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Are rigor and transparency enough? Review and future directions for case studies in technology and innovation Management

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It is crucial to assess how technology and innovation management (TIM) scholars use case-based research. Our study provides a theoretical systematic review of qualitative case-based articles published in 31 TIM journals from 2013 to 2018. Our analysis of 311 articles uncovers patterns regarding rigor (including case justification and selection), transparency (including data collection and analytical methods), and paradigmatic consistency and pluralism. Our findings show some evidence of emerging pluralism in how TIM researchers perform qualitative case studies, but also highlight some worrying trends: paradigmatic inconsistencies, lack of transparency, and over-reliance on specific approaches, all of which affect the value of case study research. We provide methodological guidelines for improving the use of qualitative case research in TIM.

1. Introduction

Case-study approaches have gained popularity and recognition for their potential to extend and test theory (e.g. Bansal and Corley, 2011). They are especially useful for examining emerging or new phenomena and inductive theory building (Eisenhardt, 1989; Yin, 1994; Stake, 1995). They have contributed significantly to the development of the field of technology and innovation management (TIM), although the challenges and shortcomings

they entail regarding TIM scholarship have been examined only recently (see Goffin et al., 2019). The present review builds on and complements existing studies by analyzing how case studies are currently used in TIM, considering a relatively wide range of outlets. Furthermore, it assesses paradigmatic consistency – the extent to which case study practices in TIM are consistent with the paradigmatic assumptions underlying them. This is motivated by the fact that, although of indisputable value, most reviews of case-study practices focus on rigor and transparency

(see, e.g. Aguinis and Solarino, 2019), but pay less attention to such paradigmatic assumptions. Yet, Pratt et al. (2019) suggest that such preoccupation with rigor can marginalize some qualitative research approaches and, consequently, limit the development of the field. Furthermore, paradigmatic inconsistencies can cloud the clarity of a construct, mask potential re-labeling of concepts and lead to ontological drift (Thompson, 2011). This possibility is especially relevant for TIM phenomena given their complexity and the need for a range of research approaches that accurately capture them (Garud et al., 2013). Thus, by examining the rigor and paradigmatic consistency used in this research, we hope to complement the current reviews and provide guidance to inform future studies in this field.

Our purpose is to examine *how qualitative case studies approaches are currently used in TIM*. We performed a systematic theoretical review (see Paré et al., 2015) of 311 qualitative case-based articles published in 31 specialist and generalist TIM journals (Thongpapanl, 2012) from 2013 to 2018. Concentrating on this period is consistent with our focus on understanding *current* case study practices, as opposed to how these practices have evolved. More pragmatically, the shorter time span also allows us to include a wider sample of TIM journals and evaluate whether case studies in these outlets are subject to criticisms similar to those of case studies in management and organizational studies (Gibbert et al., 2008; Piekkari et al., 2009; Bansal and Corley, 2012; Goffin et al., 2019). We assess whether case-based research in TIM outlets lacks rigor and transparency, as Goffin et al (2019) found for five top TIM journals, as well as whether this research exhibits limited paradigmatic consistency and diversity (c.f. Van de Ven and Poole, 2005; Thompson, 2011). We briefly consider these two interrelated attributes below.

1.1. Rigor and transparency

The rigor and transparency of qualitative studies have been topics of much interest (Bansal and Corley, 2012; Aguinis and Solarino, 2019). A lack of transparency can make the reader ‘feel alienated from the experience and lose faith in the researcher’ (Bansal and Corley, 2011, p. 237) and undermine the credibility and trustworthiness of research. Higher standards of rigor and transparency support hypothetical or actual replication and may lead to more impactful research (Bluhm et al., 2011). Goffin et al. (2019, p. 1) note, however, that many articles published in the top five innovation journals

did not justify why case study research was appropriate; did not apply theoretical sampling criteria; were not transparent on how authors drew conclusions from the data; did not consider validity and reliability adequately; and did not go beyond description in their interpretation.

Attempts to make qualitative studies more transparent include rules to guide theorizing from case studies, often by reducing idiosyncrasies of specific cases and relatively narrow guidelines for emulating quantitative research approaches (Gioia et al., 2013; Cornelissen, 2017). Those suggestions can, however, lead to reduced pluralism by pushing researchers to adopt practices that are paradigmatically inconsistent with their overall research design (Pratt et al., 2019). Transparency is important, but it should be balanced against paradigmatic consistency and pluralism rather than as a ‘one-size-fits-all qualitative template’ (Pratt et al., 2019, p. 13).

1.2. Paradigmatic consistency and pluralism

Because TIM involves complex, interdisciplinary phenomena, its development as a field needs diverse perspectives for new insights and innovative research techniques to emerge (c.f. Piekkari et al., 2009; Bluhm et al., 2011). Nonetheless, if these approaches are too diverse, they might give rise to incompatible practices that hinder the accumulation of scholarly knowledge and lead to ontological drift, when the reasons underpinning these differences remain obscured (Thompson, 2011). Taken together, too much pluralism can lead to a fragmented field of incommensurate research (c.f. Wæraas and Nielsen, 2016). Hence, to ensure the TIM field develops, research in it requires common rules that allow for *both* paradigmatic diversity and necessary rigor and methodological coherence (Flyvbjerg, 2006).

This balance is, however, difficult to achieve. As noted by Piekkari et al. (2009, p. 567), guidelines for conducting case study research are often ‘interpreted and performed “locally,” that is, within a specific scientific community or discipline’. This approach is common to how disciplinary distinctiveness is pursued (c.f. Raasch et al., 2013; Siedlok and Hibbert, 2014). It can lead to orthodoxy in the methods and paradigms researchers adopt (Markóczy and Deeds, 2009), and thereby constrain novel approaches that could advance the field (Bluhm et al., 2011; Bansal and Corley, 2012). For example, Van de Ven and Poole (2005) note that variance methods, which imply a positivistic view of organizations, have been

the dominant approach in studies of organizational change, innovation, and entrepreneurship. These studies may shed light on organizations, but offer a limited way to conceptualize aspects of organizational flux, change, and development. Similarly, Edwards et al. (2005) suggest that biases in theory and methods toward normative-variance approaches restrict our current understanding of innovation in small and medium-sized enterprises (SMEs). Thus, it is important to understand both rigor *and* paradigmatic consistency of case studies in TIM, as well as the extent of paradigmatic pluralism in the field.

Such understanding can allow us to provide guidelines for improving the use of qualitative case research in TIM. By using the typology of Van de Ven and Poole (2005), which distinguishes between process and variance ontologies and epistemologies, we develop insights and provide guidance about the fit between different case study approaches and the alternative paradigms guiding TIM research. This typology also allows us to highlight approaches that are over- or under-represented (e.g. Ji et al., 2018; see also Bansal and Corley, 2012).

