INNOVATION IN LOW-TECH FIRMS: capabilities, size and age matter

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Introdução
When innovation is evaluated and discussed, it is usually from the high-technology firms' point of view, which invest a considerable amount of resources in research and development activities, but how about innovation in traditional industries? A combination of innovation capabilities that go beyond technology seems to be the answer, however, despite the diversity of studies about innovation in low-tech industries, there is still the need to to further explore and describe specific elements that encompass these capabilities and lead low-tech firms to achieve innovative outcomes.

Problema de Pesquisa e Objetivo
Once the combination of capabilities needed to innovate have been already presented, there is still the need to further explore how these firms exploit their innovation capabilities to achieve such results. Aspects like characteristics of product development processes, technology incorporated in manufacturing, sustainability concepts applied on operational routines, as well specificities of marketing and supply chain management activities, are still in need to further investigation. Thus, this study aims to identify the characteristics of innovative low-tech firms.

Fundamentação Teórica
There is a misconception around low-tech industries that they are non-innovative (Arundel et al., 2008). However, innovative performance may occur regardless of their technological intensity (Hirsch-Kreinsen, 2008; 2015; Frick et al., 2019). It is through a combination of innovation in processes, in product design, in marketing and in supply chain management, that low-tech firms can be competitive and profitable (Reichert et al., 2016). These firms benefit more from a collection of efforts made in different areas. We apply Zawislak's et al. (2012) four innovation capabilities model.

Metodologia
A multiple case study was conducted with 12 Brazilian low-tech firms. A selective sampling was carried out by analysing secondary data that indicate if a firm could be innovative. Semi-structured interview script was based on the four-capabilities model. Each capability was analyzed separately allowing the identification of common aspects among cases and the emergence of subcategories of innovative capabilities. We then determined the level of capabilities in basic, intermediate and advanced, resulting in five highly innovative firms that were described in further details.

Análise dos Resultados
The most advanced capabilities of the 12 cases are operations, followed by management. Development and transaction capabilities are the least evolved capabilities. Five firms were considered innovative, given the advanced characteristics of at least three capabilities. They have robust operations and management capabilities, as well as development and transaction capabilities above the perceived standard, which allows them to transform their advanced technological knowledge into products of aggregated value. Two factors are also important to their innovative results: size and age.

Conclusão
Innovative low-tech firms have at least three well-developed capabilities. These firms, in general, have well-organized operations, established supply, distribution and operating markets, as well as the management processes implemented, in addition to having efforts to develop new products, often of aggregated value. They combine efforts on product development knowledge about their market to offer new products of aggregated value for higher standard markets. Also, size and age matter to innovation in Brazilian low-tech firms.

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