Qualitative Comparative Analysis in Business and Management Research (FREE)

Johannes Meuer and Peer C. Fiss

Summary and Keywords

During the last decade, qualitative comparative analysis (QCA) has become an increasingly popular research approach in the management and business literature. As an approach, QCA consists of both a set of analytical techniques and a conceptual perspective, and the origins of QCA as an analytical technique lie outside the management and business literature. In the 1980s, Charles Ragin, a sociologist and political scientist, developed a systematic, comparative methodology as an alternative to qualitative, case-oriented approaches and to quantitative, variable-oriented approaches. Whereas the analytical technique of QCA was developed outside the management literature, the conceptual perspective underlying QCA has a long history in the management literature, in particular in the form of contingency and configurational theory that have played an important role in management theories since the late 1960s.

Until the 2000s, management researchers only sporadically used QCA as an analytical technique. Between 2007 and 2008, a series of seminal articles in leading management journals laid the conceptual, methodological, and empirical foundations for QCA as a promising research approach in business and management. These articles led to a "first" wave of QCA research in management. During the first wave—occurring between approximately 2008 and 2014—researchers successfully published QCA-based studies in leading management journals and triggered important methodological debates, ultimately leading to a revival of the configurational perspective in the management literature.

Following the first wave, a "second" wave—between 2014 and 2018—saw a rapid increase in QCA publications across several subfields in management research, the development of methodological applications of QCA, and an expansion of scholarly debates around the nature, opportunities, and future of QCA as a research approach. The second wave of QCA research in business and management concluded with researchers' taking stock of the plethora of empirical studies using QCA for identifying best practice guidelines and advocating for the rise of a "neo-configurational" perspective, a perspective drawing on set-theoretic logic, causal complexity, and counterfactual analysis.

date: 04 August 2020

Nowadays, QCA is an established approach in some research areas (e.g., organization theory, strategic management) and is diffusing into several adjacent areas (e.g., entrepreneurship, marketing, and accounting), a situation that promises new opportunities for advancing the analytical technique of QCA as well as configurational thinking and theorizing in the business and management literature. To advance the analytical foundations of QCA, researchers may, for example, advance robustness tests for QCA or focus on issues of endogeneity and omitted variables in QCA. To advance the conceptual foundations of QCA, researchers may, for example, clarify the links between configurational theory and related theoretical perspectives, such as systems theory or complexity theory, or develop theories on the temporal dynamics of configurations and configurational change. Ultimately, after a decade of growing use and interest in QCA and given the unique strengths of this approach for addressing questions relevant to management research, QCA will continue to influence research in business and management.

Keywords: qualitative comparative analysis, configurational theory, causal complexity, equifinality, conjunctural causation, causal asymmetry, organizational configurations, fuzzy sets, set-analytic methods

Introduction

Qualitative comparative analysis (QCA) is a research approach consisting of both an analytical technique and a conceptual perspective for researchers interested in studying configurational phenomena (Fiss, Cambre, & Marx, 2013; Ragin, 2000, 2008; Schneider & Wagemann, 2013). QCA is particularly appropriate for the analysis of causally complex phenomena. These phenomena are characterized by three aspects of causal complexity. The first is what Ragin (1987, p. 23) referred to as "multiple conjunctural causation," the idea that multiple causes combine to bring about outcomes in complex ways. The second is equifinality, the idea that a system can achieve a particular state in more than one way. The third is causal asymmetry, the idea that combinations of causes leading to the presence of an outcome may be different from combinations leading to its absence. QCA's focus on causal complexity allows the researcher to examine situations involving "INUS" conditions (Mackie, 1974), where individual conditions are insufficient but necessary parts of a condition that is itself unnecessary but sufficient for its effect. In such situations, individual factors are by themselves not able to bring about the outcome, but a combination of factors may be sufficient to bring about an outcome.

The analytical technique of QCA was developed in the 1980s by Charles Ragin, a sociologist and political scientist, as an alternative comparative approach that lies midway between the primarily qualitative, case-oriented approach and the primarily quantitative, variable-oriented approach, with the goal of bridging both by combining their advantages (Ragin, 1987; Ragin, Mayer, & Drass, 1984) and tackling situations where causality is complex and conjunctural. QCA uses Boolean algebra for the analysis of set relations and allows researchers to formally analyze patterns of necessity and sufficiency regarding outcomes of interest. Since its inception, QCA has developed into a broad set of tech-

niques that share their set-analytic nature and include both descriptive and inferential techniques.

Many researchers have drawn on QCA because it offers a means to systematically analyze data sets with only few observations. In fact, QCA was originally applied to small-*n* situations of between 10 and 50 cases; situations where there are frequently too many cases to pursue a classical qualitative approach but too few cases for conventional statistical analysis (Ragin, 1987). However, more recently, researchers have also applied QCA to medium- and large-*n* situations marked by hundreds of thousands of cases. While these applications require some changes to how QCA is applied (Greckhamer, Misangyi, & Fiss, 2013), they retain many advantages for analyzing situations that are configurational in nature and marked by causal complexity.

As a conceptual perspective, QCA aligns closely with configurational theories in the management and business literature, theories that have significantly influenced management research since the 1960s (Dess, Newport, & Rasheed, 1993; Ketchen et al., 1997; Meyer, Tsui, & Hinings, 1993; Miller, 1987). Until the mid-2000s, QCA had relatively little influence on management research. However, starting in 2007, several publications in leading management journals jointly outlined the conceptual, methodological, and empirical foundations of QCA, thereby introducing QCA as an integrated research approach to the management and business literature (Fiss, 2007; Grandori & Furnari, 2008; Greckhamer, Misangyi, Elms, & Lacey, 2008). The impact of these foundational publications resulted in a "first" wave of QCA research in management. The first wave—lasting approximately from 2008 to 2014—included several empirical applications of QCA (e.g., Crilly, Zollo, & Hansen, 2014; Greckhamer, 2011; Meuer, 2014; Pajunen, 2008) as well as conceptual and methodological development (Fiss, Cambre, et al., 2013; Fiss, Sharapov, & Cronqvist, 2013) and established a configurational approach using set-analytic techniques more broadly in business and management. By the end of this period, research drawing on QCA had been published in nearly all top management journals, initiating a "second" wave of QCA in the management literature.

The second wave—lasting approximately from 2014 until the present—has been marked by several important developments that further established QCA as both an analytical and a conceptual approach in the business and management literature. First, the number of empirical studies rapidly increased and expanded into new subfields (e.g., Campbell, Sirmon, & Schijven, 2016; Greckhamer, 2016; Haxhi & Aguilera, 2017; Meuer, 2017; Vergne & Depeyre, 2016). Second, researchers began to employ QCA as an analytical technique in innovative ways, extending its applicability to new types of data and mixing QCA with other, more qualitative and more quantitative, methodologies (see Aversa, Furnari, & Haefliger, 2015; Meuer, Rupietta, & Backes-Gellner, 2015). At the same time, several methodological innovations around QCA as an analytical technique not only helped clarify its relation to (more) qualitative and (more) quantitative methods but also extended the applicability of QCA to new research questions and phenomena (Gabriel, Campbell, Djurdjevic, Johnson, & Rosen, 2018; Meuer & Rupietta, 2017A, 2017B).

date: 04 August 2020

Third, in response to the growing number of studies using QCA, new debates over the usefulness, validity, and future of QCA emerged. While some of these debates have been about QCA as an analytical technique (Fiss, Marx, & Rihoux, 2014; Lucas & Szatrowski, 2014; Ragin, 2014A; Vaisey, 2014), other debates called for the development of a set-analytic configurational perspective for management research (Cambré, Fiss, & Marx, 2013; Ketchen, 2013; Soda & Furnari, 2012). Ultimately, the second wave laid the groundwork for what Misangyi et al. (2017) have called the "neo-configurational perspective" in management research, a perspective that is firmly based in set-theoretic logic, deterministic causality, and counterfactual analysis, and that promises new opportunities for configurational thinking and theorizing in the business and management literature.