Overall our findings are congruent with those of Goffin et al. (2019) regarding transparency in how case studies in TIM are used. Yet we also provide important observations about the need for greater paradigmatic pluralism in this field. In addition, we show that many studies in TIM (i) have paradigmatic inconsistencies, (ii) misapply theoretical or analytical frameworks to a given research design, and, (iii) privilege variance studies even when the research conceptualizes TIM as a process. We also argue that (iv) although assessment frameworks such as CASET (Goffin et al., 2019) are useful in guiding positivistic case study approaches, they might restrict the diversity of case studies in TIM and thus hinder the understanding of this field.

The remainder of the paper is structured as follows. After a brief note on case study research, we describe our review approach by elaborating on the sample and our coding methods. We then present our findings of three approaches to qualitative case research, highlighting inconsistencies within and across the approaches. In the subsequent section, we discuss our findings and focus on the need for increasing the diversity of TIM case study approaches and research. Here, we also consider the consequences of this increased diversity for TIM researchers, reviewers, and editors. We then conclude by summarizing our contributions, acknowledging limitations to our approach, and setting out future opportunities and practices for TIM research.

2. Case study research: a brief note

Case studies cover a broad spectrum of ontological and epistemological stances. They can be underpinned by positivist and/or interpretive research philosophies and methods (Dubé and Paré, 2003). They can be used across different levels of analyses, to incorporate multiple sources of evidence (Stake, 1995), and to identify, define or refine concepts, constructs and variables and the relationships among them (Eisenhardt, 1989; Eisenhardt and Graebner, 2007; Siggelkow, 2007; Yin, 2009; Hoon, 2013). Thus, they are useful for both theory building and testing (Bansal and Corley, 2012; Cornelissen, 2017).

Case studies can also depict the interaction between the case and its context (Dubois and Gadde, 2002). They do so by linking rich descriptions of contextualized phenomena with conceptual insights. Rather than representativeness (Siggelkow, 2007), case studies allow a boundary to be demarcated between the research phenomena of interest (Woodside and Wilson, 2003) and its context (Dubé and Paré, 2003). Because they account for the possibility that findings evolve (Webb and Weick, 1979), they are often utilized in processual research (Van de Ven and Huber, 1990; Van de Ven, 1992). At the same time, case studies have been criticized for lack of rigor (Aguinis et al., 2018; Aguinis and Solarino, 2019; Goffin et al., 2019) and lack of transparency (Bansal and Corley, 2012). These concerns have led to calls for better descriptions of research methods and greater transparency to support replication and thereby enhance paradigmatic development (Bluhm et al., 2011). It is in this context of known benefits and concerns of improving case research that we situate our review of TIM qualitative case studies.

3. Qualitative case studies in TIM: an organizing framework

The use of qualitative case study approaches in TIM is well-established (Goffin et al., 2019). Scholars make valuable contributions to our understanding of TIM phenomena through qualitative case studies due to their ability to offer rich contextualized explanations. As Garud et al., (2013) argue, TIM phenomena comprise several types of complexities that require research approaches, like qualitative case studies, that capture them. Qualitative case studies are well suited to address these complexities through their ability to offer rich contextualized

		Ontology	
		TIM phenomena are conceptualized as a	
		Noun, entity, a “thing”	Verb, process in flux
Epistemology Approach to studying TIM	Variance approach	Approach I Variance studies of TIM; focus is on determining antecedents and consequences of phenomena, and/or law-like regularities between independent and dependent variables.	Approach IV Variance studies of TIM; relies on quantitative modelling and agent-based simulations to study complex phenomena.
	Process approach	Approach II Process studies of TIM; explain phenomena by breaking them into cycles, stages, or phases, along with describing the activities, characteristics, and structures.	Approach III Process studies of TIM which aim to theorize the dynamic, emergent, and complex nature of organizing without reducing those activities into a fixed set of stages/cycles.

Figure 1. Alternative approaches to studying TIM. *Source.* Adapted from Van de Ven and Poole (2005, p. 1387).

explanations of actors’ actions and interactions over time.

Researchers use qualitative case studies to develop both variance and/or process explanations. Variance approaches aim to identify antecedents and consequences of certain phenomena, while process approaches develop explanations of why and how events unfold over time (Mohr, 1982; Van de Ven and Poole, 2005). As recently pointed out by Gehman et al., (2018), some case study approaches, such as those of Eisenhardt (1989), are more consistent with variance-based purposes, while others are more geared toward process-based theorizing (e.g. Langley, 1999). Process approaches are better suited to address temporal complexities, for example, while variance approaches can surface cultural complexities through cross-case comparisons.

Van de Ven and Poole (2005) proposed a typology that uses the distinction between process and variance ontologies to map the alternative ways of studying TIM phenomena (see Figure 1).

Approach I adopts a substantialist ontology that conceptualizes TIM phenomena (e.g. organization, innovation, etc.) as entities and follows a variance epistemology. It attempts to identify causal relations to explain variance in the phenomena of interest. An example of this approach in TIM is research that focuses on identifying the antecedents and consequences of radical and incremental innovation (e.g. O’Connor, 1998; Lettl et al., 2006; O’Connor & DeMartino 2006). Approach II also adopts a substantialist ontology, coupled with a process epistemology. It attempts to identify the processes that explain the change in entities. Researchers adopting this approach have developed models that describe innovation processes in terms of stages, phases, or cycles (e.g. stage-gate model, Cooper, 2008; Minnesota Studies, Van de Ven et al., 1999). Examples of this approach include Burgelman’s (1983) stage model of internal corporate venturing

or Chiaroni et al.’s (2010) study of the process of shifting from closed to open innovation. Approach III adopts a process ontology and epistemology and is often referred to as a strong process view (Tsoukas and Chia, 2002) due to its conceptualization of TIM phenomena as ongoing processes and its associated focus on explaining movement. Examples of this approach in TIM research include studies building on actor-network theory’s notion of translation process (Callon, 1986) to emphasize the active role of actors in shaping the innovation process (e.g. Garud et al., 2011) or practice-based approaches focused on becoming and doing (e.g. Orlikowski, 2002; Dougherty, 2004; Kellogg et al., 2006). Finally, Approach IV adopts a process ontology and a variance epistemology. It relies on agent-based simulations, event history analysis, and quantitative modeling, which are unsuitable for qualitative case study approaches. Examples in TIM studies include research using agent-based modeling to simulate diffusion processes (see Kiesling et al., 2012 for a review), punctuated equilibrium models (e.g. Romanelli and Tushman, 1994; Sastry, 1997) or quantitative event history analysis (e.g. Garud and Van de Ven, 1992).

Van de Ven and Poole’s (2005) typology provides a clear organizing framework to categorize TIM articles, along with their associated practices and paradigmatic assumptions that fall under each approach. By using this typology, we can examine the extent of internal consistency and avoid evaluating case study practices based on criteria that are incommensurable with their paradigmatic assumptions.

4. Literature review design: a systematic theoretical review

Our approach is a theoretical review (see Paré et al., 2015). We adopted a systematic search strategy

(Barczak, 2017), using the Van de Ven and Poole (2005) typology to categorize our sampled articles and analyze the case study practices they employed. We used a qualitative content analysis to examine the research methods in these studies, the justifications for the methods used, and the studies' paradigmatic consistency. We explain the review process below.

