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Qualitative Comparative Analysis (QCA) and Configurational Thinking in Management Studies

PL ACADEMIC RESEARCH

1. Introduction

"Qualitative comparative analysis" (QCA) (Ragin, 1987) has emerged as a new methodological tool in management studies and has the capability to substantially enrich the methodological landscape. With its unique technical and theoretical underpinning based on configurational thinking, QCA constitutes a sound counterpart to the correlation-based methodologies that have tended to dominate management research. Originally conceived in the field of political studies and sociology, QCA has recently been pioneered by a small number of management scientists for the purpose of studying organisations and management issues (e.g., Fiss, 2007; Kogut, MacDuffie, & Ragin, 2004; Greckhamer et al., 2008). The methodological newcomer QCA has shown its potential for making valuable contributions to management studies by being able to provide a holistic account of the nature of companies, teams, individuals, or economic systems. The holistic nature of the approach enables the study of all interactions among the dimensions of the unit of analysis. QCA uniquely adds to the prevailing methodological landscape because it allows for a special conception of causality, referred to as "multiple conjunctural causation" (Ragin, 1987: 101). This notion of causation incorporates three key properties (cf., e.g., Rihoux, 2006b: 682): The first property, *multidimensionality*, implies that it is a combination of causal conditions rather than one condition alone that eventually produces an outcome; causal factors are perceived to operate in strong connection rather than in isolation from each other. For example, the combination of boiling water and leaves of the tea plant produce a tasty beverage, but neither water nor tea leaves alone are sufficient. The second, *equifinality*, implies that several different combinations of conditions can lead to the same outcome. For example, a drink prepared from the conjuncture of water and roasted and ground coffee beans may be tasty as well. The third property, *causal complexity or heterogeneity*, indicates that a condition may have different impacts on the outcome, depending on the context. A condition which is causally linked to an outcome in one combination may have no or even an antithetical relation in another. To pursue our simple example further: Sugar may go well with both coffee and tea, but certainly has a detrimental effect on the taste of another type of beverage like wine. In sum, depending upon the interplay of various conditions, alternative causal pathways may exist which engender the same outcome. Recipes for drinks can be viewed as configurations of ingredients which create different types of drinks perceived to be equally tasty. While management scholars are commonly not concerned with the science of drinks, they would want to investigate the different pathways

to run a beverage business successfully. Such a view of causation can be deemed reasonable and meaningful in any sphere of management studies.

Three major variants of QCA have emerged which are subsumed under the cover heading "configurational comparative methods" (CCMs) (Rihoux & Ragin, 2009). This cover heading indicates that the analytic procedure of all three *methods* works through a systematic *comparison* of cases which are transformed into *configurations* for this purpose. For instance, different drinks manufacturers can be systematically compared using key features such as strategy, structure, and employees before categorising them into various organisational configurations. Such a procedure may seem trivial, but comparison is a "basic and powerful mental operation" which can be translated into sophisticated and systematic CCMs (Rihoux & Ragin, 2009: xvii). The original version was introduced by Ragin (1987) and is referred to as "crisp set QCA" (csQCA). For csQCA, variables have to be dichotomised, if they are not already binary in nature. Cases are grasped as either members or non-members of sets. To address this limitation of crisp sets, Ragin developed "fuzzy set QCA" (fsQCA) (Ragin, 2000, 2008). In fsQCA, variables can be allocated continuous set membership values in the interval between 0 and 1. This means that data is calibrated into fuzzy sets with continuous degrees of membership, varying between full membership and full non-membership. The third variant overcomes the original fully dichotomous nature of QCA by allowing also multi-value variables and is therefore called multi-value QCA (mvQCA) (Cronqvist, 2007; Cronqvist & Berg-Schlosser, 2009).

CCMs build a valuable and productive alternative to conventional statistical methods – in certain situations. They open up an entirely new perspective for analysing data in management studies. CCMs on the one hand, and traditional co-variational techniques on the other, offer different avenues for analysing evidence and start from different assumptions about the kinds of findings sought by scientists (Ragin, 2006b: 14). In fact, the causal logics they explore are diametrically opposed to the extent that it has been argued that conventional statistical methods and CCMs operate in different "causal universes" (Katz, vom Hau, & Mahoney, 2005: 569; Goertz, 2003a: 48). In CCMs the idea of "configurational thinking" is incorporated, whereas in conventional statistical methods "net-effects thinking" prevails (Ragin, 2006b). The aim of conventional correlation-based techniques is to verify linear relationships under ceteris paribus conditions, seeking to estimate the average net effects of single independent variables on an outcome. In this approach the effects are abstracted from the specific cases in which they appear. Furthermore, the effects of different variables are assumed to be additive. By contrast, CCMs systematically compare entire cases,

stress the notion of multiple conjunctural causation, and aim to explore how different elements "*combine* rather than compete with each other in creating an outcome" (Fiss, 2007: 1183). Mahoney (2010) points out that CCMs, which explain the causes of a particular outcome, adopt a "causes-of-effects approach". Conversely, conventional statistical methods, which aim at the average net effects of particular causes perceived as analytically separable, draw on an "effects-of-causes approach" (Mahoney, 2010: 132). This means that methods grounded in the latter approach, such as regression analysis, evaluate which causal variables autonomously augment or decrease the probability or level of an outcome (Ragin, 1987: 64). By contrast, in a QCA, reflecting a causes-of-effects approach, the level of the "effect" under consideration is fixed in advance; the purpose of the analysis is to determine which causes have to concur in order to actually induce the previously defined outcome to occur. Such an approach allows fairly clear policy implications and, therefore, deserves a great deal of attention in management studies.