The purpose of this article is to introduce QCA, to explain how QCA consists of two central elements (a conceptual perspective and an analytical technique), to provide a brief history of QCA outlining how the two elements of QCA have emerged and become integrated, and to identify future research areas. Correspondingly, the article outlines the origins of QCA in sociology and political sciences and describes how QCA has been introduced to business and management research.

QCA in a Nutshell: Mechanisms, Aims, and Boundary Conditions

Classical QCA analysis proceeds roughly in five steps, as illustrated in Figure 1. In the first step, the researcher selects causal conditions based on substantive or theoretical knowledge of why the cases are particularly useful for providing unique insights into an outcome of interest. In the second step, the researcher constructs the data set, including the calibration of data for both the explanatory conditions and the outcome into set membership scores. In the third step, the researcher converts the data set into a truth table—a table that list in its rows all theoretically possible configurations of the causal conditions—and aims to resolve contradictory cases, that is, cases that lower the consistency of a given truth table row. In the fourth step, the researcher performs Boolean minimization to simplify the truth table, with the goal of identifying expressions associated with the outcome of interest. As part of this step, the researcher also uses logical remainders—rows of the truth table that do not have empirical instances—to identify two solutions: the intermediate solution that employs only "easy" counterfactuals and the parsimonious solution that employs both "easy" and "difficult" counterfactuals (Ragin, 2008). In the fifth step, the researcher evaluates and interprets the results with respect to the causal mechanisms they imply and the relations of the results to prior theory. Finally, because set-theoretic analysis allows for causal asymmetry, scholars recommend repeating the analysis for the negation of the outcome (Ragin, 2008; Schneider & Wagemann, 2013).
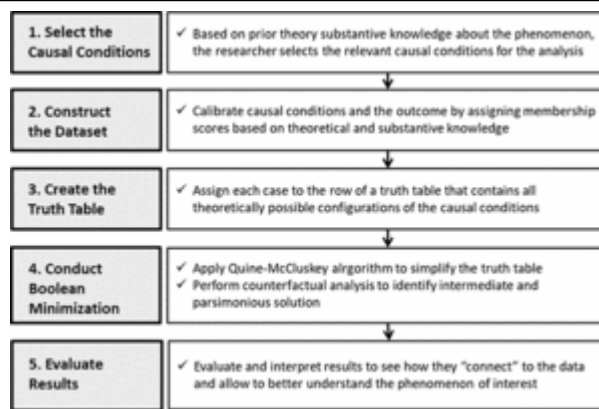
Figure 1. The five steps of a classic QCA analysis.

Throughout these five steps, researchers draw on their substantive knowledge of the cases and their context as well as theoretical knowledge for the definition of the conditions and for the calibration. Additionally, a researcher interested in theory-building might adjust the calibration, for example, by narrowing scope conditions or making causal conditions and outcomes more or less inclusive, thus using an abductive approach that is either necessity- or sufficiency-centered. Alternatively, a researcher interested in theory-testing could use robustness checks to evaluate the sensitivity of results—for example, by evaluating how differences in calibration affect the results obtained.

Researchers have also clarified the conditions under which the analytical technique of QCA may be fruitfully applied. Three topics have dominated the discussions during the last decade: case selection, sample size, and the number of conditions included in the analysis. First, most scholars agree that QCA typically involves purposive sampling where researchers draw on their substantive or theoretical knowledge to identify (and purposefully) select cases. Such a case-selection approach is firmly established in systematic comparative case analysis (Eisenhardt, 1989; Ragin, 1987) and helps researchers identify samples of high relevance or appropriateness for answering their research questions. However, purposive sampling is not a requirement, and set-analytic approaches have been applied in a variety of settings, including those marked by statistical sampling (e.g., Ragin & Fiss, 2017).

Second, QCA was developed initially for researchers with data sets too large for purely qualitative analytical techniques and too small for purely quantitative ones (cf. Ragin, 1987, p. vii). More recently, however, researchers have increasingly used QCA for the analysis of larger data sets with hundreds or thousands of cases; in principle, the applicability of QCA is not so much based on the number of cases as on whether the phenomenon in question is configurational (see Greckhamer, Furnari, Fiss, & Aguilera, 2018). Yet, in situations with less than about 10 cases, QCA typically provides relatively little advantage beyond standard qualitative approaches. Thus, while there is no maximum number of cases, there is a minimum number of cases for researchers to benefit from QCA. Ac-

date: 04 August 2020

cordingly, researchers should cautiously consider using QCA when analyzing only a very small number of cases.

Third, researchers have long debated the appropriate number of conditions to be included in a QCA analysis (e.g., Marx & Duşa, 2011; Ragin, 2000; Schneider & Wagemann, 2013). Conceptually, there is widespread agreement that researchers should select conditions based on their theoretical expertise and substantive knowledge and familiarity with the cases and the research context. Yet, practical considerations also matter. For example, because QCA analytically draws on Boolean algebra to organize cases in a truth table, every additional condition included in a QCA doubles the number of truth table rows. Accordingly, as the researcher adds conditions to the analysis, the number of possible combinations of conditions (i.e., configurations) grows exponentially. This expansion of the truth table also tends to result in a greater proportion of logical remainders, that is, rows of the truth table that are not populated with cases. While QCA can address significant levels of such limited diversity, its presence tends to render the analysis more challenging.

Because of this relationship between the number of cases and the number of conditions in an analysis, researchers have provided rules of thumb, recommendations, and other decision-making tools (Marx, 2010; Schulze-Bentrop, 2013). However, as limited diversity differs by samples, case-condition ratios should be viewed as guidelines only and researchers applying QCA need to ensure that their model is neither under- nor overspecified, because including too few conditions may result in configurations that lack conceptual clarity and distinctiveness, whereas including too many conditions may result in a model lacking parsimony.

While QCA is highly suited for phenomena and theories marked by a configurational logic, with some examples being combinations of factors leading to competitive advantage, entrepreneurial success, person–organization fit, or effective combinations of human resource practices, QCA is less helpful for analyzing phenomena that are not configurational in nature or for process research and process theorizing. Likewise, because QCA is fundamentally set-analytic and noncorrelational, researchers should avoid using QCA when they are interested in testing correlational hypotheses. In such a case, QCA will neither provide valid results, because it does not examine explanatory factors independently (ceteris paribus), nor offer results as nuanced and sophisticated as those provided by standard statistical techniques. However, that does not mean QCA cannot be used in a deductive manner: when used appropriately, QCA can be a powerful tool for testing a variety of hypotheses (Greckhamer et al., 2013; Misangyi et al., 2017). In fact, when using Boolean algebra to express theoretical assumptions as formal statements, QCA can provide fine-grained tools for evaluating such statements. An example of this is provided by Frambach, Fiss, and Ingenbleek (2016), who test theoretical predictions regarding constellations of different strategic orientations, strategy types, and market conditions by capitalizing on their expression in Boolean terms, thus allowing evaluation of the agreement between theoretical prediction and obtained results.

date: 04 August 2020

Creating QCA: The Origins of QCA in Sociology and Political Science

As an analytical technique, QCA's roots lie with John Stuart Mill's (1843) "canons," and especially his method of agreement and indirect method of difference. Mill's canons were intended to systematically compare cases regarding the presence and absence of potential causes, thereby eliminating those causes not related to an outcome of interest. Yet, whereas Mill's methods were limited to situations in which an outcome has only one cause, QCA was specifically developed to address complex situations marked by multiple causes and conjunctural causation, that is, situations where several combinations or "recipes" of causal conditions exists that are sufficient for explaining the outcome of interest.

