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Impact of incentive schemes and personality-tradeoffs on two-agent cooptition with numerical estimations

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ABSTRACT

The main purpose of the present paper is to analyze the feasibility of managing cooptition among two given agents in a firm, under a Markovian structure, where the transition probabilities are defined by the incentive schemes for cooperation and competition and the personality-tradeoffs between the two agents. Furthermore, the asymptotic behavior of the model is considered and analyzed through a numerical estimation of the different possibilities. The behavior of the steady state probabilities as a function of the incentive scheme is shown for different possibilities of personality-tradeoffs between the agents. The existence of a dominant cooptitive range, wherein the steady state probability of the cooptition state is higher than the similar probabilities of the cooperation and competition state, is shown to exist for some types of personality-tradeoffs. The state dominance mapping is found, and it is shown that the locus of the types of personality-tradeoffs in which cooptition is prevalent is quite narrow. Lastly, the probabilities of remaining in a specific state of cooperation, competition, and no cooptition are found, for the cooptition locus. Our results indicate that the possibilities for managing cooptition through incentive schemes are quite narrow and that an active management of interpersonal relationships in the firm is required. The paper also aims to introduce a general framework for the analysis of cooptition at the micro level, by explicitly considering cooptition and not merely a treatment of alternating behavior between pure cooperation and pure competition.

1. Introduction and theoretical framework

Initially introduced in 1992 by Raymond Noorda, the term *cooptition* was coined as a new paradigm of research by the seminal work of Brandenburger and Nalebuff in 1996 [1]. Ever since, cooptition has received much attention, both in the academia and in the business arena. The etymology of the term cooptition refers to competition and cooperation appearing simultaneously between the same parties. Pure cooperation, on the one hand, is generally characterized by the efforts placed by a group of individuals working together to achieve a common goal [2,3], being an important theme in human behavior [4]. Pure competition, on the other hand, generally refers to the efforts of one person attempting to outperform another in a zero-sum situation [5].

It is in this context that cooptition has been generally defined as a situation in which there is simultaneous cooperation and competition between firms: cooperation with one another and coordination of activities in order to achieve mutual goals and competition with each other in order to achieve individual goals. In other words, cooptition

means that parties can compete due to conflicting interests, but they can also cooperate due to common interests [6]. The underlying assumption is that extraordinary achievements come not only from competitive efforts of an isolated individual, but also from the efforts of a cooperative group [7]. Based on this postulation, Luo [8] advanced a conceptual and typological framework of cooptition in which both cooperation and competition coexist.

Cooptition has become an important item on many businesses' agenda, not only because a business relationship usually contains elements of both cooperation and competition [9,10], but also because the traditional business environment has experienced changes that led to the need to consider the dynamic roles simultaneously played by the various organizations in their contradictory interactions with each other [11]. These changes include, but are not limited to the classic issue of our time: do more with less and within a limited time frame – ultimately, the need is to become more efficient [12]. In practice, this has been translated into more than two decades of research on cooptition, whether it has been or not characterized as cooptition.

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Furthermore, new concepts have been advanced, such as coepetitive advantage and coepetition strategy [13], coepetitive business models [14], and coepetitive practices [15].

Coepetition has been studied from many perspectives: (a) following the game theory view [1,16–18]; (b) following the resource-based view [19–22], and (c) following a network approach [23,24]; and within different settings, such as but not limited to, low carbon manufacturing [25], supply chain [26,27], green supply chains [28], tourism [29–32], and even computer-supported collaborative learning [33].

In the area of low carbon manufacturing, one of the most recent papers is the one by Luo, Chen, and Wang [25], wherein the authors developed competition and coepetition models to examine the optimal pricing and emission reduction policies with various emission reduction efficiencies of two competing manufacturers. Interestingly enough, their results indicated that although coepetition among the manufacturers would help generate more profit and less total carbon emissions than pure competition, this would be a short-lived state. In the long run, their coepetition would decrease investments in green technology and increase carbon emissions per unit, leading to a weakened competitive position on the market.

In supply chain, recent research has been dedicated to evaluating different aspects of coepetition. In [26], the authors considered the problem of supply contract design for a one-time interaction between a supplier and a buyer, in order to investigate the incentives and equilibrium investment policies in a two-echelon supply chain. To this end, the authors model the structure of the decision-making process between a supplier selling a product and an independent buyer. In [27], the authors focused on the case of knowledge exchange in supply chain innovation projects and to this end they explored a pool of symmetric and asymmetric 2×2 games that could effectively model the knowledge-sharing dilemma among supply chain partners (firms) that jointly innovate. The firms were considered along two dimensions: collaboration motive and relative power. Studies have also been dedicated to studying coepetition among green supply chains; for example, a recent paper by Hafezalkotob [28] focused on the impacts of government regulations on competition and cooperation of two GSCs in an energy-saving context.

