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# Net versus combinatory effects of firm and industry antecedents of sales growth☆

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ABSTRACT

This study examines antecedents of sales growth using a two-step mixed-method approach including analyses of net effects and combinatory effects. Based on a sample of 453 respondents from manufacturing and service firms, this article shows how the combination of structural equation modeling (SEM) and fuzzy set Qualitative Comparative Analysis (fsQCA) provides more detailed insights into the causal patterns of factors to explain sales growth. This article contributes to the extant literature by highlighting fsQCA as a useful method to analyze complex causality (specifically combinatory effects of antecedent conditions) and by discussing options regarding how this approach can be used to complement findings from conventional causal data analysis procedures that analyze net effects.



## 1. Introduction

One of the most dominant and enduring notions emphasized in management research is that of cause and effect mechanisms. This causal logic in research represents a primary focus on analyzing drivers and/or inhibitors of certain outcomes. Prior studies contribute to the understanding of linear causation and the net effects of antecedents on outcomes. However, knowledge about complex causation and corresponding analytical approaches is scarce (Ragin & Fiss, 2008; Woodside, 2014). Complex causation describes a situation "… in which an outcome may follow from several different combinations of causal conditions" (Ragin, 2008a, p. 23). Complex causation implies combinatory effects of multiple antecedent factors on an outcome. Examination of complex causation mirrors managerial practice, which builds upon holistic decisions that include trade-off considerations between several organizational aspects. Managerial decisions typically consider interdependencies among multiple causal factors rather than single causal factors (Meyer, Tsui, & Hinings, 1993). Complex causation reflects this notion and takes into account all logically possible configurations of causal factors that may influence an outcome in question. Complex causation thus represents a major methodological challenge (Davis, Eisenhardt, & Bingham, 2007; Ragin, 2008a; Wagemann & Schneider, 2010).

The analysis of combinatory effects can play crucial roles in organization theory and management research (Doty & Glick, 1994; Meyer et al., 1993). Considerable parts of extant research understand firms as complex systems that comprise interconnected structures and practices (Clegg, Hardy, & Nord, 1996; Fiss, 2007; 2011). Such configurational research draws on Gestalt theory and involves a holistic approach in which a social entity takes its meaning from the interaction and interdependencies between its elements as a whole and cannot be understood in isolation (Hult, Ketchen, Cavusgil, & Calantone, 2006; Short, Payne, & Ketchen, 2008).

Conventional analytic methods to test configurational theories and combinatory effects are often less proficient at handling multi-faceted interdependencies. Configurations are "nonlinear synergistic effects and high-order interactions" between a broad set of variables (Delery & Doty, 1996, p. 808). Frequently employed data analysis methods such as correlation-based regression analysis or structural equation modeling (SEM) imply symmetric relationships between variables, and aim to improve the understanding of net effects of individual antecedents of an outcome (Woodside, 2013). Correlational methods focus on the extent to which antecedent factors can explain variance in the outcome (analysis of net effects) rather than concentrate on ways in which antecedent factors may combine into configurations to explain an outcome (analysis of combinatory effects).

The overall purpose of this article is to emphasize fuzzy set Qualitative Comparative Analysis (fsQCA; Ragin, 2000; 2008a) as a useful data analysis method of combinatory effects, having the capacity

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to complement the insights obtainable from the analysis of net effects. This article aims to expand researchers' diagnostic toolkit by illustrating a two-step, mixed-method approach that incorporates analyses of both net effects and combinatory effects to obtain more detailed insights into the patterns of antecedent factors for an outcome. The article therefore advocates methodologically richer approaches that combine analyses of net and of combinatory effects for outcomes of interest.

This article continues as follows. The next section explains basic principles of fsQCA and illustrates potential benefits of this method in comparison to correlational methods. Next, this article presents a study including the analysis of net effects based on variance-based SEM (step 1) and the analysis of combinatory effects based on fsQCA (step 2). The study investigates how three sets of antecedent factors, that is, firm strategic factors, firm demographics, and industry characteristics, relate to sales growth as the outcome of interest.

## 2. Basic principles and potential benefits of fsQCA

FsQCA is a case-oriented, set-theoretic research approach that describes cases as combinations of attributes as well as the outcome in question (Fiss, 2011; Ragin, 2008a). One of the key differences between fsQCA and correlational methods refers to the *approach of explanation* (Mahoney & Goertz, 2006). For example, firms with superior market performance (as an example outcome of interest) may have excellent market knowledge, a clear management strategy, and an effective strategy implementation (as one example configuration of three causal factors). FsQCA focuses on the extent to which a case has membership in the sets of specific attributes or combinations of these attributes, and the outcome set (Ragin, 2008a). In contrast, the primary focus of correlational methods is to estimate the average effect of one (or more) independent variable(s) in a set of cases to explain a maximum of variance in the dependent variable. For example, one might estimate the net effect of market knowledge on market performance. Correlational methods thus reflect a variable-oriented research approach that focuses on determining the magnitude of the effect of a cause on an outcome.