After its introduction by Ragin in his book *The Comparative Method* (1987), the adoption of QCA as an analytical technique was primarily restricted to the fields of historical sociology and comparative political science. In these fields, researchers frequently compared data sets of perhaps 20–50 countries and complemented the analysis with intensive case knowledge about each particular country, a situation that closely corresponded to the comparative nature of QCA and allowed for a systematic comparison in such small-*n* situations. Accompanied by several methodological and agenda-setting works (Amenta & Poulsen, 1994; Griffin & Ragin, 1994; Kosko & Toms, 1993), the number of publications using QCA slowly increased, leading to some critical responses (e.g., Lieberson, 1991).

At this time, both empirical applications of QCA as well as methodological contributions and discussions were almost exclusively restricted to political science and sociology. In sociology, studies using QCA quickly appeared in the leading journals (e.g., Amenta, Carruthers, & Zylan, 1992; Amenta & Halfmann, 2000). In political science, however, QCA faced stronger resistance, and researchers struggled to publish QCA publications in top journals. Overall, until 2000, no more than about ten publications of QCA appeared annually.

After 2000, and with the introduction of a new variant of QCA, namely fuzzy set QCA, the interest in QCA grew rapidly. A key distinctive feature of QCA is its reliance on sets instead of variables. When originally introduced by Ragin (1987), QCA relied on crisp sets, that is, dichotomous sets where a case is either fully in or fully out of the set, thus closely resembling binary variables. While crisp sets allow for the application of the Quine-McCluskey algorithm—a method for the minimization of Boolean expressions—and are applicable to many phenomena, they have the disadvantage of not allowing for a precise and graded assessment of membership functions, a desirable feature for many social science concepts that do not have clear cutoffs, such as being high performing, poor, or educated.

To address this challenge, in 2000 Ragin introduced fsQCA, a variant of QCA that allows researchers to include not only dichotomous, but also calibrated, fuzzy conditions that range from 0 to 1, thus avoiding information loss. In short, fuzzy set cases have degrees

date: 04 August 2020

of membership in a construct (e.g., the set of developed countries, the set of high-performing firms, etc.). The three key membership thresholds are 0 ("fully out"), 0.5 (the point of maximum ambiguity of membership), and 1 ("fully in"). While fuzzy sets resemble ratio level variables, they are in fact different in that they have both a meaningful floor (0) and a meaningful ceiling (1) and the membership scores are "calibrated," that is, tied to either theoretical or substantive knowledge of what it means to be at a particular level of membership.

Because it can accommodate both crisp and fuzzy sets, fsQCA quickly became the most frequently used variant of QCA, an alternative being multivalue QCA (mvQCA), introduced by Cronqvist (2003). The introduction of fuzzy sets along with commensurate software packages, such as fs/QCA (Ragin & Davey, 2017) and TOSMANA (Cronqvist, 2017), led to increased adoption of QCA, as evidenced by a growing number of studies published between 2000 and 2008. Most of the publications continued to appear in the fields of political science and sociology. The situation changed in 2007 with the introduction of QCA to the management literature.

QCA in Business and Management Research

To understand the adoption and use of QCA in business and management, it is important to view it against the background of configurational thinking in those fields. Configurational approaches and configurational theorizing have a long tradition in management studies and organizational sociology. Broadly speaking, configurations refer to "complex systems of interdependencies brought about by central, orchestrating themes" (Miller, 1996, p. 506). The notion of an organization as a configuration of interconnected elements is arguably foundational to many of the dominant theories in the field, especially contingency theory (Drazin & van de Ven, 1985; Lawrence & Lorsch, 1967; Thompson, 1967) and configurational theory (Meyer et al., 1993; Miller, 1986). This notion also emphasizes complex causality and nonlinear relationships where "variables found to be causally related in one configuration may be unrelated or even inversely related in another" (Meyer et al., 1993, p. 1178).

Similarly, typological theories, such as those of Blau and Scott (1962), Burns and Stalker (1961), Miles and Snow (1978), Mintzberg (1983), and Porter (1980), have played a key role in business and management research. Scholars' engagement with typological theories also included important elements of configurational theory, among them concepts such as the notion of equifinality—the idea that a system can achieve a particular state in more than one way (see Gresov & Drazin, 1997). The emphasis on elements of configurational theory arguably also provided a fertile ground for a novel approach that would allow researchers to move beyond their prior toolkit, a toolkit primarily involving interaction effects, cluster analysis, and deviation scores (see Fiss, 2007).

date: 04 August 2020

The First Wave of QCA: Laying the Conceptual, Methodological, and Empirical Foundations

While a few articles using QCA had occasionally been published in management outlets (e.g., Kogut & Ragin, 2006; Romme, 1995; Stevenson & Greenberg, 2000), the late 2000s ushered in a different and more sustained attempt to introduce QCA to the field of management. Starting in 2007, several articles began to outline the conceptual, empirical, and methodological foundations for QCA in business and management, leading to a first wave of publications introducing QCA to several leading management journals.

Whereas before 2007 most publications primarily used QCA as an analytical approach, these seminal articles marked the introduction of QCA as a research approach in the management literature. For example, Fiss's (2007) conceptual article on set-theoretic approaches to organizational configurations not only introduced QCA to a larger management audience but also highlighted the importance of using an approach like QCA that aligns with the theoretical assumptions of configurational theory.

Similarly, Grandori and Furnari (2008) outlined an agenda for the combinatorial analysis and design of organizations, along with a set of propositions that they subsequently tested on a sample of 75 firms using QCA. Greckhamer et al. (2008) introduced the use of QCA as an analytical technique for strategic management research by using it as an alternative to variance decomposition for understanding the relative importance of industry, corporate, and business-unit factors for performance, while Lacey and Fiss (2009) argued for the use of QCA to study comparatively across different levels of analysis.

Around the same time, the *Journal of Business Research* published a set of articles that brought together a variety of applications using QCA (e.g., Häge, 2007; Kvist, 2007; Skaaning, 2011; Stokke, 2007; Vis, Woldendorp, & Keman, 2007), along with a user manual (Duşa, 2007). Moreover, drawing on QCA's comparative roots, several researchers applied QCA in the area of international business to study sets of countries, in the mold of traditional QCA studies in political science and sociology (Crilly, 2011; Greckhamer, 2011; Jackson & Deeg, 2008; Pajunen, 2008; Schneider, Schulze-Bentrop, & Paunescu, 2010).

Fiss (2011) complemented these conceptual and methodological contributions with the first empirical study in one of the leading management journals. He emphasized the value of QCA for typology theorizing and further developed the ideas of causal asymmetry and core and peripheral elements in organizational configurations. While causal asymmetry refers to a situation where configurations of causes leading to the presence and absence of an outcome are not the mirror images of each other, core and peripheral elements are defined based on the strength of the evidence for a causal relation to the outcome. Similarly, Crilly et al. (2014) offered an exemplary small-*n* QCA study applying QCA to understand how firms respond to institutional pressures, while Soda and Furnari (2012) outlined the use of QCA's counterfactual logic for understanding the plausibility of unobserved configurations.