4.1. Search boundaries and sample

As with any other review, we had to develop our journal inclusion criteria and a timeframe that would allow for a meaningful and rigorous review (Kitchenham, 2004). Three factors guided our sampling criteria. First, we wanted to understand how TIM scholars use case studies. Second, we wanted to assess how paradigmatically consistent, diverse and rigorous the field is. Third, we wanted our sample of articles to be both relevant and manageable to enable an in-depth analysis (Welch et al., 2013).

Consequently, rather than concentrating solely on a small number of top-tier journals (e.g. see Goffin et al., 2019), we included both specialist and generalist (Short, 2009) TIM journals identified by Thongpapanl (2012). Because we focused on current case study practices, and not on changes in practices, we restricted our search to the 2013–2018 period. This approach allows us to offer a snapshot of a more representative range of TIM outlets for a more in-depth analysis that complements and extend earlier findings (e.g. Goffin et al., 2019), while also allowing us to leverage Thongpapanl's (2012) list. Since our focus is on understanding *current* practices as opposed to changes over time, a more representative sample would result from a broader selection of journals. We present the list of journals, and the number of articles per journal, in Table 1.

The search of *Scopus* for articles with the keywords '(innovat*) AND (qualitative OR case study)' in the 50 journals identified by Thongpapanl (2012) resulted in 631 articles. Given our aim to investigate current practices, we were deliberately inclusive and relied on the authors' own reporting, rather than predefined criteria of a case study. We, thus, included all articles claiming to adopt a qualitative case study approach. We excluded mixed-methods papers because they entail different choices regarding research design, sampling, data collection and analysis, and rely on different ways to present their findings. We also excluded quantitative or conceptual articles that presented illustrative case studies but did not rely on data from these cases to develop their findings. When it was not clear whether an article relied

on the case study method or where it was missing a methods section, the authors discussed the merits of including or excluding the article until we reached a consensus. We excluded 243 articles at this stage.

Next, we analyzed how much the articles focused on innovation or innovation-related phenomena, which we defined as the emergence, development, and implementation of innovation, within and between organizations, and within and across institutional and geographical contexts (Garud et al., 2013). Excluding articles that did not focus on innovation phenomena per se yielded a sample of 311 articles published in 31 journals.¹ Figure 2 summarizes the sampling process and details the applied criteria.

4.2. Coding framework, coding process, and analysis

We followed a 'directed coding' approach whereby we relied on existing theories and reviews to develop our coding scheme (Leppäaho et al., 2016) and then revise our categorizations based on emerging insights from our data. We began by coding the articles according to the existing categorizations of case study research and the authors' reporting on *what* 'type' of case study they conducted, *why* the authors adopted a case design, *how* the authors selected cases, and *how* they performed data collection and analyses. Authors reported employing a wide variety of case study types from *Yin*-esque qualifiers (holistic, embedded, multiple, single); alternative categorizations such as Stake's (2005) categorization of intrinsic, instrumental, and collective case studies; and more time-related (process-oriented, longitudinal, holistic) or generic qualifiers (e.g. in-depth). Second, we captured authors' justifications for using a case approach and categorized them (i.e. how and why questions, novel or emerging phenomena, generate in-depth understanding) together with the references provided. To determine the sampling approach (i.e. how cases were selected), we coded for (1) authors' explicit statements about their sampling strategy, (2) their sampling strategy (e.g. theoretical/purposeful, convenience, polar cases, unique cases, not stated) (Fletcher and Plakoyiannaki, 2011), and (3) references cited to support these choices. We also coded the details of data collection methods, data analyses, and supporting references. For the data analysis, we coded for the approach followed (e.g. cross-case, within-case, thematic coding, first/second/third, not clear) and references that authors provided. We coded the approach to case theorizing, which captures the role of prior theory during

Table 1. TIM journals publishing qualitative case studies 2013–2018

Journal title	Approach			Total
	I	II	III	
<i>Technological Forecasting and Social Change</i>	19	22	4	45
<i>Technology Analysis and Strategic Management</i>	13	15	4	32
<i>Industrial Marketing Management</i>	12	7	9	28
<i>Technovation</i>	13	8	3	24
<i>Research Policy</i>	9	8	6	23
<i>International Journal of Technology Management</i>	12	8	1	21
<i>R and D Management</i>	9	8	2	19
<i>Industry and Innovation</i>	9	3	3	15
<i>Journal of Product Innovation Management</i>	7	4	2	13
<i>Science and Public Policy</i>	7	3	2	12
<i>Journal of Business Research</i>	7	3	2	12
<i>Research Technology Management</i>	5	3	0	8
<i>Journal of Engineering and Technology Management</i>	3	4	1	8
<i>Long Range Planning</i>	3	2	3	8
<i>Journal of Technology Transfer</i>	4	2	0	6
<i>California Management Review</i>	2	3	0	5
<i>Organization Science</i>	0	1	3	4
<i>Regional Studies</i>	2	2	0	4
<i>Industrial and Corporate Change</i>	3	0	0	3
<i>IEEE Transactions on Engineering Management</i>	2	1	0	3
<i>MIS Quarterly</i>	1	1	1	3
<i>Journal of Management Studies</i>	1	0	2	3
<i>International Journal of Project Management</i>	1	0	2	3
<i>Administrative Science Quarterly</i>	0	1	1	2
<i>Strategic Management Journal</i>	0	1	0	1
<i>Journal of Business Venturing</i>	1	0	0	1
<i>Journal of International Business Studies</i>	0	0	1	1
<i>Small Business Economics</i>	0	0	1	1
<i>Journal of Operations Management</i>	0	1	0	1
<i>Economics of Innovation and New Technology</i>	0	1	0	1
<i>Entrepreneurship Theory and Practice</i>	1	0	0	1
Total	146	112	53	311

the theory-building process (Andersen and Kragh, 2010), into the three modes of theorizing (inductive, deductive, abductive) that Mantere and Ketokivi (2013) suggest. We coded studies as inductive when the authors clearly stated that they adopted an inductive approach or that they analyzed their data inductively. Similarly, we coded studies as deductive when the authors stated that they aimed to test, validate or extend theory. Finally, we coded studies as abductive when authors clearly stated they were following an abductive approach to theorizing. We decided to code the iterative approach proposed by Corbin and Strauss (1990) as abductive because authors were using iterative and abductive synonymously.