In tourism, research interests have been quite varied. For example, Damayanti, Scott, and Ruhanen [29] explored coepetitive behaviors among informal tourism economy actors, Della Corte & Aria [30] focused on coepetition among small and medium tourism enterprises, and Fong, Wong, & Hong [31] examined how institutional logics of four tour operators unfolded over the last decade subsequent to the changes in the broader institutional environment. Interestingly, despite the diversity of research endeavours in the area, a recent bibliometric analysis on ‘tourism coepetition’ by Chim-Miki and Batista-Canino [32], who looked at the papers published on the topic between the years 1995–2015, indicated that the number of papers is not just low, but that there is no specific model on tourism coepetition.

Computer-supported collaborative learning is yet another area that has benefited from studies on coepetition. For instance, Wang, Wallace, and Wang [33] employed the idea of coepetition by integrating rewarded and unrewarded competition with collaboration to study how learning processes unfolded and varied when rewards were or were not provided to groups on a competitive basis.

As editors of *Coepetition Strategy*, Dagnino and Rocco [34] presented research by different authors in reference to coepetition between organizations and within organizations. The large number of topics enclosed in the research studies presented was not exclusively related to firms, but also covered organizations such as governments, universities, and opera houses, among others. The themes covered included knowledge creation, innovativeness, trust, creation of high technology industries, globalization, biotechnology, multiparty alliances, automotive industry, insurance fraud problems, fairness, and reciprocity. Moreover, the papers covered cases from different countries, such as Israel, Taiwan, Australia, Italy, and Japan.

In a more recent study conducted by Czakon, Mucha-Kus, and Rogalski in 2014 [35], the authors provided a comprehensive analysis of academic research on coepetition, spanning the years 1997–2010. In their literature review, they covered topics such as definitions, methodologies, linkage of the topic with related fields, types of coepetition and geographical distribution of coepetition research, top-cited papers, facets of coepetition, aspects related to the intensity of cooperation and competition relationships, theoretical approaches, patterns in coepetitive relationships and coepetition strategies, typology of coepetitive strategies, roles in network coepetition, empirical research foci, and topics for further research. Other relevant references on coepetition are the studies by Stein [36] and Bouncken, Gast, Kraus, and Bogers [37].

It is to be noted, however, that despite the various research efforts existing in the literature, there is a lack of unified definitions [38]. In time, research on coepetition has focused mainly on the advantages, opportunities, and outcomes that it entails: the pooling of competencies, the increased incentive to take risks and be proactive in product development, and the prospect of healthy competition [39], knowledge sharing [40–42], knowledge creation [43], knowledge transfer [44], knowledge acquisition [45], and team or group performance [46,47], among others. As Zineldin [48] stated, partners in a coepetitive relationship can create new value by reducing many uncertainties and risks, while gaining “access to vast information about common needs, aspiration and plans, which provides a substantial competitive advantage by strengthening strategic cooperation” (p. 785). Additionally, Tauer and Harackiewicz [49] examined the effects of competition and cooperation on intrinsic motivation and performance and found that cooperation and competition both have positive aspects and that integrating both can facilitate high levels of both intrinsic motivation and performance.

Nevertheless, although coepetition is a source of value, it also creates tensions within the firm [50–54]. Tension is often “multi-dimensional and multi-level, and dealing with tension requires an implicit recognition and management of the inherent contradictions” ([55], p. 4, based on [54]). In consequence, in order to optimize the benefits of coepetition, the challenge for managers is to simultaneously manage cooperation and competition [8]. As Clarke-Hill et al. [17] stated, firms should focus on maintaining a balance between cooperation and competition.

It is also to be noted that in all of the above studies, no explicit reference has been found with regards to coepetition and interpersonal relationships within a firm. There are important research efforts on cooperation and competition at the individual level but, as far as our knowledge goes, there is no relevant research concerning the specific concept of coepetition at the individual level. The studies at the individual level have been developed mainly in the fields of social psychology, social biology, political science, and other social sciences, and lack in the field of management. For more information, the reader is referred to the studies by Axelrod [56,57], Wilson and Wilson [58], Nowak [59], Nowak and Highfield [60], Deutsch [2,61], and Johnson and Johnson [62].

It is not too bold to say that most of the research on the topic of coepetition has been developed at the inter firm level and to a lesser extent at the intra firm level; no significant attention has been given to aspects of coepetition among individuals within a firm. Knowledge about this important topic is, thus, still very superficial, fragmented, and lacking a solid academic basis. The present research endeavor directs its attention to address this gap. The aim is to introduce a general framework for the analysis of the coepetition at the micro level, by explicitly considering coepetition and not merely a treatment of alternating behavior between pure cooperation and pure competition.

Within an organization, at the interpersonal relationships level, what are the links between incentives and coepetition? How can incentives be used to manage coepetition? How to define a typology of coepetition in accordance with an incentive structure, for management purposes? How do the interpersonal relationships influence the level of

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