Characteristic of the first wave—which lasted from approximately 2008 to 2014—were two developments. First, researchers increasingly used and successfully established QCA as a novel research approach with the potential to make important contributions to debates ongoing in the most influential management journals (e.g., Ayuso, Rodríguez, García-Castro, & Ariño, 2012; Crilly, 2011; Crilly et al., 2014; Garcia-Castro & Aguilera, 2015; Meuer, 2014). This development was important not only for legitimizing QCA as a research approach in the business and management literature but also for developing an initial level of expertise among editorial boards and reviewers to evaluate the quality of publications using QCA.

Second, scholars increasingly debated methodological design aspects around QCA, aspects that would ensure a strong alignment of the conceptual perspective with the analytical technique. Some of the debates concerned aspects of model specification, such as determining the right number of causal conditions (often vis-à-vis the number of cases in a sample) or considerations for setting coverage and consistency thresholds (Marx & Duşa, 2011). Other debates concerned robustness tests and the differences between small-*n* and large-*n* QCA analysis (Emmenegger, Schraff, & Walter, 2014; Fiss, Sharapov, et al., 2013; Greckhamer et al., 2013; Skaaning, 2011).

Overall, the first wave led to the revival of the configurational perspective in the business and management literature, in particular in the area of strategic management and organization theory (Misangyi et al., 2017). It also helped establish QCA as an analytical approach that provides unique opportunities for systematic comparative case analysis. Finally, it initiated the emergence of a scholarly community of management researchers engaged in QCA across a variety of research areas.

The Second Wave of QCA: Strengthening the Foundations and Moving Beyond Them

During a second wave—lasting approximately from 2014 to the present—researchers increasingly applied QCA across a broad set of subfields in management research and developed new methodological opportunities for QCA in business and management research. Not only did the number of publications using QCA significantly increase in the top journals (Campbell et al., 2016; Dwivedi, Joshi, & Misangyi, 2018; Greckhamer, 2016), but also researchers applied the approach to new topics, such as education research, human resource management, and corporate sustainability (see Caves, Meuer, & Rupietta, 2015; Cooper & Glaesser, 2016; Halme, Rintamäki, Knudsen, Lankoski, & Kuisma, 2018; Meuer, 2017). At the same time, a number of studies increasingly experimented with new approaches to applying QCA, analyzing time-series data or integrating QCA with econometric analyses (Aversa et al., 2015; Meuer et al., 2015), and developing new methodological approaches involving QCA (Gabriel et al., 2018; Meuer & Rupietta, 2017A). Overall, during the second wave, QCA evolved into an established research approach across several fields in management research.

date: 04 August 2020

As the second wave progressed, and concurrent with greater maturity and increasing popularity of QCA, debates around the nature, opportunities, and future of QCA as a research approach expanded. Several new software packages, for example, for R (Duşa, 2016; Medzihorsky, Oana, Quaranta, & Schneider, 2016) or Stata (Longest & Vaisey, 2008), increased accessibility and user-friendliness of QCA. Some researchers expressed concerns about the validity of QCA as an analytical approach, questioning whether QCA produces valid and reliable results, leading to debates over the value of QCA for causal inference (Baumgartner, 2015; Baumgartner & Thiem, 2017; Lucas & Szatrowski, 2014; Schneider & Rohlfing, 2016; Thomann & Maggetti, 2017). At the same time, reviews and agenda articles in several fields, such as entrepreneurship, operations management, marketing, and paradox research, emphasized the value of QCA (e.g., Kuckertz & Prochotta, 2018; Russo, Confente, Gligor, & Cobelli, 2019; Schad & Bansal, 2018; Schneider & Eggert, 2014; Tóth, Thiesbrummel, Henneberg, & Naudé, 2015). Thus, in addition to increasing scrutiny of its algorithms, QCA as an approach became more popular, particularly in research areas outside the traditional areas of strategic management and organization theory.

Two seminal articles marked the growing maturity of the second wave of QCA research in the management and business literature. For the conceptual perspective, Misangyi et al. (2017, p. 255) outlined the main arguments of configurational theorizing in management, arguing that the introduction of QCA as a research approach in the management literature has led to the emergence of a neo-configurational perspective "that enables a fine-grained conceptualization and empirical investigation of causal complexity through the logic of set theory." Similarly, for the analytical technique, Greckhamer et al. (2018) took stock of the plethora of empirical studies using QCA in the past decade to provide best-practice guidelines for how management researchers may leverage the benefits of the analytical technique of QCA for enriching configurational theories in the management and business literature.

Nowadays, toward the end of the second wave, QCA in business and management research is still a relatively new and evolving methodology. Nonetheless, as a research approach, QCA appears well established and is likely to continue growing over the coming years. In addition, QCA is increasingly applied in adjacent fields, such as marketing (Frösén, Luoma, Jaakkola, Tikkanen, & Aspara, 2016), information systems management (Park, El Sawy, & Fiss, 2017; Park, Fiss, & El Sawy, 2020), and accounting (Bedford, Malmi, & Sandelin, 2016). Given these developments and its unique strengths, QCA research will continue to grow in the business and management literature.

Opportunities for Further Development

The articulation of the neo-configurational perspective of QCA marks an important point in the co-evolution of the conceptual perspective and the analytical technique that together constitute QCA. This perspective not only takes stock of the recent development in QCA but also packages the different threads into an integrated metatheoretical perspec-

tive (Misangyi et al., 2017). Similarly, the growth of QCA in the management and business literature and the accumulated experience and expertise with QCA among editors and reviewers have helped to clarify and substantiate the scope conditions for applying a set-analytic approach. For example, currently most management and business researchers agree that QCA is particularly useful when one is interested in exploring phenomena that are configurational by nature, in identifying necessary and sufficient conditions, or in developing new, and validating existing, typologies. Common to these types of scientific inquiry is that they all draw on the three aspects of causal complexity central to QCA: conjunctural causation, causal asymmetry, and equifinality.

The opportunities inherent in QCA along with the growth of QCA research in the management and business literature have paved the way for new developments in the conceptual and methodological elements of QCA. Moreover, as many phenomena of interest to management researchers are configurational by nature, QCA, as an approach, will continue to diffuse across several new research areas.

Advancing the Analytical Technique of QCA

On the methodological side, the analytical technique of QCA will benefit from advancements that clarify and strengthen the opportunities to draw inference from the method. For instance, some criticism has suggested that QCA results are very sensitive to the researcher's specification (e.g., Seawright, 2005). In response, researchers have made significant advancements in testing the sensitivity and robustness of QCA results in several directions (Schneider & Wagemann, 2013). Studies using QCA increasingly include information about the robustness of reported results toward changes in calibration, cutoff points (both frequency and consistency), and alternative explanations (Fiss, 2011; Meuer et al., 2015; Vergne & Depeyre, 2016). Researchers have also experimented with new ways for communicating the results of such robustness tests. For example, rather than claiming that configurational results remain unaltered irrespective of the researcher's modeling choices, as is common with correlational analyses, researchers should also explain how different modeling choices affect changes in the results and to what extent these changes affect the overall implications of their analysis.

Further, researchers increasingly realize that the usefulness of robustness tests depends on several interrelated factors, such as the researcher's familiarity with the cases, the size of the sample, and the reliance on the analytical technique of QCA. For example, in classical small-*n* QCA, familiarity with the cases and context allows the researcher to draw on substantive and theoretical knowledge to calibrate conditions and outcomes, thereby increasing content validity of the measures. However, in large-*n* situations, such familiarity with the cases is more challenging. Thus, researchers need to take special care to ensure that the findings obtained are in fact valid, and they need to invest more effort in evaluating the type and effectiveness of different robustness tests, developing ways of ensuring the validity of findings, especially in large-*n* situations when familiarity with the cases may not be feasible.