We adopted Van de Ven and Poole's (2005) framework to analyze the ratio of variance to process approaches, coding for Approaches I, II and III. We discarded Approach IV from our coding structure since it relies on quantitative modeling and agent-based simulations methods. When coding those dimensions, each coder added justifications to increase the transparency and credibility of the process. Some articles were difficult to categorize, especially between approaches II and III. (e.g. Geiger and Finch, 2016; Makkonen and Komulainen, 2018). In those instances, each coder read the paper and justified their coding. We engaged in rounds of discussion until we reached consensus. Finally, we coded the presented output (e.g. process models, propositions,

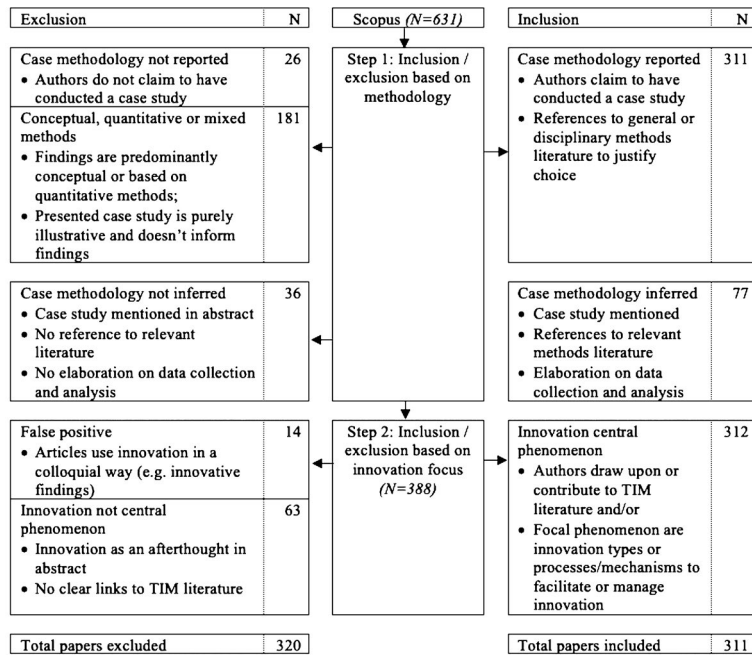


Figure 2. Summary of the search process.

typologies, narratives) to understand the variety of outputs produced from the different approaches.

5. Findings

In this section, we present the findings from our analysis and structure them according to the three alternative approaches of studying TIM proposed by Van de Ven and Poole (2005). In this way, we surface the relations among specific decisions about methods, their underlying paradigmatic assumptions, and any inconsistencies we observed. 142 articles (47%) followed Approach I (variance theorizing), 112 (37%) followed Approach II (weak process theorizing), and 57 (19%) followed Approach III (strong process theorizing). We observed both differences in practices across the three approaches and inconsistencies common to all three approaches. Those included scant, or no, justification for the adopted case approach and case selection; little transparency about sampling, data collection, and analysis; and unclear descriptions of how the theory was generated, what modes of theorizing were used, and how findings were theorized from data. We compare specific approaches in Table 2 and summarize the main points below.

5.1. Approach I: variance theorizing

In Approach I, TIM phenomena are conceptualized as entities or things, with the aim of (1) establishing

variance or relations between a priori specified or inductively derived constructs, or (2) fleshing out the attributes, characteristics, and their relations, of certain phenomena, which would then be presented in the form of typologies. Given the focus on variance and establishing law-like relationships, it was not surprising that Eisenhardt's (1989), Eisenhardt and Graebner (2007) and Yin's (1994, 2009) approaches were the most cited to justify this approach. Nonetheless, citations to Eisenhardt or Yin were sometimes accompanied by case study references that are incongruent with variance approaches (e.g. Langley, 1999, which assumes a process ontology), making the author(s)' ontological stance ambiguous.

The articles using this approach differed in the reasons offered for adopting a case study approach and in the details and length of justifications given to justify their decisions. First, 35 (25%) articles did not justify adopting a case approach. Following Eisenhardt (1989), those that did usually relied on statements referring to the ability of case approaches to provide an 'in-depth', 'holistic,' and 'contextual understanding' of the phenomena under study or claimed 'theory generation' due to lack of prior theory. Many authors were unclear on how prior theory informed their work despite 'their lengthy and detailed literature reviews [which] indicate otherwise' (see Graebner et al., 2012, p. 281).

Consistent with establishing variance, most articles using this approach adopted multiple or single-embedded case approaches, which allows

Table 2. Summary findings by perspective

Perspective (Van de Ven and Poole, 2005)	Variance/variance (approach I)		Variance/process (approach II)		Process/process (approach III)	
	142 (47 %)		112 (37 %)		57 (19 %)	
Case approach and justification						
<i>Reported case approach</i>						
In-depth	18	(13 %)	17	(15 %)	12	(21 %)
Exploratory/inductive	41	(29 %)	36	(32 %)	17	(30 %)
Time-based	15	(11 %)	27	(24 %)	28	(49 %)
<i>Justification for case methodology¹</i>						
Novel/emerging phenomenon	18	(13 %)	21	(19 %)	6	(11 %)
In-depth/holistic understanding	66	(46 %)	55	(49 %)	21	(37 %)
How and why questions	18	(13 %)	15	(13 %)	4	(7 %)
Unfolding of process	9	(6 %)	5	(4 %)	10	(18 %)
Theory generation	45	(32 %)	37	(33 %)	19	(33 %)
Expand/validate theory	12	(8 %)	13	(12 %)	1	(2 %)
Not clear/not given	35	(25 %)	28	(25 %)	16	(28 %)
<i>Key references¹</i>						
Yin (various years)	73	(51 %)	49	(44 %)	14	(25 %)
Eisenhardt (and colleagues)	62	(44 %)	40	(36 %)	12	(21 %)
Siggelkow (2007)	6	(4 %)	8	(7 %)	1	(2 %)
Other methods references	42	(30 %)	40	(36 %)	24	(42 %)
No methods' references	35	(25 %)	33	(29 %)	19	(33 %)
Case study design and selection						
<i>Case design</i>						
Single	34	(24 %)	50	(45 %)	30	(53 %)
Multiple	108	(76 %)	62	(55 %)	27	(47 %)
Maximum number of cases	35		68		30	
Minimum number of cases	2		2		2	
Average number of cases	7		7		6	
<i>Selection criteria (multiple)¹</i>						
Illustrative/exemplar	34	(31 %)	25	(40 %)	9	(33 %)
Extreme/unique case	3	(3 %)	1	(2 %)	1	(4 %)
Variations along constructs	25	(23 %)	13	(21 %)	8	(30 %)
Similarities along constructs	31	(29 %)	12	(19 %)	4	(15 %)
Not clear/not given	16	(15 %)	16	(26 %)	1	(4 %)
<i>Selection criteria (single)¹</i>						
Observability of phenomenon	3	(9 %)	5	(10 %)	4	(13 %)
Illustrative/exemplar	11	(32 %)	23	(46 %)	10	(33 %)
Extreme/unique case	10	(29 %)	4	(8 %)	3	(10 %)
Not clear/not given	14	(41 %)	16	(32 %)	13	(43 %)
Data collection						
<i>Primary method of data collection</i>						
Interviews	119	(84 %)	89	(79 %)	42	(74 %)
Observations	5	(4 %)	6	(5 %)	4	(7 %)
Secondary data	16	(11 %)	14	(13 %)	10	(18 %)
Not clear	2	(1 %)	3	(3 %)	1	(2 %)
<i>Combination of data collection methods</i>						
Interviews and secondary data	80	(56 %)	69	(62%)	16	(28 %)
Interviews-observations and secondary data	37	(26 %)	27	(24 %)	28	(49 %)

