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Revisiting associations between specific asset investment and loyal and cooperative behavior: A complexity theory perspective

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ABSTRACT

This paper offers theoretical explanations for why the associations of firms' specific asset investment (SAI) with its intention to engage in loyal and cooperative behavior are not only positive but also negative. This study applies fuzzy-set qualitative comparative analysis (fsQCA) to revisit the theory, data, and analysis of Wu, Chen, and Chen (2015). The study also employs contrarian case analysis and offers complex algorithms for firms' loyal and cooperative behavior, providing an alternative approach to theory and data analysis compared with the dominant logic of statistical analyses that Wu et al. (2015) report. Wu et al. (2015) report a positive main effect of SAI on firms' loyal and cooperative behavior. The findings in the current reanalysis include more complex, nuanced, views on the antecedents relating to SAI, loyal behavior, and cooperative behavior measures. Counter to the findings of Wu et al.'s (2015) findings gained from symmetric testing by using structural equation modeling, the current study, using asymmetric testing with fsQCA, identifies the occurrence of causal asymmetry and draws conclusions from algorithms yielding high scores for conditions of firms' loyal and cooperative behavior. The findings indicate that not all firms' SAI positively associate with their two business behaviors; the firms that view SAI negatively may do so on the basis of levels of prior relationships, such as the frequency of transactions and relationship length.

1. Introduction

Several scholars highlight the emergence of business structures based on continual transaction and interfirm cooperation between two firms. Inter-organizational relationships represent an interesting phenomenon in the domain of organizational activity (Oliver, 1990). If and when to terminate a specific relationship can be a difficult issue to solve for firms that enter into inter-organization relationships. Why some firms continue and others terminate their relationships has been a subject of both theoretical and empirical researches (e.g., Heide & John, 1990; Kang, Mahoney, & Tan, 2009; Levinthal & Fichman, 1988; Wang, He, & Mahoney, 2009). Much of these researches concerns the deployment of specific assets in business-to-business (B2B) relationships (e.g., business buyer and business seller, original equipment manufacturer and supplier, wholesaler and distributor or retailer) (Williamson, 1985) and holds that B2B relationships are maintained because the parties invest in specific assets (Buvik & Reve, 2001). According to this view, specific asset investment (SAI) makes exchange partners costly to replace; this in turn cements the inter-organizational relationship (Williamson, 1983) and makes termination of the relationship less likely.

This study reexamines the data, analysis, and theory of Wu, Chen, and Chen (2015). Regarding social exchange theory, Wu et al. (2015) propose that firms' SAI involve mutually resource-dependent investment. Aside from anticipating the maintenance of the value of their SAI, the parties also expect to obtain benefits from the transaction relationship. Moreover, transaction parties may jointly modify the transaction process with their partners to improve transaction efficiency. Finally, Wu et al. (2015) investigate whether a firm's SAI positively associates with a firm's loyal and/or cooperative behavior toward its partner in a dyadic B2B relationship. Using data from 153 companies in Taiwan belonging to industries that have complete supply chains, the results show that SAI positively associate with loyal behavior ($\beta = 0.28$, $t = 3.22$), while having a nonsignificant effect on cooperative behavior ($\beta = 0.01$, $t = 0.09$).

Although Wu et al. (2015) propose a positive relationship between SAI and loyal and cooperative behavior, they also concede that not all business transactions between enterprises obtain the value created by specific assets. According to the view of transaction cost economics, specific assets may damage the performance of simple market governance by creating hold-up hazards. Because specific assets are of a lesser value in alternative uses, partners in an exchange have incentives to

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appropriate returns from these specialized investments through post-contractual bargaining or threats of termination (Poppo & Zenger, 1998). In that case, firms' SAI may have a negative effect on loyal and cooperative behavior.

According to the preceding arguments, differences in the manner in which each firm comes to understand and manage that problems related to specific assets likely result in a wider variance of responses to firms' evaluations of hold-up hazards on business relationships than a positive (or negative) statistically significant main effect reported only. Wu et al. (2015) both oversimplify transaction cost economics and social exchange theory and neglect valuable available information because they did not use any methods besides multiple regression analysis (MRA) and structural equation modeling (SEM; i.e., Wu et al. (2015) used symmetric tests only).

The main study contribution includes the presentation of an alternative perspective that explains the antecedent conditions of firms and how firms with high levels of SAI versus firms with low levels of SAI evaluate the intention to engage in loyal and cooperative behavior. Furthermore, the current study explains the hypotheses and findings of Wu et al. (2015). A second contribution lies in the application of fuzzy-set qualitative comparative analysis (fsQCA), which is an asymmetric test that employs both a quantitative and qualitative approach to data analysis and theory and can generalize across cases while still being able to elucidate complexity at the individual case level (e.g., Woodside, Prentice, & Larsen, 2015). In doing so, the current study used contrarian case analysis (CCA). CCA involves recognizing that nearly all data sets include cases whereby an antecedent condition (for instance, X as an independent variable) associates with an outcome condition (for instance, Y as a dependent variable) in a manner counter to the reported principal symmetric relationship. Thus, although Wu et al. (2015) hypothesize a positive relationship between firms' SAI and loyal or cooperative behavior (a high X score and a high Y score), at the individual case level, a few cases show a higher SAI score associates with a lower negative loyal or cooperative behavior score. The current study labels such cases as Contrarian Type 1 cases, that is, cases showing contrarian high scores for an antecedent condition (i.e., a high SAI score is equivalent to a high X score) and low scores of the outcome condition (dependent variable Y) while the main effect indicates a positive relationship. Contrarian Type 2 cases are which with low scores in the antecedent condition (independent variable X) associating with high scores of the outcome condition (i.e., loyal or cooperative behavior is the same condition as a high Y score) when a study indicates a positive variable main effect relationship. This study shows how to model complex antecedent conditions for both Contrarian Type 1 and 2 cases. This study then provides a brief review on complexity and configural theory required to apply fsQCA to the Wu et al. (2015) study to review and reanalyze the available data. Finally, this study provides conclusions, managerial implications, and research limitations.