A closely related issue is that of endogeneity in QCA studies. In this regard, several critics (e.g., Collier, 2014; Seawright, 2005) have argued that omitted relevant variables and invalid inferences present a major challenge to QCA. In small-*n* QCA, issues of omitted causal conditions and case selection are addressed using case knowledge; the researcher is close enough to the issues to ensure that all factors that truly matter are accounted for and included. In contrast, in large-*n* studies, the closeness to the cases is less readily given and often is not possible, so that the algorithm and research design carry a much greater burden in ensuring the validity of inferences. Currently, issues of omitted variables are too often given insufficient attention, at least partly because standard "control" approaches typical for correlational analyses and built on the ceteris paribus assumption do not readily transfer to QCA. Future research may examine and develop options for minimizing the threat of endogeneity, especially in the form of omitted causal factors.

It is also expected that researchers will further develop and expand the applicability of the analytical technique of QCA. For several years, researchers have pointed out that QCA—both in its conceptual perspective and its analytical foundation—faces challenges when dealing with longitudinal data analysis (see Fischer & Maggetti, 2017; Furnari & Meuer, 2016; Hak, Jaspers, & Dul, 2013). Several researchers have provided alternative approaches for including time considerations in QCA, such as temporally ordered configurations (Caren & Panofsky, 2005), panel data set theory (García-Castro & Ariño, 2016), or case-oriented calibration of change patterns (Ragin, 2014B). Others have experimented with approaches, such as lagged time windows, for using QCA on time-series data (Aversa et al., 2015; Meuer & Rupietta, 2015). Yet, despite these advancements, QCA still lacks a compelling approach for fully capturing the potential of temporal theorizing and time-series configurational analysis.

Advancing the Conceptual Foundations of QCA

In addition to methodological developments, there are also significant opportunities for advancing the conceptual foundations of QCA. Current debates about the value of the conceptual perspectives underlying QCA have largely focused on the value of configurational thinking and theories (Cambré et al., 2013; Miller, 2018; Soda & Furnari, 2012), asking how to best conceptualize a configurational perspective and in what areas of organizational (and social) reality researchers can reasonably assume configurational phenomena to exist. The debates are expected to continue and ideally to result in a clearer articulation of how configurational theorizing proceeds, what its main tenets are, and how it differs from correlational theorizing or process theorizing. Specifically, more work is needed on how multiple conjunctural causation affects the conceptualization of social phenomena, thus contributing to a greater diversity in approaches to theorizing organizational and management phenomena.

date: 04 August 2020

QCA in the Interplay Between Theory and Methods

The introduction of QCA to the management and business literature has helped shift attention to alternative ways of theorizing, most notably typological theories and theorizing about necessary and sufficient conditions (Delbridge & Fiss, 2013). In fact, although many phenomena of interest to management researchers are configurational by nature (i.e., theoretical statements relating to the phenomena entail a conjunctural or equifinal logic), the phenomena have in the past largely been empirically studied using correlational methods, leading to a misfit between theories and methods (Fiss, 2007; Misangyi et al., 2017).

Relatedly, because quantitative statistical methods represent the dominant methodological approach to empirical research in management, styles of theorizing have likewise been steered toward correlational statements, as shown by Delbridge and Fiss (2013), leading to a situation where methods significantly yet often unintentionally inform and shape theories (cf. Abbott, 1988). As a research approach, QCA thus offers an alternative to what Ragin (2008) called the hegemony of "net-effects thinking." The comparative approach inherent in QCA, with its focus on complex causal processes, thus requires a new way of theorizing. Most notably, this way of theorizing differs from "the more of A, the more of B"—statements currently prevalent in management research. Instead, QCA requires statements focusing on causal conditions, combinations of conditions, or necessary or sufficient conditions for bringing about an outcome of interest. Thus, the introduction of QCA to management research has renewed interest in the alignment of theory and methods, along with potential pitfalls in current management research.

Thus, advancing configurational theorizing remains relatively underdeveloped and may begin with researchers' clarifying and explicitly stating why QCA is the appropriate method of choice given their phenomenon of interest. Thus far, authors frequently draw attention to notions of complex causality to motivate their choice of method. Yet, in terms of theorizing, QCA may serve different purposes with varying implications for sampling and research design (Colquitt & Zapata-Phelan, 2007; Meuer & Rupietta, 2017B; Misangyi, 2018). Is a researcher using QCA for theory-building, for explaining an underdeveloped puzzle, or for testing theory? QCA may be used for each of these purposes, yet each requires a different approach to theorizing the relations linking explanatory with outcome conditions, developing (configurational) hypotheses, or treatment of findings. However, more recently Furnari et al. (2020) have articulated heuristics aimed at facilitating the development of configurational theories.

There are also significant opportunities for advancing the connection between QCA and other theoretical approaches. For example, a configurational perspective has in the past occasionally been associated with complexity theory (Jenson, Leith, Doyle, West, & Miles, 2016; Schad & Bansal, 2018; Täuscher, 2018; Verweij & Gerrits, 2013), as the tenets of complex causality emphasized in QCA—conjunctural causation, equifinality, and asymmetric causality—closely correspond to propositions underlying systems and complexity theory. Yet, how exactly QCA relates to these theories and to what extent it is different in kind

date: 04 August 2020

rather in degree, remain unclear, and more research might enhance configurational theorizing with related research fields, such as systems or complexity theory.

Similarly, while QCA has so far primarily been applied to organization- or country-level phenomena (Misangyi et al., 2017), there are significant opportunities for applying a configurational approach to microlevel phenomena. For instance, Crilly (2013) used QCA to examine the simultaneous effects of individual psychological factors, the organizational context, and the broader social context on why managers behave in a socially responsible way. Similarly, Leischnig and Kasper-Brauer (2015) studied configurations of employee personal characteristics and work perceptions in order to explain employee adaptive behavior, while Straatmann, Rothenhöfer, Meier, and Mueller (2018) employed QCA to analyze the interdependencies among psychological factors related to change-supportive intentions. Given that a number of microlevel theories embrace the notion of configurations either explicitly in the form of a "gestalt" or implicitly in the form of their arguments, the use of QCA for studying microlevel phenomena has potential to increase in coming years.

Finally, as much as the analytical technique of QCA has thus far not been developed to address time-series data, configurational theory is silent on issues like configurational change and configurational process theories. For example, consider Porter's (1980) influential typology of generic strategies that distinguishes between differentiation and cost leadership strategies. To some extent, the configurations that capture these strategies are generic, in that they are robust to temporal influences. Yet, a global financial crises or environmental disasters may call into question the generic validity of the typology, as configurations of strategic types may adjust or succumb to shifts in the competitive landscape. Similarly, past research has emphasized that configurational change will be episodic, fundamental, and often exogenously determined (e.g., Miller, Friesen, & Mintzberg, 1984), yet a more dialectic approach to configurations instead suggests that configurational change may be continuous, gradual, and endogenous (e.g., Farjoun, 2010). Future advancements in the conceptual perspective underlying QCA may thus provide insights into the temporal dynamics of configurations or into patterns of configurational change.

Conclusion

This article provides a brief account of the emergence of QCA as a research approach that consists both of an analytical technique and a conceptual perspective. After a decade of management research drawing on QCA, the approach has reached a certain level of maturity, providing ample illustrations for how to appropriately use QCA but also where QCA needs further development. Notwithstanding the plethora of methodological and conceptual advancements in QCA, given the configurational nature of many phenomena of interest to business and management researchers, QCA is likely to continue to diffuse into related research fields in management and beyond.

date: 04 August 2020

References

Abbott, A. (1988). Transcending general linear reality. *Sociological Theory*, *6*(2), 169–186.