Table 2. (Continued)

Perspective (Van de Ven and Poole, 2005)	Variance/variance (approach I)		Variance/process (approach II)		Process/process (approach III)	
	142 (47 %)		112 (37 %)		57 (19 %)	
<i>Numbers of interviews</i>						
Max # of interviews	150		170		200	
Min # of interviews	2		2		4	
Average # of interviews	30		29		33	
Theorizing approach and outputs						
<i>Theorizing approach</i>						
Deductive	43	(30 %)	17	(15 %)	3	(5 %)
Abductive	30	(21 %)	21	(19 %)	23	(40 %)
Inductive	39	(27 %)	38	(34 %)	26	(46 %)
Not stated/not clear	30	(21 %)	36	(32 %)	5	(9 %)
<i>Outputs</i>						
Propositions	40	(28 %)	11	(10 %)	2	(4 %)
Process model	0	(0 %)	35	(31 %)	36	(63 %)
Typology	50	(35 %)	23	(21 %)	0	(0 %)
Narrative	10	(7 %)	18	(16 %)	14	(25 %)
Description of findings	15	(11 %)	16	(14 %)	4	(7 %)
Theoretical framework	24	(17 %)	8	(7 %)	1	(2 %)
Others	3	(2 %)	1	(1 %)	0	(0 %)

¹Authors often give several justifications for adopting a case methodology, their sampling strategy, and the analytical approach; also, they support those choices with several references. Thus, the numbers do not add up to 100%.

variation to be observed for the phenomena of interest (Eisenhardt, 1989). These articles generally followed Eisenhardt’s recommendation of sampling four to ten cases, but the number of cases samples ranged from two to 35. Surprisingly, some of these articles justified neither the number of cases nor the sampling approach they used. The most common approach was theoretical sampling, but few authors explained the theoretical dimensions they used to select cases. Some of those articles increased variation in context or analytical constructs, while others aimed for similarities. Heterogeneity in sampling practices was surprising given the importance of this decision in variance multi-case research to control for extraneous variation (Gehman et al., 2018).

Regarding data collection, interviews were the most common primary data collection method, often supplemented by secondary data. The use of interviews is consistent with the Eisenhardt method, given its ability to retrospectively identify the sources of variation for a specific outcome (Gehman et al., 2018). In addition to interviews and secondary data, 39(27%) articles used observations, which suggests the potential insights that TIM researchers can generate through this method. However, researchers undermined this promise by not specifying who or what researchers observed or when and how the observations occurred. This deficiency extends to the other

methods we categorized; many articles did not justify or provide details of how they selected participants. This is surprising given that TIM phenomena are distributed and actors might have different perspectives that reflect their functional roles (Garud et al., 2013). Additionally, it was often unclear how observations informed the conclusions of a study, as authors typically presented only quotes from interviews.

Similarly, references to secondary data often appeared ceremonial; most articles provided few or any details about these data, why they were appropriate, or how researchers accessed them. When researchers gave reasons for using secondary data and discussed how these data related to the research questions and theoretical perspectives, these data were the primary or only data source. Sumo et al., (2016), for example, analyzed contracts and other formal documents, in addition to in-depth interviews, to understand how pay-for-performance contracts can foster innovation.

We also noted that the reasons for the approach to theorizing and the analytical techniques used in several articles were unclear. Most articles adopted a deductive approach to theorizing, wherein researchers’ a priori propositions or theoretical frameworks were proposed for testing and refinement through case study evidence. These articles usually adopted a multiple case study approach that is consistent with

Eisenhardt's recommendation. Eisenhardt (1989) and Yin (1994) were cited most often for data analysis, particularly for pattern matching and within and cross-case analysis in multiple case studies.

We also observed inconsistencies in the justifications for adopting a case approach. For example, despite deductively testing propositions or frameworks, some articles claimed to use an exploratory case approach due to a lack of prior theory. Such contradictions were prevalent in inductive studies where the notion of induction was used much more loosely and meant different things to different researchers, ranging from purely inductive approaches to milder ones where prior theory played a guiding role (Andersen and Kragh, 2010).

Furthermore, it was often unclear which constructs were derived inductively and which were borrowed from prior theory. This is problematic because, as Graebner et al. (2012, p. 281) note, '[I]abeling virtually all qualitative research as "inductive" tends to perpetuate the myth that all qualitative research is theory-building.' Good examples of explicating the abductive and iterative approach in our study are Aarikka-Stenroos et al. (2017) and Kazadi et al. (2016).

Regarding the presentation of findings and discussions and consistent with their variance focus, most Approach I articles relied on propositions (28%) and theoretical frameworks (17%), or a combination, to postulate relationships between constructs, and typologies (35%), which flesh out the attributes and characteristics of certain constructs and how those differ across contexts and/or dimensions. Some articles relied on narratives to present their findings. While nothing inherent in narratives prevents them from making causal claims, they are arguably better suited to explicating the progression of events (Langley, 1999; Pentland, 1999). Since proponents of the variance approach aim to emulate post-positivistic approaches with their emphasis on establishing law-like explanations (Eisenhardt, 1989; Welch et al., 2011), it is preferable to rely on propositions and theoretical frameworks to allow future researchers to undertake quantitative hypothesis-testing studies. Finally, 11% of these articles provided detailed insights on their findings but made no explicit theoretical connections. Most of those had no clearly stated theorizing approach, and most lacked information on their data analysis.

5.2. Approach II: weak process theorizing

Studies in this approach were classified as adopting a variance ontology and a process epistemology, whereby TIM phenomena were conceptualized

as entities or things, and the aim was to explain the change in the phenomena by identifying distinct events, cycles, or stages (Van de Ven and Poole, 2005). This approach was the most heterogeneous in terms of the practices adopted. We attribute this heterogeneity to the variance ontology and process epistemology this approach entails, which allows scholars to stretch their research questions in different ways on the process/variance continuum. However, this diversity can lead to ontological and epistemological drift (Thompson, 2011). This heterogeneity is also reflected in the references cited in support of the case approach. While Eisenhardt (1989) and Yin (1994) are still heavily cited, a more eclectic range of references is invoked.

Most of the articles (55%) in this approach relied on multiple case studies, which can help detect phases/stages and patterns across cases and contexts. Most sampling in this approach was theoretical, but researchers' theoretical justifications were not always clearly explicated. The most common data collection method was interviews (95%), with 79% using interviews as the primary method of data collection. Relative to Approach I, a lower percentage of these studies relied on observations (either as primary or secondary method). This is surprising given the known limitations of interviews in elucidating processes due to their retrospective nature. Surprisingly few of these studies addressed this issue explicitly by mentioning triangulation and relying on secondary sources (see Vuori and Huy, 2016, for an exception).

