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Constructing useful models of firms' heterogeneities in implemented strategies and performance outcomes

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ABSTRACT

This study advances the proposition that applying core tenets of complexity theory is useful for solving the "crucial problem" in strategic management—describing, explaining, and predicting firm heterogeneity. The study describes the core tenets (e.g., the necessity of constructing models for cases with relationship reversals to a significant main effect—cases occur whereby both high and low scores of an antecedent condition indicate high scores in an outcome condition; asymmetric models are necessary because the causes of successful outcomes are not the mirror opposite of the causes of unsuccessful outcomes). Constructing "somewhat precise outcomes models" (SPOM) rather than null hypothesis statistical testing (NHST) is the principal analytic tool. The study describes asymmetric models of implemented strategy and competitive advantage for ROE, negation of ROE, and complex outcome statements for agribusiness firms ($n = 247$) across seven Latin America national as well as tests the predictive validities of models across specific nations for the models of sampled firms within Costa Rica, El Salvador, Guatemala, and Nicaragua. The findings support the propositions that constructing complex antecedent statements (i.e., algorithms/configurations/recipes/screens) are useful for indicating high performance or the negation of high performance consistently. Configural implemented strategy models have direct influences on both high and low performance outcomes, while competitive advantage models impact low, but not, high performance outcomes. Complex competitive advantage conditions contribute indirectly to high performance outcomes.

> Strategy theory has converged on a view that the crucial problem in strategic management is firm heterogeneity—why firms adopt different strategies and structures, why heterogeneity persists, and why competitors perform differently.
>
> [(Powell, Lovallo, & Fox, 2011: 1370)]

1. Introduction: a seemingly subtle but radical paradigm shift

The following narrative illustrates a configuration of firm performance outcomes. At first blush 2014 was a great year for VW. Sales growth, net income growth, and earnings before interest, taxes, depreciation, and amortization (EBITDA) growth were all positive and substantially higher in comparison to 2013. But, "'The problem is that VW simply has far too many employees,' says [VW] research center director Ferdinand Dudenhöffer. But Winterkorn [VW CEO], standing next to the labor chief at a workforce assembly in Wolfsburg, swore he wouldn't cut jobs. Workers gave him a standing ovation" (Boston, 2014). Dudenhöffer assesses VW's recent performance to include a low ratio of EBITDA to number of employees–a metric indicating low marketing efficiency. Boston's (2014) VW report describes a configuration of firm performance outcomes representing a complex recipe of positive and negative ingredients.

The combination of a low EBITDA relative to the number of employees is representative of one metric for performance efficiency. The potential for creating very substantial numbers of antecedent resources and implement strategy recipes and configurational performance outcome recipes illustrate the theoretical problem of modeling the heterogeneity inherent in the discipline of strategic management. Expanding on Powell et al.'s (2011) perspective on the crucial problem in strategic management, achieving the dual objectives of model construction generalizing beyond anecdotal narratives at the level of individual firms and still capturing substantial firm-level heterogeneity is the prime conundrum of strategic management theory. Modeling to solve this prime

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conundrum includes construction of accurate models of complex outcome conditions rather than examining outcomes one at a time—thus, addressing the heterogeneity in performance outcomes recipes such as the high EBITDA coupling with high number of employees at VW.

Powell et al. (2011: 1371) define "behavioral strategy" as follows: "Behavioral strategy merges cognitive and social psychology with strategic management theory and practice. Behavioral strategy aims to bring realistic assumptions about human cognition, emotions, and social behavior to the strategic management of organizations and, thereby, to enrich strategy theory, empirical research, and real-world practice." "Merges" is the operative word for describing, understanding, predicting, and/or influencing behavioral strategy and its sub-fields including behavioral pricing. Powell et al.'s (2011) perspective serves to advance (Mintzberg's, 1978, p. 934) definition of a strategy as "a pattern in a stream of decisions"; a definition enabling research on strategy formation and implementation in a broad descriptive context. As Mintzberg (1978: 934) proposes, "Specifically we can study both strategies that were intended and those that were realized despite intentions." Alternative consistently, executed, realized strategies are useful (partial) definitions of specific firms; firms distinguish themselves by what they actually do—their signature performances. Teece's (2014: 14) proposals for a dynamic capabilities-based entrepreneurial theory of the multinational enterprise informs this signature performance proposition, "The (dynamic) capabilities framework is an entrepreneurial approach that emphasizes the importance of (signature) business processes, both inside the firm and also in linking the firm to external partners."

> Dynamic capabilities rely not just on best practices but on "signature" practices; not just on any resources but on VRIN [valuable, rare, inimitable, and non-substitutable] resources. They also require astute managerial orchestration guided by what Rumelt (2011) has called "good strategy".
>
> [(Teece, 2014: 20)]

Explicating signature practices indicating highly desirable versus undesirable performance outcomes would be helpful in moving strategic management research forward toward solving the discipline's "crucial problem" (Powell et al., 2011: 1370)—describing and explaining firm heterogeneity and the outcomes associated with alternative configurations of firm characteristics and actions. Useful examination of configurations of firms' characteristics (e.g., firm size, national headquarters, market orientation, and resources), actions, and performance outcomes is possible and necessary; the objective of such research is to accurately report on what specific configurations of firm characteristics and plans affect what specific configurations of firm actions that result in what specific configurations of firm performances—such research is capable of describing the nitty-gritty heterogeneous (signature) behaviors of individual firms while generalizing to (as much as possible) to describe and explain the implemented strategies indicating good versus bad strategy.