Amenta, E., Carruthers, B. G., & Zylan, Y. (1992). A hero for the aged? The Townsend Movement, the political mediation model, and US old-age policy, 1934–1950. *American Journal of Sociology*, *98*(2), 308–339.

Amenta, E., & Halfmann, D. (2000). Wage wars: Institutional politics, WPA wages, and the struggle for US social policy. *American Sociological Review*, *65*(4), 506–528.

Amenta, E., & Poulsen, J. D. (1994). Where to begin: A survey of five approaches to selecting independent variables for qualitative comparative analysis. *Sociological Methods & Research*, *23*(1), 22–53.

Aversa, P., Furnari, S., & Haefliger, S. (2015). Business model configurations and performance: A qualitative comparative analysis in Formula One racing, 2005–2013. *Industrial and Corporate Change*, *24*(3), 655–676.

Ayuso, S., Rodríguez, M. A., García-Castro, R., & Ariño, M. A. (2012). Maximizing stakeholders' interests: An empirical analysis of the stakeholder approach to corporate governance. *Business & Society*, *53*(3), 414–439.

Baumgartner, M. (2015). Parsimony and causality. *Quality & Quantity*, *49*(2), 839–856.

Baumgartner, M., & Thiem, A. (2017). Often trusted but never (properly) tested: Evaluating qualitative comparative analysis. *Sociological Methods & Research*, 49(2), 279–311.

Bedford, D. S., Malmi, T., & Sandelin, M. (2016). Management control effectiveness and strategy: An empirical analysis of packages and systems. *Accounting, Organizations and Society*, *51*, 12–28.

Blau, P., & Scott, W. (1962). *Formal organizations*. San Francisco, CA: Chandler.

Burns, T., & Stalker, G. M. (1961). *The management of innovation*. London, UK: Tavistock Publications.

Cambré, B., Fiss, P. C., & Marx, A. (2013). Conclusion: The path forward. In *Configurational theory and methods in organizational research* (pp. 311–319). *Research in the Sociology of Organizations* (Vol. 38). Bingley, UK: Emerald Group Publishing.

Campbell, J. T., Sirmon, D. G., & Schijven, M. (2016). Fuzzy logic and the market: A configurational approach to investor perceptions of acquisition announcements. *Academy of Management Journal*, *59*(1), 163–187.

Caren, N., & Panofsky, A. (2005). TQCA: A technique for adding temporality to qualitative comparative analysis. *Sociological Methods & Research*, *34*(2), 147–172.

date: 04 August 2020

Caves, K., Meuer, J., & Rupietta, C. (2015). Advancing educational leadership research using qualitative comparative analysis (QCA). In A. J. Browers, A. R. Shoho, & B. G. Barnett (Eds.), *Challenges and opportunities of educational leadership research and practice*. Charlotte, NC: Information Age Publishing.

Collier, D. (2014). Comment: QCA should set aside the algorithms. *Sociological Methodology*, *44*(1), 122–126.

Colquitt, J. A., & Zapata-Phelan, C. P. (2007). Trends in theory building and theory testing: A five-decade study of the *Academy of Management Journal*. *Academy of Management Journal*, *50*(6), 1281–1303.

Cooper, B., & Glaesser, J. (2016). Exploring the robustness of set theoretic findings from a large *n* fsQCA: An illustration from the sociology of education. *International Journal of Social Research Methodology*, *19*(4), 445–459.

Crilly, D. (2011). Predicting stakeholder orientation in the multinational enterprise: A mid-range theory. *Journal of International Business Studies*, *42*(5), 694–717.

Crilly, D. (2013). Corporate social responsibility: A multilevel explanation of why managers do good. In *Configurational theory and methods in organizational research* (Vol. 38, pp. 181–204). Bingley, UK: Emerald Group Publishing.

Crilly, D., Zollo, M., & Hansen, M. (2014). Faking it or muddling through? Understanding decoupling in response to stakeholder pressures. *Academy of Management Journal*, *55*(6), 1429–1448.

Cronqvist, L. (2003). ***Presentation of TOSMANA: Adding multi-value variables and visual aids to QCA***. Paper presented at the COMPASSS Launching Conference, Louvain-La-Neuve and Leuven.

Cronqvist, L. (2017). *Tosmana: Tool for small-n analysis* [Version 1.54]. Trier, Germany: University of Trier.

Delbridge, R., & Fiss, P. C. (2013). Editors comments: Styles of theorizing and the social organization of knowledge. *Academy of Management Review*, *38*(1), 325–331.

Dess, G. G., Newport, S., & Rasheed, A. M. A. (1993). Configuration research in strategic management: Key issues and suggestions. *Journal of Management*, *19*(4), 775–795.

Drazin, R., & van de Ven, A. H. (1985). Alternative forms of fit in contingency theory. *Administrative Science Quarterly*, *30*(4), 514–539.

Duşa, A. (2007). User manual for the QCA (GUI) package in R. *Journal of Business Research*, *60*(5), 576–586.

Duşa, A. (2016). *QCAGUI: Modern functions for qualitative comparative analysis* [R Package Version 2.1].

date: 04 August 2020

Dwivedi, P., Joshi, A., & Misangyi, V. F. (2018). Gender-inclusive gatekeeping: How (mostly male) predecessors influence the success of female CEOs. *Academy of Management Journal*, *61*(2), 379–404.

Eisenhardt, K. M. (1989). Building theories from case study research. *Academy of Management Review*, *14*(4), 532–550.

Emmenegger, P., Schraff, D., & Walter, A. (2014). *QCA, the truth table analysis and large-n survey data: The benefits of calibration and the importance of robustness tests*. COMPASSS WP Series 2014–79.

Farjoun, M. (2010). Beyond dualism: Stability and change as a duality. *Academy of Management Review*, *35*(2), 202–225.

Fischer, M., & Maggetti, M. (2017). Qualitative comparative analysis and the study of policy processes. *Journal of Comparative Policy Analysis*, *19*(4), 345–361.

Fiss, P. C. (2007). A set-theoretic approach to organizational configurations. *Academy of Management Review*, *32*(4), 1180–1198.

Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organizational research. *Academy of Management Journal*, *54*(2), 393–420.

Fiss, P. C., Cambre, B., & Marx, A. (Eds.). (2013). *Configurational theory and methods in organizational research. Research in the Sociology of Organizations* (Vol. 38). Bingley, UK: Emerald Group Publishing.

Fiss, P. C., Marx, A., & Rihoux, B. (2014). Comment: Getting QCA right. *Sociological Methodology*, *44*(1), 95–100.

Fiss, P. C., Sharapov, D., & Cronqvist, L. (2013). Opposites attract? Opportunities and challenges for integrating large-N QCA and econometric analysis. *Political Research Quarterly*, *66*, 191–197.

Frambach, R. T., Fiss, P. C., & Ingenbleek, P. T. (2016). How important is customer orientation for firm performance? A fuzzy set analysis of orientations, strategies, and environments. *Journal of Business Research*, *69*(4), 1428–1436.

Frösén, J., Luoma, J., Jaakkola, M., Tikkanen, H., & Aspara, J. (2016). What counts versus what can be counted: The complex interplay of market orientation and marketing performance measurement. *Journal of Marketing*, *80*(3), 60–78.

Furnari, S., Crilly, D., Misangyi, V. F., Greckhamer, T., Fiss, P. C., & Aguilera, R. V. (2020). Capturing causal complexity: Heuristics for configurational theorizing. *Academy of Management Review*.