CCMs are not intended to supplant conventional statistical methods (Ragin & Rihoux, 2004b: 22). However, it is increasingly recognised that traditional statistical methods with their idiosyncratic epistemological approach are neither intended for, nor suited to the analysis of configurational causal logic implicit in CCMs. In fact, the linear and additive causal logic of regression techniques contradicts the very notion of multiple conjunctural causation (Mahoney, 2010: 132–133; Ragin, 1987: 63). Because the two distinct methods act in different causal universes, each method has its own inherent goals, strengths and drawbacks. The choice of the most adequate method should ideally be guided by the research question and objectives.

Social scientists who are mainly interested in the analysis of country-level data conventionally promote the use of QCA for a medium number of cases. For instance, Wagemann & Schneider (2010: 377) state that "its full potential it unfolds in studies based on a mid-sized N". Sometimes it is even labelled as "medium-N technique" (e.g., Krook, 2010). When applied to medium-N settings a major rationale for the use of QCA is usually referred to the quantity of cases which is not suitable for conventional statistical methods. In fact, one of QCA's strengths is that it can work with medium- or even small-Ns. In addition, because the roots of QCA lie in sociology and political science, it is often assumed to solely bridge the methodological gap between small- and large-N designs – that is, between qualitative and quantitative research. Indeed, QCA was originally designed for, and is still mostly applied with, a medium-N. However, recent methodological advancements in particular make it also perfectly suitable for large-N designs. As a consequence, it increasingly attracts the interest of man-

agement scientists. Nowadays, the application spectrum of QCA can be considered as universal concerning the number of cases (from about 10 cases onwards). Rihoux (2006b: 685), a QCA protagonist, declares that CCMs, in technical terms, are "actually quite well suited to large-N situations, i.e. to research designs in which the comprehension of each individual case matters much less".

In terms of analytical approach, the three variants of QCA unfold their full potential in different spheres. The starting point of the crisp set version "lies more in cases (more in the qualitative world)", whereas the starting point of the fuzzy set version "lies more in variables and generalization (i.e., in the quantitative world)" (Rihoux, 2006b: 685). Consequently, "fuzzy sets should rather be considered more as a challenge towards conventional statistical and correlational quantitative analysis" (Rihoux, 2006b: 685). Based on this insight, as a rule of thumb, csQCA appears more suited to address small-N issues (less than 30-40 cases) demanding case-based knowledge, whereas fsQCA is usually targeted at large-N data sets, where it can be seen "as a challenge to mainstream statistical data treatment" (Rihoux, 2006b: 686). The third version, called multi-value QCA (mvQCA), appears to be most powerful in medium-N situations (Rihoux, 2006b: 686).

With the recognition of CCMs as empirical data analysis techniques suitable even for large-N designs, they become a highly eligible set of tools in management studies. Nevertheless, they are still quite foreign to most business scholars who are typically trained in conventional mainstream statistical methods which overwhelmingly dominate research in management studies. As a consequence, "some scholars who are trained in regression-oriented analysis may be inclined to react with scepticism to these methods" (Mahoney, 2010: 133). Fortunately, since scepticism has accompanied even the most valuable and promising innovations, those critical voices should motivate, rather than discourage, researchers from exploring the potential of QCA.

In some respect cautious scepticism may understandably be justified, since until now the usage of QCA is mainly geared towards small-N and medium-N designs in sociology and political science. Therefore, the major impetus of my doctoral thesis is to leverage the applicability of QCA to large-N designs in general, and the discipline of management studies in particular. While its general applicability in the large-N sphere has been confirmed, the special demands of large numbers of cases have not yet been addressed in the methodological QCA literature. Therefore, in order to advance this methodology as a quantitative technique suitable for large-N designs, in this thesis several conventions and criteria are redesigned or innovated. Apart from its strong methodological focus, this thesis also conveys a theoretical perspective. It is stated that the causal uni-

verse analysed in a scientific study should be reflected in its theoretical underpinnings. QCA's underlying causal logic of multiple conjunctural causation coincides with the key assumptions of configurational theory in management studies. For example, one major assumption is that the causes of social and economic phenomena are multidimensional in nature. The strategy, structure, and processes of an organisation cannot be understood separately from each other as they are characterised by strong, mutual synergies. In this way, configurational theory is inherently connected with QCA. Consequently, the configurational theories which emerge in management studies are structurally suited to be tested with CCMs. However, since they have not yet been comprehensively and consistently gathered, the various configurational approaches in management studies are identified and elucidated in this thesis, which is structured as follows.