Furthermore, most of these studies relied on semi-structured interviews, which might not be optimal for capturing the emergent and open-ended nature of process research. Researchers barely utilized alternative approaches such as the narrative interview. As with Approach I, we saw little reflection and justification of data collection decisions despite their centrality for answering process questions; as Bizzi and Langley (2012) argue, decisions about when the process starts and ends, and whom to interview, can shape the outcome of process research.

As with Approach I, we observed a lack of clarity regarding theorizing; 32% of articles did not state clearly how they theorized from their data. Studies adopting deductive and abductive approaches were clearer in how prior theory informed their analysis. In deductive approaches, researchers imposed a priori frameworks to examine the extent of fit between theory and data. While this approach might be useful in multiple case designs to avoid 'data asphyxiation' (Pettigrew, 1990), it is less able to detect emergent processes or unexpected findings.

Regarding the presentation of findings and discussions, most articles produced process models that broke down the phenomena into stages or cycles. Yet, there was heterogeneity in the tools used to present findings. Typologies (21%) focused on showing how the process can differ across different dimensions. Another 16% relied on narratives to explain the different stages in the process and their progression over time. Other articles (7%) relied on theoretical frameworks that postulate relationships between constructs. However, unlike Approach I, this work did not focus exclusively on elucidating causal relationships. Instead, it attempted to show how certain constructs shaped or influenced the different stages of a process. Surprisingly, 10% of these articles relied on propositions. However, such propositions were mainly descriptive rather than focused on causality (e.g. Surie, 2013; Wang et al., 2018). Finally, 14% of these articles presented descriptive findings, reflecting the difficulty process researchers face in moving from extensive description to theory (Gehman et al., 2018).

5.3. Approach III: strong process theorizing

Approach III adopts a process ontology and epistemology. It has been framed as a strong process view (Tsoukas and Chia, 2002; Langley et al., 2013) that focuses on *becoming* and *doing* (Jarzabkowski et al., 2017). This approach conceptualizes TIM phenomena as being in continuous flux and attempts to understand the unfolding of processes. For example, research on the social construction of science and technology and the emergence of new technologies and innovation uses theories rooted in process and practice perspectives. Unsurprisingly, 49% of these articles claimed a temporal (e.g. longitudinal, processual, historical) approach. Interestingly, many of these articles supported their choices with references to Yin and Eisenhardt, even though Eisenhardt does not mention temporal aspects and Yin mentions longitudinal cases only in passing (Blazejewski, 2011).

Most articles using this approach adopted a single case study design, which is consistent with process scholars' suggestions for immersion in the field and a rich presentation of findings. Although there is nothing inherent in process research that prevents researchers from studying multiple cases (Langley and Abdallah, 2011), the need to collect large amounts of data from each case and the challenges of presenting detailed findings of each case within the page limits of journal articles, make it difficult to focus on more than a few cases. Studies adopting multiple case designs in this approach had an

average of six cases. The sampling strategies adopted by those articles relied on theoretical sampling but, unlike Approach I, the aim was to maximize variations in specific contexts or constructs to detect similar processes or patterns across different cases, rather than maximize variance in outcomes.

Many articles using this approach relied on a mixture of interviews, observations, and secondary data to trace processes backward and forward. However, as with Approaches I and II, semi-structured interviews were the predominant data collection method. This finding is surprising since alternative forms, such as narrative interviews, are better suited to capture the emerging nature of processes. In turn, we observed that almost none of these articles used non-verbal data (e.g. gathered from observations) when presenting their findings.

Approach III articles were the most consistent with regard to theorizing modes. Except for a few articles that were unclear about their approach, and two articles that adopted a deductive approach, most adopted inductive and abductive theorizing modes. As with Approaches I and II, however, we observed a lack of clarity about inductive theorizing, where researchers do not spell out the role of prior theory; as Langley notes, 'we overemphasize the idea of induction, that we are completely theory-free' (cf. Gehman et al., 2018, p. 14). Process research might emphasize how abduction leads to richer process theorizing through connecting to prior theory.

Regarding the presentation of findings and discussion, this approach was the most consistent. Most articles relied on process models (63%) and narratives (25%), which are best for capturing the unfolding of the process (Langley, 1999; Pentland, 1999). As Van de Ven and Poole (2005, p. 1390) note, presenting the findings of strong process research is challenging: 'its representation, interpretation, and explanation of processes must always reify the processes – which are evanescent and in flux – in words and diagrams fixed statically to the page'. To overcome this challenge, this work used language distinct from that found in Approaches I and II. To avoid process reification, it emphasized iterations, instantiation, progression, recursivity, and interrelations among constructs and processes to go beyond merely representing stages, in addition to using gerunds to emphasize flow, movement, and open-endedness.

6. Discussion

Motivated by calls for more rigor and transparency in qualitative research in TIM (Goffin et al., 2019)

and in management and organizational studies in general (Gibbert et al., 2008; Piekkari et al., 2009; Bansal and Corley, 2012; Aguinis and Solarino, 2019), we have examined how qualitative case studies are currently used in TIM. Beyond addressing the calls for greater transparency in terms of ‘specific steps, decisions, and judgment calls’ (Aguinis et al., 2018, p. 834), we also analyzed the breadth and consistency of the ontological and epistemological choices within TIM studies. Answers to these questions are important if the field is to address a larger range of research questions more rigorously (Van de Ven and Poole, 2005; Cornelissen, 2017), rather than focus only on transparency (see Pratt et al., 2019). We focus our discussion in the next sections on: (1) the value of diversity in TIM case study approaches; and (2) the consequences of research decisions for TIM researchers, reviewers, and editors.

7. Progressing diversity of case study approach in TIM

While our findings largely confirm the conclusions of Goffin et al., (2019) about the lack of transparency, we also show the imbalance among the three research approaches. We found that variance approaches still underlie most case research. This tendency might lead to orthodoxy in practices, which can restrict the development of a field (Bluhm et al., 2011; Bansal and Corley, 2012; Hadjimichael and Tsoukas, 2019). This prospect may apply even more to the TIM field given the complex and multidimensional phenomena it studies. There is an increased need both to recognize alternative ways of conducting case research and to understand the research decisions required to ensure paradigmatic consistency, rigor, and transparency.

There is some recognition that the different case study approaches can be classified by their ability to address process and variance-based phenomena (Langley and Abdallah, 2011; Gehman et al., 2018). The process/variance distinction for discriminating among alternative case study approaches is particularly suited to TIM. As Garud et al., (2013) argue, innovation phenomena are difficult to study. They are evolutionary, as they implicate several levels of analyses; relational, as they are constituted by a diverse set of social actors and material objects; temporal, as they extend over time and events are experienced differently; and cultural, as they take place in contextualized spaces. Different types of qualitative case studies can address distinct aspects of these

complexities. Strong process approaches can address temporal complexities, and variance approaches can capture contextual differences through cross-case comparisons. TIM scholars should learn to recognize the relative advantages and disadvantages of these different approaches. In line with Garud et al. (2013) and our findings, we encourage wider adoption of the variance-process typology, while using variance, weak process, and strong process modes to study different aspects of these phenomena. Table 3 summarizes the three approaches in terms of their paradigmatic assumptions, relative strengths, and benefits for TIM scholarship, and research practices that are paradigmatically consistent with each approach. In constructing this typology, we followed Piekkari et al. (2010) and distinguished between the more and less common practices that we observed in the three approaches and included references to relevant methods papers and papers in our sample. Our typology does not form a rigid template. Rather, we hope that it sensitizes researchers to a wider gamut of approaches, specifically to those that may be underused, and helps them design future studies that are both innovative and paradigmatically consistent.