Furnari, S., & Meuer, J. (2016). *Three approaches to longitudinal QCA: Opportunities and challenges*. Paper presented at the Academy of Management 2016, Anaheim, CA.

date: 04 August 2020

Gabriel, A. S., Campbell, J. T., Djurdjevic, E., Johnson, R. E., & Rosen, C. (2018). Fuzzy profiles: Comparing and contrasting latent profile analysis and fuzzy set qualitative comparative analysis for person-centered research. *Organizational Research Methods*, *21*(4), 877–904.

Garcia-Castro, R., & Aguilera, R. V. (2015). Incremental value creation and appropriation in a world with multiple stakeholders. *Strategic Management Journal*, *36*(1), 137–147.

García-Castro, R., & Ariño, M. A. (2016). A general approach to panel data set-theoretic research. *Journal of Advances in Management Sciences & Information Systems*, *2*, 63–76.

Grandori, A., & Furnari, S. (2008). A chemistry of organization: Combinatory analysis and design. *Organization Studies*, *29*(3), 459–485.

Greckhamer, T. (2011). Cross-cultural differences in compensation level and inequality across occupations: A set-theoretic analysis. *Organization Studies*, *32*(1), 85–115.

Greckhamer, T. (2016). CEO compensation in relation to worker compensation across countries: The configurational impact of country-level institutions. *Strategic Management Journal*, *37*(4), 793–815.

Greckhamer, T., Furnari, S., Fiss, P. C., & Aguilera, R. V. (2018). Studying configurations with qualitative comparative analysis: Best practices in strategy and organization research. *Strategic Organization*, *16*(4), 482–495.

Greckhamer, T., Misangyi, V., Elms, H., & Lacey, R. (2008). Using qualitative comparative analysis in strategic management research: An examination of combinations of industry, corporate, and business-unit effects. *Organizational Research Methods*, *11*(4), 695–726.

Greckhamer, T., Misangyi, V., & Fiss, P. C. (2013). The two QCAs: From a small to a large-N set theoretic approach. In P. C. Fiss, B. Cambre, & A. Marx (Eds.), *Configurational theory and methods in organizational research*. Bingley, UK: Emerald Group Publishing.

Gresov, C., & Drazin, R. (1997). Equifinality: Functional equivalence in organization design. *Academy of Management Review*, *22*(2), 403–428.

Griffin, L., & Ragin, C. C. (1994). Some observations on formal methods of qualitative analysis. *Sociological Methods & Research*, *23*(1), 4–21.

Häge, F. M. (2007). Constructivism, fuzzy sets and (very) small-N: Revisiting the conditions for communicative action. *Journal of Business Research*, *60*(5), 512–521.

Hak, T., Jaspers, F., & Dul, J. (2013). The analysis of temporally ordered configurations: Challenges and solutions. In *Configurational theory and methods in organizational research* (pp. 107–127). Bingley, UK: Emerald Group Publishing.

Halme, M., Rintamäki, J., Knudsen, J. S., Lankoski, L., & Kuisma, M. (2018). When is there a sustainability case for CSR? Pathways to environmental and social performance improvements. *Business & Society*. 0007650318755648.

Haxhi, I., & Aguilera, R. V. (2017). An institutional configurational approach to cross-national diversity in corporate governance. *Journal of Management Studies*, *54*(3), 261–303.

Jackson, G., & Deeg, R. (2008). Comparing capitalisms: Understanding institutional diversity and its implications for international business. *Journal of International Business Studies*, *39*(4), 540–561.

Jenson, I., Leith, P., Doyle, R., West, J., & Miles, M. P. (2016). Testing innovation systems theory using qualitative comparative analysis. *Journal of Business Research*, *69*(4), 1283–1287.

Ketchen, D. (2013). We try harder: Some reflections on configurational theory and methods. In *Configurational theory and methods in organizational research* (pp. 303–309). Bingley, UK: Emerald Group Publishing.

Ketchen, D., Combs, J., Russel, C., Shook, C., Dean, M. A., Runge, J., . . . & Beckstein, B. A. (1997). Organizational configurations and performance: A meta-analysis. *Academy of Management Journal*, *40*(1), 223–240.

Kogut, B., & Ragin, C. (2006). Exploring complexity when diversity is limited: Institutional complexity in theories of rule of law and national systems revisited. *European Management Review*, *3*(1), 44–59.

Kosko, B., & Toms, M. (1993). *Fuzzy thinking: The new science of fuzzy logic*. New York, NY: Hyperion.

Kuckertz, A., & Prochotta, A. (2018). What's hot in entrepreneurship research 2018? *Hohenheim Entrepreneurship Research Brief*, *4*(February), 1–7.

Kvist, J. (2007). Fuzzy set ideal type analysis. *Journal of Business Research*, *60*(5), 474–481.

Lacey, R., & Fiss, P. C. (2009). Comparative organizational analysis across multiple levels: A set-theoretic approach. In *Studying differences between organizations: Comparative approaches to organizational research*). *Research in the Sociology of Organizations* (Vol. 26, pp. 91–116). Bingley, UK: Emerald Group Publishing.

Lawrence, P., & Lorsch, J. W. (1967). *Organization and environment: Managing differentiation and integration*. Boston, MA: Harvard Graduate School of Business Administration.

Leischnig, A., & Kasper-Brauer, K. (2015). Employee adaptive behavior in service enactments. *Journal of Business Research*, *68*(2), 273–280.

Lieberson, S. (1991). Small N's and big conclusions: An examination of the reasoning in comparative studies based on a small number of cases. *Social Forces*, *70*(2), 307–320.

Longest, K. C., & Vaisey, S. (2008). Fuzzy: A program for performing qualitative comparative analyses (QCA) in Stata. *The Stata Journal*, *8*(1), 79–104.

Lucas, S. R., & Szatrowski, A. (2014). Qualitative comparative analysis in critical perspective. *Sociological Methodology*, *44*(1), 1–79.

Mackie, J. L. (1974). *The cement of the universe: A study of causation*: Oxford, UK: Clarendon Press.

Marx, A. (2010). Crisp-set qualitative comparative analysis (csQCA) and model specification: Benchmarks for future csQCA applications. *International Journal of Multiple Research Approaches*, *4*(2), 138–158.

Marx, A., & Duşa, A. (2011). Crisp-set qualitative comparative analysis (csQCA), contradictions and consistency benchmarks for model specification. *Methodological Innovations Online*, *6*(2), 103–148.

Medzihorsky, J., Oana, I.-E., Quaranta, M., & Schneider, C. (2016). *SetMethods: Functions for set-theoretic multi-method research and advanced QCA* [R package version 2.3].

Meuer, J. (2014). Archetypes of inter-firm relations in the implementation of management innovation. *Organization Studies*, *25*(1), 121–145.

Meuer, J. (2017). Exploring the complementarities within high-performance work systems: A set-theoretic analysis of UK firms. *Human Resource Management*, *56*(4), 651–672.

Meuer, J., & Rupietta, C. (2015). Qualifying "fit": The performance dynamics of firms' change tracks through organizational configurations. *COMPASSS—Working Paper WP 2015–80*.

Meuer, J., & Rupietta, C. (2017a). Integrating QCA and HLM for multilevel research on organizational configurations. *Organizational Research Methods*, *20*(2), 324–342.

Meuer, J., & Rupietta, C. (2017b). A review of integrated QCA and statistical analyses. *Quality & Quantity*, *51*(5), 2063–2083.

Meuer, J., Rupietta, C., & Backes-Gellner, U. (2015). Layers of co-existing innovation systems. *Research Policy*, *44*(4), 888–910.

