthermore since a *non-replication* design is better suited for unravelling causal mechanism and in understanding the process (Blatter and Haverland 2012), explaining clearly all constructs of the study becomes essential. Therefore, while we find no direct relationship of rigor criteria on citations, we do find that it has an indirect impact through case study design.

Here we want to acknowledge that we do recognize some limitations of our study. First our study focuses only on top tier journals. While our intention is to proxy best research practices by including high impact factor journals, it would be interesting if future studies can extend this analysis to middle or lower tier journals. Secondly, our study looks exclusively at the management field. Our reason for looking at articles published in the field of management is to control for disciplinary context. However future studies can expand disciplinary scope to better understand the factors that drive article citations for qualitative research. Third, our article could not account for the review process, and its role on the disclosure or non-disclosure of a particular rigor criterion. Therefore future studies can expand this analysis by interviewing authors, reviewers and editors to understand better the role of the review process on the reporting of different rigor criteria.

## Concluding remarks

In the field of scientometrics, the discussion revolves largely around what drives article citations for quantitative research. In this regard, our study moves the conversation towards qualitative research, by understanding the interrelationships between rigor and case study design on article impact for qualitative case study research.

By proposing a new empirical classification for case study design (i.e. *replication* and *non-replication*), we side with previous researchers who suggest that new scientific discoveries will only happen when the research community will accept pluralistic designs (Folger and Turillo 1999; Welch et al. 2011; Welch and Piekkari 2017). However, at the same time, we also contend that pluralistic designs will only be accepted more if papers transparently report rigor. From this perspective, researchers, editors and reviewers can use the set of rigor criteria proposed in this study when conducting or evaluating qualitative case study research. At the same time, we strongly urge both academicians and editorial boards to further refine and expand the set of rigor criteria proposed in this study, so that the research community can agree on foundational rigor criteria. We contend that such an agreement will not only promote pluralistic designs but will also make them impactful.

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