The importance of paradigmatic consistency in qualitative case study approaches is vital to avoid the assessments by editors and reviewers against paradigmatically inappropriate criteria. For example, the positivistic philosophical perspective underpinning the CASET framework (Goffin et al., 2019) or the advice in Aguinis and Solarino’s (2019) recent review are appropriate to assess TIM studies adopting variance ontology and methodology. However, their criteria can ‘punish’ approaches that do not fit the variance approach and might influence authors to list such approaches to appease reviewers (Pratt et al., 2019). For example, while Goffin et al. (2019) note that lack of a pilot study is a weakness of qualitative studies, pilot studies are neither feasible nor relevant in most process approaches. Consequently, the imposition of inappropriate criteria can both compromise paradigmatic consistency and limit paradigmatic pluralism (Chen and Hirschheim, 2004; Pratt et al., 2019).

Similarly, there may be reasons not to penalize research that does not emphasize ‘new concept development and theoretical discovery’ (Goffin et al., 2019, p. 12). Researchers adopting a strong process approach might find it difficult to adhere to the prevailing canons of data interpretation rooted in positivistic and variance approaches. Consequently, we need to learn to think in terms different to those that our largely substance-based education imprinted on our ways of thinking. Indeed, the increasing

Table 3. Onto-epistemological assumptions and methodological practices

	Variance qualitative case study	Weak process qualitative case study	Strong process qualitative case study
<i>Philosophical assumptions and relevance for TIM research: How do you perceive innovation and what are the relative strengths and benefits of each approach?</i>			
Innovation conceptualized as a/an...	Fixed entity that is <i>causally related</i> to other entities; focus on <i>determinants</i> or <i>law-like regularities</i> of innovation outputs, adoption or impact	Chronological sequence of fixed stages or cycles; focus on <i>episodic explanations</i> , structural influences, significant events, and typical activities in each stage	Interrelated processes in ongoing flux and emergence that are unfolding over time; focus on holistic explanations and actions by specific people in time and place
Key strengths and benefits for TIM scholarship	Produce testable TIM propositions ¹	Account for contextual differences in TIM phenomena by observing similarities and differences in processes across contexts	Account for temporality that is central in TIM phenomena
	Surface cultural and contextual complexities intrinsic to TIM phenomena through cross-case comparisons		Sensitive to contextual dynamics and socio-material agency in shaping TIM processes
	Easily transferable to practitioners and policymakers	Advantageous for developing phasic process models with practical relevance	Advantageous for developing models about complex TIM phenomena that have learning implications for managers ²
<i>Consistent research approaches</i>			
Research design	Multiple and single-embedded designs cases ³	Single and single-embedded, dual methodology ⁵ Multiple cases if a priori process model is developed and 'applied'	Single or single-embedded designs
Sampling strategy	Cases chosen to fill particular theoretical categories ³ ; can include polar types to contrast patterns ^{3,6,7}	Information-rich cases to maximize utility ^{4,6,8} For multiple cases, either homogenous to establish process <i>generality</i> or heterogeneous to capture similarities and differences across contexts ⁹⁻¹¹	Exemplar or unique contexts that make the process visible ¹² ; real-time and longitudinal access is desirable ¹³
<i>Consistent data collection methods and data types</i>			
Common practice	Semi-structured interviews and archival material ^{14,15}	Ex-post semi-structured interviews and archival material ^{16,17}	Repeated in-depth interviews and observation ¹⁸ ; narrative interviews ¹⁹
Less common practice	Historical cases using archival records including biographies and autobiographies ²⁰	Real-time, repeated interviews and observations ²¹ ; historical cases ²² ; meaningful integration of archival data ²³ ; action research ²⁴	Action and intervention research ²⁵ ; historical methods ²⁶
<i>Consistent data analysis, theorizing and presentation approaches</i>			
Appropriate theorizing	Deductive or abductive	Inductive or abductive	Inductive or abductive
Common analysis practice	Constant comparison and pattern matching ²⁷⁻²⁹	Gioia method and open coding ³⁰ ; Constant comparison and pattern matching ³¹ ; process strategies, ⁴	Process strategies, ^{4,32,33} pattern inducing ^{28,34}

Table 3. (Continued)

	Variance qualitative case study	Weak process qualitative case study	Strong process qualitative case study
Common output practice	Propositions, ¹⁵ theoretical frameworks ³⁵ and typologies ³⁶	Temporal phases ³⁷ ; process models (emphasising mechanisms) ³⁰	Process models, ³⁸ context-laden narratives (emphasising ongoing flow) ^{39,40}
Less common analysis and output practices		Reflection-in-action ⁴¹	flow mapping ⁴² reflexivity analysis ⁴³

¹Goffin et al. (2019).
²Langley and Tsoukas (2017).
³Eisenhardt (1989).
⁴Langley (1999).
⁵Leonard-Barton (1990).
⁶Pettigrew (1990).
⁷Eisenhardt and Graebner (2007).
⁸Flyvbjerg (2006).
⁹Stake (2005).
¹⁰Langley and Abdallah (2011).
¹¹Gehman et al. (2018).
¹²Siggelkow (2007).
¹³Blazejewski (2011).
¹⁴Horváth and Enkel (2014).
¹⁵Sumo et al. (2016).
¹⁶Kannan-Narasimhan and Lawrence (2018).
¹⁷Vuori and Huy (2016).
¹⁸Henfridsson and Yoo (2013).
¹⁹Weisenfeld and Hauerwass (2018).
²⁰Jenkins (2014).
²¹Cabanelas et al. (2013).
²²Markard et al. (2016).
²³Lepoutre and Oguntoye (2018).
²⁴Holzmann et al. (2014).
²⁵Te Kulve and Konrad (2017).
²⁶Turnheim and Geels (2013).
²⁷Dingler and Enkel (2016).
²⁸Reay and Jones (2016).
²⁹Miles and Huberman (1994).
³⁰Vuori and Huy (2016).
³¹Frattini et al. (2014).
³²Jarzabkowski et al. (2017).
³³Canales (2016).
³⁴Dille et al. (2018).
³⁵Vafeas and Hughes (2016).
³⁶Colombo et al. (2015).
³⁷Estrada et al. (2016).
³⁸Kriz and Welch (2018).
³⁹Jarzabkowski et al. (2017).
⁴⁰Haley (2018).
⁴¹Bogers and Horst (2014).
⁴²Medlin and Törnroos (2015).
⁴³Pansera and Owen (2015).

theorrea – mania for new theory – affecting organization studies (Antonakis, 2017) is underpinned by a narrow set of metrics for judging research value. It can discourage studies that present rich, consistent case narratives that can offer more in-depth insights into phenomena of interest. Research that identifies compelling and interesting empirical relations in TIM may shed light on complex phenomena. Hence, a greater variety of approaches underpinned by transparency, rigor, and internal paradigmatic consistency is vital for our field (c.f. Pratt et al., 2019).