Meyer, A. D., Tsui, A. S., & Hinings, C. R. (1993). Configurational approaches to organizational analysis. *Academy of Management Journal*, *36*(6), 1175–1195.

Miles, R. E., & Snow, C. C. (1978). *Organization strategy, structure and process*. New York, NY: McGraw-Hill.

date: 04 August 2020

Mill, J. S. (1843). *A system of logic, ratiocinative and inductive* (p. 130). Cambridge University Press.

Miller, D. (1986). Configurations of strategy and structure: Towards a synthesis. *Strategic Management Journal*, *7*(3), 233–249.

Miller, D. (1987). The genesis of configuration. *Academy of Management Review*, *12*(4), 686–701.

Miller, D. (1996). Configurations revisited. *Strategic Management Journal*, *17*(7), 505–512.

Miller, D. (2018). Challenging trends in configuration research: Where are the configurations? *Strategic Organization*, *16*(4), 453–469.

Miller, D., Friesen, P. H., & Mintzberg, H. (1984). *Organizations: A quantum view*. Upper Saddle River, NJ: Prentice Hall.

Mintzberg, H. (1983). *Structure in fives: Designing effective organizations*. Upper Saddle River, NJ: Prentice Hall.

Misangyi, V. (2018). *QCA is a cross-case comparative method: Designs in management research*. Paper presented at the Academy of Management Meeting, Chicago, IL.

Misangyi, V., Greckhamer, T., Furnari, S., Fiss, P. C., Crilly, D., & Aguilera, R. (2017). Embracing causal complexity: The emergence of a neo-configurational perspective. *Journal of Management*, *43*(1), 255–282.

Pajunen, K. (2008). Institutional and inflows of foreign direct investment: A fuzzy-set analysis. *Journal of International Business Studies*, *39*, 652–669.

Park, Y., El Sawy, O. A., & Fiss, P. C. (2017). The role of business intelligence and communication technologies in organizational agility: A configurational approach. *Journal of the Association for Information Systems*, *18*(9), 1.

Park, Y., Fiss, P. C., & El Sawy, O. A. (2020). Theorizing the multiplicity of digital phenomena: The ecology of configurations, causal recipes, and guidelines for applying QCA. *Management of Information Systems Quarterly* (In press).

Porter, M. E. (1980). *Competitive strategy*. New York, NY: Free Press.

Ragin, C. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies*. Berkeley, CA: University of California Press.

Ragin, C. (2000). *Fuzzy-set social science*. Chicago, IL: University of Chicago Press.

Ragin, C. (2008). *Redesigning social inquiry*. Chicago, IL: University of Chicago Press.

date: 04 August 2020

Ragin, C. (2014a). Comment: Lucas and Szatrowski in critical perspective. *Sociological Methodology*, *44*(1), 80–94.

Ragin, C. (2014b). *QCA and panel data*. Paper presented at the Second International QCA Expert Workshop, ETH Zurich.

Ragin, C., & Davey, S. (2017). *Fuzzy-set/qualitative comparative analysis 3.0*. Irvine: Department of Sociology, University of California.

Ragin, C., & Fiss, P. C. (2017). *Intersectional inequality: Race, class, test scores, and poverty*. Chicago, IL: University of Chicago Press.

Ragin, C., Mayer, S., & Drass, K. (1984). Assessing discrimination: A Boolean approach. *American Sociological Review*, *49*(2), 221–234.

Romme, A. G. L. (1995). Self-organizing processes in top management teams: A Boolean comparative approach. *Journal of Business Research*, *34*(1), 11–34.

Russo, I., Confente, I., Gligor, D., & Cobelli, N. (2019). A roadmap for applying qualitative comparative analysis in supply chain research: The reverse supply chain case. *International Journal of Physical Distribution & Logistics Management*, *49*(1), 99–120.

Schad, J., & Bansal, P. (2018). Seeing the forest and the trees: How a systems perspective informs paradox research. *Journal of Management Studies*, *55*(8), 1490–1506.

Schneider, C., & Rohlfing, I. (2016). Case studies nested in fuzzy-set QCA on sufficiency: Formalizing case selection and causal inference. *Sociological Methods & Research*, *45*(3), 526–568.

Schneider, C., & Wagemann, C. (2013). *Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis*. Cambridge, UK: Cambridge University Press.

Schneider, M., & Eggert, A. (2014). Embracing complex causality with the QCA method: An invitation. *Journal of Business Market Management*, *7*(1), 312–328.

Schneider, M., Schulze-Bentrop, C., & Paunescu, M. (2010). Mapping the institutional capital of high-tech firms: A fuzzy-set analysis of capitalist variety and export performance. *Journal of International Business Studies*, *41*, 246–266.

Schulze-Bentrop, C. (2013). *Qualitative comparative analysis (QCA) and configurational thinking in management studies*. Frankfurt, Germany: Peter Lang.

Seawright, J. (2005). Qualitative comparative analysis vis-à-vis regression. *Studies in Comparative International Development*, *40*(1), 3–26.

Skaaning, S.-E. (2011). Assessing the robustness of crisp-set and fuzzy-set QCA results. *Sociological Methods & Research*, *40*(2), 391–408.

date: 04 August 2020

Soda, G., & Furnari, S. (2012). Exploring the topology of the plausible: Fs/QCA counterfactual analysis and the plausible fit of unobserved organizational configurations. *Strategic Organization*, *10*(3), 285–296.

Stevenson, W. B., & Greenberg, D. (2000). Agency and social networks: Strategies of action in a social structure of position, opposition, and opportunity. *Administrative Science Quarterly*, *45*(4), 651–678.

Stokke, O. S. (2007). Qualitative comparative analysis, shaming, and international regime effectiveness. *Journal of Business Research*, *60*(5), 501–511.

Straatmann, T., Rothenhöfer, L. M., Meier, A., & Mueller, K. (2018). A configurational perspective on the theory of planned behaviour to understand employees' change-supportive intentions. *Applied Psychology*, *67*(1), 91–135.

Täuscher, K. (2018). Using qualitative comparative analysis and system dynamics for theory-driven business model research. *Strategic Organization*, *16*(4), 470–481.

Thomann, E., & Maggetti, M. (2017). Designing research with qualitative comparative analysis (QCA) approaches, challenges, and tools. *Sociological Methods & Research*, *49*(2), 0049124117729700.

Thompson, J. D. (1967). *Organizations in action*. New York, NY: McGraw-Hill.

Tóth, Z., Thiesbrummel, C., Henneberg, S. C., & Naudé, P. (2015). Understanding configurations of relational attractiveness of the customer firm using fuzzy set QCA. *Journal of Business Research*, *68*(3), 723–734.

Vaisey, S. (2014). Comment: QCA works—When used with care. *Sociological Methodology*, *44*(1), 108–112.

Vergne, J.-P., & Depeyre, C. (2016). How do firms adapt? A fuzzy-set analysis of the role of cognition and capabilities in US defense firms' responses to 9/11. *Academy of Management Journal*, *59*(5), 1653–1680.

Verweij, S., & Gerrits, L. M. (2013). Understanding and researching complexity with qualitative comparative analysis: Evaluating transportation infrastructure projects. *Evaluation*, *19*(1), 40–55.

Vis, B., Woldendorp, J., & Keman, H. (2007). Do miracles exist? Analyzing economic performance comparatively. *Journal of Business Research*, *60*(5), 531–538.

Johannes Meuer

Department of Management, Technology and Economics, ETH Zürich

Peer C. Fiss

Marshall School of Business, University of Southern California

date: 04 August 2020