The claim here is that the substantial majority of perspectives and empirical studies in the strategic management literature fail to address the crucial problem adequately—reports on the impact of market orientation (e.g., Frösén, Luoma, Jaakkola, Tikkanen, & Aspara, 2016), the resource-based view (e.g., Peteraf, 1993; Wernerfelt, 1984, 1989), competitive advantage (e.g., Barney, 1991; Porter, 1985), "critical success factors" (e.g., Cooper & Kleinschmidt, 1995), and dynamics capabilities (Teece, 2014) on firm performances do not describe nor explain configurations of firms' implemented strategies and which of these configurations indicate good versus bad outcomes. Much like the examining of photographs and films of executions of American gridiron (football) by coaches and players, solving the crucial problem in strategy theory requires the study of implemented strategies during and after these strategy executions; such research needs to include, but go beyond, lengthy case study reports, to provide accurate predictive models of what configurations of firm characteristics-actions lead to good versus bad outcomes. The present study describes potentially useful advances in theory and empirical research for capturing firm heterogeneities in characteristics, implemented actions, and outcomes in models that are testable for their accuracy using additional samples of naturally identifiable firms.

The present study contributes unique perspectives of applying core tenets of complexity theory in examining the realized recipes in the use of firm resources, as well as the emergent firm stances in regards to competitors as antecedents of high (and low) complex recipes of firm performance efficiencies (i.e., performance outcome recipes). The theoretical stance and an empirical examination in the present study describe firm performance antecedents and firm efficiency outcomes by recipes (aka, configurations, see Fiss, 2011; Ordanini, Parasuraman, & Rubera, 2014) rather than linear, additive, symmetric models (e.g., Conant, Mokwa, & Varadarajan, 1990; Dean & Sharmand, 1996; Karna, Richter, & Riesenkampff, 2016; Poppo, Zhou, & Li, 2015). The present study also contributes by formally proposing core tenets of complexity theory as a foundational perspective useful for improving the behavioral theory of the firm. Complexity theory includes the proposition that nearly all simple antecedent conditions relate positively, negatively, and not at all to a desirable and undesirable outcome within the same set of data (cf. Fiss, 2007; Ordanini et al., 2014). Consequently, studies describing the net effects of antecedents on an outcome via regression analyses (i.e., the vast majority of strategic management studies)—the dominant logic today in data analysis in strategic management—provides rather shallow reporting that subtly reduces the usefulness of the core issues that strategic management research attempts to answer. Rather than focusing on net effects of variables' contributions to performance metrics, a more useful approach for advancing strategy theory includes asking what recipes of firm resources and implementation actions indicate firms with high-performance recipe outcomes as well as asking separately, what alternative strategies associate with low-performance receipt outcomes (cf. Fiss, 2007).

Also, the present study goes beyond tests of fit validity to formally test the predictive accuracy of recipe algorithms of performance outcomes via additional samples of firms (cf. Gigerenzer & Brighton, 2009). This recipe approach is also useful for accurately modeling the negation of high-performance recipe outcomes that follows from adopting the causal asymmetry tenet in strategy theory (Fiss, 2007, 2011), that is, the tenet that models of useful causal recipes for low-performance outcomes are unique and not symmetric to the causal recipes useful for describing high-performance outcomes. The modeling of complex outcomes advances from the conventional logic of modeling one outcome variable as a dependent variable (e.g., Fiss, 2011; Snow & Hambrick, 1980; Shan, 1990) to modeling outcome recipes implied in the VW good news, bad news, opening example.

The VW anecdotal case reports a high firm-performance in combination with too many firm employees; this combination is measurable by a configural high score for $(EBITDA_{2014} / EBITDA_{2013}) \cdot (VWemployees_{2014} / EBITA_{20014})$, with the mid-level dot ("·") indicating the logical "AND" combination. Using configural Boolean algebra, both terms in this expression include calibrated scores ranging from 0.00 to 1.00 (see Ragin, 2008). Presumably, each term has a high value—assuming that the first term (i.e., annual growth in EBITDA) equals 0.96 and the second term (VW employees as an index of $EBITA_{2014}$) equals 0.92, the combination score for this outcome recipe would equal 0.92, that is, the combination scores for a complex recipe of simple outcome conditions is equal to the lowest score among the simple outcome conditions—the same rule applies for calculating the score for complex antecedent conditions (i.e., recipes). Given executives in firms estimate multiple performance metrics and that the multiple outcomes for a given firm often includes a recipe of favorable and unfavorable conditions occurring together, strategic management theory can advance in usefulness by examining performance recipes of

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