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Pursuit of rigor in research: Illustration from coopetition literature

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ABSTRACT

We propose that rigor consists of three key aspects: conceptual (the theoretical lens, constructs, and logic used to understand a phenomenon), methodological (how data are collected and analyzed to capture a phenomenon), and empirical (how findings are organized, distilled, and related to the theory). We discuss rigor in the context of coopetition research and explain how rigor could be enhanced in future research. For each aspect of rigor, we discuss what it means to conduct rigorous research, review the current state of coopetition research using a rigor lens, and systematically discuss ways of improving rigor in future research. We suggest that pursuit of research with greater level of rigor would help increase the impact of coopetition research and contribute to the creation of cumulative knowledge on the topic.

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1. Introduction

Pursuit of rigor in research is about being precise and thorough in the development of the theory, in the design and execution of the study, and in reporting the results and drawing implications. Rigor is important for several reasons. At the most fundamental level, rigor is necessary to establish a strong core foundation on which future researchers can build. Lack of precision and thoroughness in current studies could provide imprecise and incorrect information about the true nature of the phenomenon and would be of little help in building a strong research foundation (Strauss & Corbin, 1990). Ambiguity in the conceptualization, methods, and findings will make it difficult to compare and contrast research findings, could make it difficult to replicate the studies, and would ultimately inhibit the development of cumulative knowledge (Schmidt & Hunter, 1995). Even more importantly, proliferation of studies with limited rigor would reduce the potential for publication of research in top tier journals, but publication in such outlets is critical for wider readership and future scholarly research on a topic.

We focus on coopetition research and systematically discuss the importance of rigor and ways of achieving rigor in future research. Coopetition is a topic of growing importance to research scholars (Bengtsson & Kock, 2014). Existing research has begun to provide evidence that benefits of engaging in coopetition are high, especially in technological development and market creation (Gnyawali & Park, 2011), but challenges are also high (Bouncken & Kraus, 2013; Bouncken, Gast, Kraus, & Bogers, 2015; Dagnino, 2009; Gnyawali, Madhavan, He, & Bengtsson, 2016; Raza-Ullah, Bengtsson, & Kock, 2014; Tidström, 2014). Prior research has greatly advanced our understanding of coopetition both conceptually and empirically. Conceptually, scholars have examined the nature, benefits, and challenges associated with the simultaneous pursuit of cooperation and competition (e.g. Bengtsson & Kock, 2014; Park, Srivastava, & Gnyawali, 2014; Tidström, 2014), and a considerable level of attention has been given to the drivers and outcomes of coopetition (e.g. Dahl, 2014; Gnyawali & Park, 2009; Ritala & Hurmelinna-Laukkanen, 2013). Empirically, researchers have used diverse research methods including case studies (Bengtsson & Johansson, 2014; Rusko, 2011), surveys (Li, Liu, & Liu, 2011), and secondary data analysis (Luo, Slotegraaf, & Pan, 2006; Quintana-García & Benavides-Velasco, 2004) to examine coopetition in a wide range of industry contexts.

Growth of research in a nascent field such as coopetition is both promising and challenging: promising because opportunities exist to make strong contributions through rigorous research, and challenging because the lack of a strong theoretical and empirical foundation based on rigorous research inhibits subsequent research and the development of cumulative knowledge on the topic. Accordingly, the primary purpose of this paper is to underscore the importance of rigor and help coopetition researchers understand rigor and ways of achieving it in their research. We believe a discussion on rigor is especially important for readers of *Industrial Marketing Management* based on the journal's large number of publications and multiple special issues on coopetition.

In the sections below, we briefly explain what rigor is and what the key considerations are in enhancing rigor in theory, methods, and results. We then briefly examine current coopetition literature in order to illustrate and assess the level of rigor and to identify areas of improvement regarding rigor. Then we discuss specific ways of achieving rigor in various aspects of future coopetition research. We conclude with a discussion of intriguing avenues for future research

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on coopetition. We accordingly urge future researchers to improve rigor in their research so that we could develop cumulative knowledge on the topic and collectively advance coopetition research in the future.

2. A rigor lens

The Oxford English Dictionary defines rigor (also spelled rigour) using terms such as precision, exactness, accurate, and thorough. As Mentzer (2008: p. 72) suggests, rigor "is the constant examination of whether research can actually support and justify the claims it makes. It implies use of the appropriate theories and methods to avoid concluding something the research did not actually reveal." Rigor is often examined using three key criteria: clarity and precision in the theory or conceptual framework, appropriateness and precision of the methodologies, and distilled and robust findings (Shrivastava, 1987). We briefly discuss each element below.

