



Structuration aspects in academic spin-off emergence: A roadmap-based analysis



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ABSTRACT

The influence of the strategic management research rooted conception of firm performance as resulting from the structure–agency duality is clear in the academic spin-off (ASO) literature. However, the interplay of structuration aspects during ASO emergence is still under-researched—though potentially relevant to explain spin-offs' heterogeneity. Thus, this paper presents a roadmap-based investigation of structure and agency patterns in the emergence of a Brazilian high-tech ASO focused on developing products from carbon nanotubes to industrial applications. Causal cognitive mapping was used to construct seven emergence roadmaps from entrepreneurs' retrospective narratives and the qualitative comparative analysis (QCA) was applied to formally analyze the maps. As a result, the main generative mechanisms of the structuration aspects were identified, leading to evidence-based propositions about the distinctive explanatory capability of: R&D-oriented agency, internal structures and environment–resources combinations. Moreover, the study identified subsets of the original roadmap layers able to consistently limit, in a logically parsimonious way, the empirical diversity of various phenomena considered theoretically relevant aspects of academic spin-off emergence. Hence, the paper illustrates the value, from a scholarly perspective, of incorporating formal techniques to roadmap analyses and identifies complex patterns of structure and agency to be further explored by future investigations.

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1. Introduction

The field of strategic management has been historically divided in two main strands of research [1–4]. The first, called “strategy content”, encompasses all research work which emphasizes external (e.g. institutional and industrial context) and internal structures (e.g. resources) as the main determinants of firm conduct and, consequently, of its performance. The second, called “strategy process”, comprises studies which highlight the agents and the way they form strategy over time (i.e. agency) as the main explicative variables for organizational performance heterogeneity.

Hence, the paradigms established by the “structure, conduct and performance” framework—with its emphasis on structures external to the company—and by the resource-based view (RBV)—with its focus on internal structures—are considered the two

Abbreviations: ASO: academic spin-off; QCA: qualitative comparative analysis.

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basic theoretical platforms on which the strategy content strand relies. On the other hand, seminal work, such as that of Bower [5], Mintzberg [6], Quinn [7] and Pettigrew [8], oriented towards investigating the strategy formation process and its effects on firm success and failure are considered classic theoretical references of the mainstream research on strategy process.

Thus, the Porterian school and its ramifications and, subsequently, the Penrosean tradition and its influence through works such as those of Wernerfelt [9] and Barney [10] represent the foundations of the strategy content strand. Similarly, the development of the concept presented by Mintzberg and Waters [11] until the appearance of the “strategy-as-practice” approach [12,13] indicates the broad theoretical spectrum of process research.

Despite this multiplicity of theories, the centrality of the “structure–agency” duality in conceptual proposals remained unaltered. This fact indicates a rooted conception of performance as a result of a dual combination of environmental determinism and individual and group voluntarism, corroborating the viewpoint that highlights the influence of structuration theory on the strategic management field [14].

In the literature dedicated to the academic spin-offs phenomenon, the impact of this perspective focused on structure and agency is noticeable. In fact, the theoretical influence of strategic management on the study of ASOs has been explicitly recognized in some recent and broad literature reviews which aimed to identify the main trends in this new field of research (e.g., [15–18]).

However, the interplay of structuration aspects during ASO emergence is still under-researched. Therefore, the objective of this paper is to characterize these basic aspects and their relationships, in the context of the emergence of these academic new ventures.

2. Theory

Both agency and structure are important theoretical constructs in the academic spin-off specialized literature. While some works concentrate on identifying levels of analysis of internal and external structures that directly influence spin-off activity, other research strands focus on the agency processes that will have to take place in order to create a new firm. This section synthesizes both theoretical contributions.

2.1. *The spin-off: internal and external structures*

An ASO is a company that emerges from the transfer of a core technology developed within an academic institution [19]. The entrepreneurial team, usually but not necessarily, may include the inventor(s) of the technology—who, in this case, may or may not be currently affiliated with the parent institution [19]. Organizations with these characteristics can be differentiated in relation to three main dimensions: (a) institutional link; (b) business model; and (c) types of resources [16]. These dimensions reflect distinct theoretical traditions of research observed in the studies of new technology-based firms (NTBFs)—of which the ASOs are considered a subgroup.

The resource-based view, for instance, risen from the field of strategic management (e.g. [9,10]), is the theoretical foundation for the dimension “type of resources”, which is focused on the firm’s internal structure. According to RBV, resources are all assets, tangible and intangible, semi-permanently linked to the firm. In general, four main categories of resources are identified: technical, social, human and financial [16]. Technical resources are, primarily, the products and technologies of the firm, whereas human resources refer, among others, to the founding team, management staff and other people involved. Social resources are constituted, for example, by the contacts with industry people, academics and investors. Finally, financial resources can be assessed, for instance, by the level and type of funding received [20].

The business model perspective, on the other hand, focuses on the articulation of the value proposition of a product, the identification of the corresponding market segment, the position taken in the value chain and the estimated cost structure and profit margin [21]. Thus, this theoretical tradition emphasizes elements such as sectoral differences, technological regimes and product–market combinations that can generate growth.

Finally, the institutional perspective, based on the institutional and neo-institutional theories, focuses on external structures, especially on the relationship between the new firm and the organization from which it spins off. It highlights, for instance, the way by which the institutional context impacts the resource configuration and the business model of the new company. It is not only the link between the two organizations that is analyzed, but also how the new venture can be influenced by the parent organization’s strategic choices, such as: prioritization of a specific technology transfer mechanism, establishment of incubators and technology parks, definition of incentive systems for the entrepreneurial researcher [16].

Recently, some broad literature reviews of this nascent field of knowledge [15,17,18] contributed distinctively to the identification of the main research strands related to these prominent theoretical perspectives. According to these reviews, the central element of this area of study is the activity of ASO. In relation to this activity, researchers explore its antecedents and consequents in different levels of analysis. As for the antecedents, at least four levels are identified: (a) individual characteristics; (b) organizational resources; (c) institutional characteristics; and (d) environmental factors [17]. A more abstract classification of these dimensions identifies the academic institution as a point of reference (meso level of analysis), from which the macro and micro levels of investigation are defined [15]. In this case, dimensions (b) and (c) correspond to the meso level; (a), to micro; and (d), to macro.

Hence, at the micro level of analysis, individual attributes relevant to ASO activity are investigated. Personality, motivation, ability, and aptitude are examples of characteristics whose influence on the individual behavior of those involved with academic

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