2. Theoretical background

2.1. Complexity theory, configuration, and asymmetric analysis

The perspective of complexity theory serves as a useful foundation for formulating and testing a theory beyond the now dominant logic of applying the MRA and SEM perspectives of the net effects of main and interaction terms. Complexity theory provides a perspective for explicit consideration of hypotheses counter to the dominant logic of presenting one theory per study. Gigerenzer (1991) argues that it is too simplistic to consider high outcomes of Y as associating only with high outcomes of X (i.e., single direction between X to Y). In the study on complexity theory, Byrne (2005) indicates that a simple analysis cannot access causal processes in complex systems. Complex and contingent causes (indicators) always direct the trajectories of complex systems. Thus, as estimated by the particular configuration, both high and low scores of X can result in high outcomes of Y.

Both complexity theory and configural theory expand on the core principle of equifinality (von Bertalanffy, 1968), which states that several possible complex configurations of antecedent conditions (i.e., algorithms) can result in the same outcome. Configural theory also expands on the principle of causal asymmetry. Aligned with the criticism of the symmetrical approaches of MRA and SEM, causal asymmetry is the notion that the causes of the presence of an outcome might be very different from the causes of an absence of the outcome (Ragin, 2008; Woodside, 2013).

For application of complex theory in business researches, Anderson (1999) provides advances in theory and researches on complexity theory relevant to organization science. Urry (2005, p. 4) notes, "Relationships between variables can be nonlinear with abrupt switches occurring, so the same cause can, in specific circumstances, produce different effects." A substantial body of literature concerns bridging configural analysis using fsQCA with complexity theory in subdisciplines of management; such bridging expands on contributions in sociological methods (Ragin, 2008), organization science (Fiss, 2007, 2011; Meier & Donzé, 2012), psychology (Woodside et al., 2015), and marketing (Woodside, 2014; Woodside & Zhang, 2013). In addition, Urry (2005) provides an extensive literature review of complexity theory in the natural and social sciences and offers many useful insights.

Woodside (2016) provides an example to support the conclusion that symmetric statistical test outputs are misleading. Fig. 1A shows a distribution of XY scores, indicating no significant relationship. In situations of perfect consistency, Fig. 1B shows that all cases involved show higher or equal values for the outcome than for the antecedent conditions considered. A symmetrical XY relationship indicates the necessary and sufficient presence of an antecedent condition (a simple variable or a regression model). Researchers traditionally conducted data analysis and hypothesis testing to examine the symmetric relationship between X and Y as Fig. 1B. However, asymmetrical relationships are often present in most real-life contexts and XY relationships are rarely symmetrical (Ragin, 2008). For example, high values of Y occur both with low and high values of X where either high values of X are sufficient but not necessary for high values of Y as Fig. 1C shows and illustrates the expectation for consistent findings using asymmetric analysis. Last asymmetric XY condition is that high values of X are necessary but not sufficient for high values of Y as Fig. 1D shows, where high values of Y occur only with high values of X.

The pattern of data in Fig. 1 is a consequence of the multi-causal notion of causality found in all varieties of XY relationships. In a linear regression, these cases would be assumed to contradict the underlying model, resulting in a low measurement of fit. Woodside's (2016) explanation is consistent with Anscombe (1973). Anscombe (1973) created four XY plots of four different data sets having the identical averages, standard deviations, and correlations to illustrate the great usefulness of showing relationships visually—such visual displays should be done before and/or after symmetric as well as asymmetrical testing (for details of "Anscombe's quartet", see Woodside, 2016).

Woodside (2013) compares and contrasts the use of symmetric (e.g., MRA and SEM) versus asymmetric tests (e.g., fsQCA), stating that symmetric tests consider the accuracy of high values of X (an antecedent condition), indicating high values of Y (an outcome condition), and low values of X, indicating low values of Y, and that asymmetric tests consider the accuracy of high values of X, indicating high values of Y without predicting how low values of X relate to values of Y. Asymmetric tests accurately reflect reality, given that the causes of high Y scores usually differ substantially from the causes of low Y scores (i.e., the principle of causal asymmetry, see Fiss, 2011).

Since the body of work and rigorous analytical tools, such as configural analysis, relating to complexity theory applications and fsQCA are expanding in the management subdisciplines, the dominance of the logic of MRA, SEM, and the survey research features described in Woodside's (2014) article may significantly diminish during the second