2.1. Rigor in theory development

In a nutshell, rigor in theory development or simply "conceptual rigor" refers to the careful development of a theory that would provide a solid basis for empirical research and practice (Van de Ven, 1989). Researchers may take a more deductive approach by drawing from and building on the existing literature or take an inductive approach by carefully observing the phenomenon and drawing theoretical insights from the field observations. No matter how the theory is built, researchers ought to be clear on the definition of the phenomenon and of the core constructs that represent the phenomenon. An attempt to develop a theory should go beyond basic literature review, statement of constructs, or a depiction of a diagram (Whetten, 1989). A theory answers the question of why and how something occurs, precisely articulates the constructs representing the phenomenon, and points out the nature of causal relationships. "A strong theory… delves into underlying processes so as to understand the systematic reasons for a particular occurrence or nonoccurrence" (Sutton & Staw, 1995: 378). A theory articulates how constructs are related in a coherent fashion (Bacharach, 1989; Mitchell & James, 2001; Suddaby, 2010) to provide a novel understanding.

We draw from Suddaby (2010) and suggest that conceptual rigor involves four key elements: 1) identification and clear definition of key constructs, 2) clarification of the boundary conditions for the constructs and the theory, 3) clear articulation of the relationships among the constructs, and 4) internal coherence of the arguments and the overall theory. These elements are rather progressive in nature, i.e., subsequent aspects build on the previous aspects and rigor increases when more of these elements or conditions are satisfied. First, at the most basic level researchers need to carefully select a few constructs that capture the essential properties of the phenomenon of interest and clearly define those constructs. Lack of definition creates ambiguity and confusion, which will inhibit the development of a common understanding of the constructs and the phenomenon they represent. Definitions should be parsimonious and avoid tautology. Second, once the constructs are defined, it is important to specify the boundary conditions where the constructs will or will not hold. This includes clarity on the level of analysis (individual, group, organization, inter-organization, etc.), type of organization (for profit, not for profit, diversified or single business firms, etc.), and time (current state, future state, dynamism, etc.). The third element involves clear articulation of how the constructs are related to each other to provide an explanation of the phenomenon. Such relationships could be stated in a propositional form, and presented in the form of a nomological network depicting the relationships among the constructs. Finally, a theory needs to have internal coherence, i.e., the selected constructs capture all critical parts of the phenomenon, are coherent, and are logically consistent with each other to lead to an overall theory. A focused or parsimonious framework, i.e., constructs and relationships are fewer but provide a powerful explanation, is preferred. With a well-developed theory, empirical researchers could build on the theory and design studies that can empirically support or refute the theory.

2.2. Rigor in design and conduct of empirical research

Rigor in design and conduct of empirical research refers to having a carefully developed plan for data collection and a solid execution of the plan. Broadly speaking, three key aspects are important to evaluate a paper's rigor in design and conduct of research: 1) stating the what, why, and how of the methods used, 2) demonstrating that the methodological choices made were informed and appropriate, and 3) providing a strong foundation for replication and future research. Just like conceptual rigor, the more clearly research meets these aspects, the greater the rigor. *First*, a paper needs to clearly specify the what, why, and how of the research design. To begin with, researchers need to provide clear and detailed descriptions of the research context, the selected sample, and operationalization of key constructs (Zhang & Shaw, 2012). Not only do they need to specify *what* sample, data, and measurements were used, but they also need to address *why* the particular sample or context used is appropriate to examine the research question. It is also critical to justify why their operationalizations can accurately measure the intended constructs (Bono & McNamara, 2011). In addition, authors should clearly describe *how* they obtained the data. For example, a rigorous survey-based study would provide information such as how the authors identified and contacted the respondents; how they developed the specific survey items and validated the survey; how the questionnaires were distributed; how many observations were lost in each procedure; and how they reached the final sample (Grover, Lee, & Durand, 1993), and how reliable and valid were the survey instruments used. A clear explanation of these fundamentals helps the reader clearly understand the research context, design, and procedures followed.

The *second* criterion refers to the appropriateness of the choices made. A study may provide explanations as to why a certain context is chosen; however, based on the provided justification, readers may not be fully convinced of the choice made. For example, a convenient sample of students with little work experience used in studying executive decisions on coopetition may not be an appropriate sample to answer research questions regarding how a top management team makes strategic decisions (Bono & McNamara, 2011). *Third*, once the requirement for clear description and a convincing justification has been met, the final criterion of replicability becomes relevant. A replicable study provides sufficient information that a restudy of the first study is feasible (Golafshani, 2003) and provides a basis to build and improve on in future research. Replicability of research techniques is one of the most important features for high quality scientific publications (Asendorpf et al., 2013; Chase, 1970). Studies with the highest level of rigor will also provide standardized approaches that could be followed by future studies. A study's methodology that is transparent, thorough, and well justified could be used and refined by future researchers and subsequently further increase rigor.

2.3. Rigor in analysis and reporting of results

Once the data are collected using rigorous methods, it is critical that the researchers take great care in analyzing the data and reporting the results. We suggest that rigor in analysis and reporting of results is achieved mainly through the following (Echambadi, Campbell, & Agarwal, 2006; Hitt, Boyd, & Li, 2004; Zhang & Shaw, 2012): 1) stating the what, why, and how of the analytical procedures, 2) reporting the results clearly, and 3) demonstrating that the findings are credible. *First*, just like the what, why, and how of research design, it is crucial to clearly describe and justify the analytical procedures used (Zhang & Shaw, 2012). Take secondary data analysis as an example, researchers should clearly state the statistical procedure used and justify their

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