Additionally, our findings highlight some worrying inconsistencies of a paradigmatic nature.

Such trends might signal a troubling, if not dangerous, paradigmatic and methodological drift (Thompson, 2011) that could further undermine the position of qualitative studies, and the field itself. Considering the lack of rigor reported in many studies, this could be a particular malady – *driftus ontologicus* – from which TIM studies increasingly suffer (see Antonakis, 2017 for an insightful list of research diseases). Indeed, while pluralistic approaches are needed to capture the nature of TIM phenomena (Garud et al., 2013), the lack of transparency or understanding of the underlying paradigmatic assumptions underpinning different case

study practices can seriously hinder the progress of our field (see Pratt et al., 2019).

8. Consequences for researchers, editors, and reviewers

As our findings have shown, and as the case study literature suggests (Langley and Abdallah, 2011; Welch et al., 2011; Gehman et al., 2018), alternative ways of conducting case study research are shaped by different philosophical positions. What is important is 'paradigm consistency and reflexivity: case researchers need to consider whose notions of good case research they are following, and be consistent and transparent in making this decision' (Piekkari et al., 2010, p. 115). Based on our review of TIM research, the lack of such consistency appears problematic.

For researchers, we have attempted to provide some guidance on different ways to conduct case research and the underlying philosophical and methodological decisions they entail. These guidelines are particularly useful in the early stages of designing TIM case research and in preparing manuscripts. They ensure that authors provide information that editors, reviewers, and future readers require (i.e. to improve rigor and transparency when appropriate) and that is consistent (for evaluation against appropriate criteria respective of the ontological approach).

Since evaluating paradigmatic consistency in qualitative case research can be challenging, editorial boards may wish to consider appointing permanent expert reviewers on research philosophy, as well as methods. These roles are important for sustaining improvements in research (Goffin et al., 2019), particularly for future studies that use a processual approach in TIM (Garud et al., 2013). Such expertise could help reviewers ensure quality and internal consistency, and create broader recognition and acceptance of alternative ways of conducting TIM case research. This recognition is paramount for avoiding the evaluation of researchers' work against criteria that are incommensurable with their assumptions. As highlighted recently, for instance, some reviewers are increasingly requiring the Gioia method (Gioia et al., 2013), to structure analyses, even though this approach is not always suitable for case approaches (Cornelissen, 2017; Gehman et al., 2018).

9. Conclusion

Given the pluralistic ways of doing qualitative case studies in TIM (Welch et al., 2011) and the

concerns about rigor and transparency posed by such scholarship (Bansal and Corley, 2012; Aguinis et al., 2018; Goffin et al., 2019), we took stock of these approaches in TIM. Our study contributes to the TIM literature by uncovering patterns regarding rigor (including case justification and selection), transparency (including data collection and analytical methods), and paradigmatic consistency and pluralism in the three approaches currently employed by TIM researchers. While our sample includes several exemplary studies, much of this research has inconsistencies, lacks transparency, and relies overly on specific approaches. Together, these problems reduce the rigor of qualitative case study research in TIM. Furthermore, our study contributes to the TIM field by Van de Ven and Poole's (2005) typology and integrating it with current case study practices to highlight potential reasons for these inconsistencies. The typology can guide researchers in designing and reporting their studies in ways that are consistent with their paradigmatic assumptions.

We argue that specific approaches are better suited to addressing different types of complexities that are inherent in TIM phenomena (Garud et al., 2013). Variance approaches have been the most prevalent in innovation and organizational change studies (Van de Ven and Poole, 2005); we found that this practice persists. We observed, however, an emerging stream of studies that attempt to theorize the processual aspects of TIM phenomena. We argue that this strong processual approach (Langley et al., 2013) can enrich our understanding of TIM, and we urge scholars to further this line of inquiry, which is particularly suitable to the dynamic and emergent nature of TIM phenomena. To realize this call for greater pluralism in philosophical positions, TIM researchers need to expand their repertoire of case approaches. Our findings show an over-reliance on a narrow set of approaches (i.e. Eisenhardt, 1989; Yin, 1994), often incompatible with specific lines of inquiry. Accordingly, we urge TIM researchers to explore alternative approaches for conducting case study research (i.e. Ragin, 1992; Stake, 1995; Flyvbjerg, 2006) rather than using standard approaches that do not uniformly fit the pluralistic ways of studying TIM phenomena.

Our call for novelty and pluralism extends to data collection methods. Several studies in our sample rely on alternative forms of interviewing such as narrative interviews (e.g. Kruss and Gastrow, 2017) as well as novel uses of archival records (e.g. Pinkse et al., 2014). We applaud these efforts and call on TIM researchers to explore other alternative approaches to traditional semi-structured

interviews, such as micro-ethnography (e.g. Pansera and Owen, 2015), and new forms of archival records. Expanding our repertoire of data collection methods requires greater transparency about data analysis so that readers can evaluate the rigor and internal consistency of the research design. Because the lack of detailed descriptions of analytical methods and findings may lower the degree of rigor and field development (Bansal and Corley, 2012), we argue that transparency about these issues is required to move TIM forward.

10. Limitations and future research

As with every study, our work has some limitations. First, although the period of our review (2013–2018) is consistent with our objective of understanding the current practices of case study approaches in TIM, this approach limits our ability to draw conclusions about changes in the field over time. Second, although we made every effort to ensure that our analysis and assessment of paradigmatic consistency and transparency are rigorous, some interpretation and subjectivity underpin our results. This approach is consistent with our paradigmatic positions, but it might be perceived as a weakness when approached from a positivistic stance. Third, while we attempt to provide guidelines for future research that are not overly normative² or that reduce paradigmatic pluralism (c.f. Pratt et al., 2019), the result of this goal can be viewed as a limitation of the study.

While our study complements the findings related to long-term trends in case study practices in TIM examined by Goffin et al. (2019), we believe that future studies can further investigate how paradigmatic diversity has evolved and what has triggered those changes. For example, future studies can examine how process approaches have changed in terms of their ontological conceptualization of process (strong versus weak) (Tsoukas and Chia, 2002) and whether these changes were reflected in researchers' choices of methods. Similarly, a better understanding of triggers (e.g. seminal works) that affect paradigmatic choices or pluralism can sensitize editors to the power of this work. Overall, we believe that a better understanding of the process and practices of conducting case research in TIM will move the field forward.

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Notes

- ¹ Some of the journals in Thongpapanl's (2012) list, such as the *Academy of Management Review*, do not publish qualitative research, and some did not publish qualitative case studies in the 2013–2018 period, which resulted in articles from only 31 journals.
- ² We would like to thank one of the reviewers to ensuring we kept a balance between being too prescriptive and too vague in developing our guidelines.

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