A further distinction between fsQCA and correlational methods concerns the *concept of causality*. FsQCA builds on multiple conjunctural causality (Ragin, 2008a) and takes into account that an outcome rarely has a single cause, that causes rarely operate in isolation from one another, and that a specific cause may have opposite (i.e., positive or negative) effects depending on context (Greckhamer, Misangyi, Elms, & Lacey, 2008; Rihoux, 2006). Although correlational analyses can involve multiple independent variables and can examine additive and multiplicative functional relationships to explain a dependent variable, they differ from set-theoretic approaches due to the basic assumption of causal symmetry. FsQCA considers causal asymmetry, which implies that solutions (i.e., combinatory effects) for the presence of an outcome can differ substantially from solutions for the absence of the same outcome (Fiss, 2011; Fiss, Sharapov, & Cronqvist, 2013; Ragin, 2008a; Wu, Yeh, Huan, & Woodside, 2014). In correlational analyses, solutions (i.e., models of net effects) of the inverse of a dependent variable remain the same except for sign changes in the coefficients of the independent variables.

Focusing on the *explanations for an outcome*, a major advantage of fsQCA is the incorporation of equifinality (Fiss, 2007; 2011). Equifinality means that "a system can reach the same final state from different initial conditions and by a variety of different paths" (Katz & Kahn, 1978, p. 30). Equifinality implies the coexistence of alternative solutions or causal pathways for an outcome of interest. These solutions reflect different recipes or combinatorial statements and are logically equivalent and thus substitutable (Ragin, 2008a). Identification of equifinality solutions for specific phenomena is an important research area in the marketing and management literature (e.g., Marlin, Ketchen, & Lamont, 2007; Payne, 2006). Consideration of equifinality provides decision makers in firms with optional design choices to achieve a desired outcome, thus fostering the potential for efficiency gains (Fiss, 2011). In comparison to fsQCA, correlational methods seek to identify one optimal model that best represents the empirical data. For instance, a major goal in covariance-based SEM is to identify a model that fits the observed data. Perfect model fit occurs when the model-implied covariance matrix is equivalent to the empirical covariance matrix. Correlational methods thus typically focus on unifinality, expressed in one optimal model (i.e., one solution).

In order to examine what combinations of attributes lead to the outcome in question, fsQCA relies on Boolean algebra rather than linear arithmetic. FsQCA builds upon the premise that relationships among different variables are understandable in terms of set membership (Fiss, 2007). A fuzzy set is "a continuous variable that has been purposefully calibrated to indicate degree of membership in a well-defined and specified set" (Ragin, 2008a, p. 30). The degree of membership in a fuzzy set can range from 0 to 1 (Ragin, 2008a). To assess set relationships with fsQCA, causal factors and the outcome in question need transformation into fuzzy sets via calibration. FsQCA then explores how the membership of cases in fuzzy sets of causal factors relates to membership in the outcome set (Ragin, 2008a). The analysis of set relationships provides insights into necessity and/or sufficiency of causal conditions for an outcome. A causal condition or a combination of causal conditions is necessary if its occurrence is a prerequisite for an outcome, and a causal condition or a combination of causal conditions is sufficient if its occurrence can produce a certain outcome (Ragin 2000; 2008a).

## 3. Firm and industry factors as antecedents of sales growth

The number of studies using fsQCA in business research is growing rapidly; these studies provide new insights into a broad range of management (Fiss, 2011; Greckhamer et al., 2008; Leischnig, Geigenmueller, & Lohmann, 2014; Misangyi & Acharya, 2014) and marketing issues (e.g., Leischnig & Kasper-Brauer, 2015; Ordanini, Parasuraman, & Rubera, 2014; Tóth, Thiesbrummel, Henneberg, & Naudé, 2015). Since this article aims to illustrate how analyses of net and combinatory effects help improve the understanding of phenomena and embrace a complementary view by employing a mixed-method approach, the study below addresses a topic that receives continuous interest in research using correlational methods, but which receives only little attention in the QCA literature. Specifically, this research examines how three sets of causal factors relate to sales growth of a focal company (see Fig. 1): firm strategy factors (i.e., customer orientation, competitor orientation, and relationship coordination), firm demographics (i.e., firm size and firm age), and industry characteristics (i.e., industry growth). Organization theory and prior empirical research guides the selection of the constructs that are relevant in the context of this study.

Organization theory suggests that firm-internal strategic orientations interact with characteristics of the firms and the environment (Short et al., 2008). In addition, business relationship and market orientation research suggest that strategic orientations toward different stakeholders in the embedded business network represent important antecedents of sustainable competitive advantage (Achrol & Kotler, 1999). Research into market orientation emphasizes customer orientation and competitor orientation as pivotal concepts in this context (Jaworski & Kohli, 1993; Narver & Slater, 1990). While customer orientation refers to a firm's tendency to continuously create superior value for its customers based on an appropriate understanding of their needs, competitor orientation refers to a firm's tendency to continuously sense competitive actions and respond to them timely and appropriately (Narver & Slater, 1990). Prior studies underline the need to supplement these two strategic orientations through building relationships with key stakeholders (Gulati, Nohria, & Zaheer, 2000; Palmatier, Scheer, Evans, & Arnold, 2008). Firms need to establish routines to coordinate relationships with external partners and to develop appropriate responses to environmental changes (Palmatier et al., 2008). Such relationship coordination refers to a firm's capacity to coordinate and

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