Chapter 2 deals with the methodological perspective by analysing the nature of configurational comparative methods, and it identifies the technical and theoretical peculiarities of large-N designs. The chapter starts by outlining the techniques of both the crisp and the fuzzy version of QCA. This is followed by a review of empirical QCA articles published in peer-reviewed journals, to appraise the recent developments of the scope and areas of its application. The compilation comprises 145 studies and is the largest of its kind so far. Out of these journal articles the contributions which are related to the discipline of management studies are highlighted. Moreover, the review extracts information from these studies not only in terms of the research topic but also, crucially, with regards to methodology. Drawing on the review as a whole, an innovative formula is developed which provides guidance for the most consequential part of a QCA, namely, the technical specification of the model. The technical model specification refers to the adequate ratio of analysed variables to the number of observations at hand. It is shown that the inclusion of variables is restricted and determined by the number of cases. It is assumed that, practically, a great many factors are always relevant for an outcome, but it is recommended to concentrate on a particular number. The new formula developed in this thesis reveals that the few large-N QCA applications which have hitherto been published tend to suffer from an inadequate ratio of variables to observations. Once the optimal ratio is settled, another crucial decision is required in the analysis procedure. The level of the so-called consistency threshold which distinguishes sufficient configurations from insufficient ones must be defined. Once again referring to the review, the underlying mechanisms which shift the threshold are outlined, and it is argued that in particular the quantitative usage of QCA on large-N datasets calls for QCA's qualitative element. The consistency threshold is shaped by both the technical and theoretical model specification. The theoretical specification of the

model refers to the theory-based selection of the relevant variables. The importance of making hypotheses about the variables and their interplay based on configurational theories is further elucidated. I am able to demonstrate that QCA is a powerful tool for testing conceptual typologies and for deriving chiefly empiricist taxonomies. Particularly, it is argued that a QCA can constitute a middle road between a confirmatory and an exploratory approach, whilst combining the virtues of both. Finally, the new formula is refined as gauge for an ex-post appraisal of the theoretical model specification. This further strengthens the formula's capacity to ameliorate the model specification as a whole, as well as the quality of causal inference.

Chapter 3 deals with the theoretical perspective. First it is highlighted that the causal logic of configurational thinking is incorporated in both CCMs and configurational theory. The cover heading "managerial configurations" is proposed to capture the variety of configurations analysed in the different fields of management studies. In addition, it is explicated why research on alignment between these different types of configurations is crucial. A configuration leads to the predicted outcome if it displays both internal fit among its elements and external fit to the environment in which it is embedded. On the one hand more than one configuration will work in any given context, but on the other there will clearly be a finite number. Thereafter, the hitherto prevailing mismatch between, on the one hand, hypotheses based on configurational theory and, on the other, the methods used to test them is discussed. This includes a demonstration of the limits of conventional statistical techniques, which do not have the capacity to deal with a causal universe characterised by configurational thinking. Such a causal universe is reflected in a separate analysis of sufficient configurations and necessary conditions. Finally, an extensive review of configurational approaches within management studies is conducted. It is shown that managerial configurations are composed of various dimensions and are linked to several outcomes on multiple levels of analysis. They are identified for nine salient research fields: Strategic management, human resource management, organisational behaviour, leadership, business ethics and corporate social responsibility, corporate governance, entrepreneurship, marketing, and international business. The review reveals a wide scope for CCMs in future management research.

In chapter 4, an illustrative fsQCA at company-level is conducted. A large-N study of 510 firms serves as exemplar by incorporating all the newly developed criteria from the preceding chapters. The work organisation in the German mechanical engineering industry at the end of the 1990s is examined referring to data from the NIFA ("Neue Informationstechnologien und Flexible Arbeitssysteme") workplace panel. In particular, the conditions under which firms im-

plement holistic work groups rather than neo-tayloristic ones are analysed. A holistic or self-managed work group consists of a whole bundle of so-called "high-performance" work practices, whereas a neo-tayloristic work group comprises only some of these practices alongside traditional tayloristic elements. Advances in technologies and human capital are believed to foster group work with a holistic work organisation. However, the same factors have been considered as leading to more tayloristic work organisations. I argue that the implications of the three factors for the appropriate work organisation are ambiguous. The factors may encourage particular firms to introduce holistic group work – but others may be encouraged to renew their tayloristic work organisation by adopting neo-tayloristic group work. As a consequence, it is argued that the choice between holistic and (neo-) tayloristic work organisation crucially depends on various kinds of production systems geared towards flexibility and leanness. Drawing on configurational theory and employing fsQCA, multiple organisational configurations are identified that induce the introduction of holistic work groups in the German mechanical engineering industry. In a last step, the performance-enhancing effect of both neo-tayloristic and holistic group work is challenged. In particular, using t-tests, the profitability of these two types of work organisation among front-line workers is compared both in relation to each other and to the classical tayloristic work organisation.

Finally, in chapter 5, central conclusions regarding QCA and configurational theory are outlined. Furthermore, standards of good practice of QCA are summarised, the newly developed criteria in this thesis are highlighted and an impulse for the future definition of a convention regarding the evaluation of QCA results is given.