

DOI: 10.17747/2618-947X-2025-4-404-408



The Role of Dynamic Capabilities in Creating Product Innovations

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Abstract

This paper examines the importance of innovation in the development of new products as a means of increasing organizational competitiveness. It reviews the theoretical foundations of the resource- and capability-based view of the firm, with particular attention to the contemporary concept of dynamic capabilities. The paper identifies four key higher-level competencies – dynamic capabilities – that are used to analyze the impact of specific firm abilities on the effectiveness of product innovation: sensing capability, seizing capability, transformation capability, and entrepreneurial management capability. Based on this review, a general thesis and a theoretical model are proposed that may be applied in empirical research and further tested using real-world cases of product innovation.

Keywords: firm resources and capabilities, digital transformation, strategic analysis

For citation:

Semenov P.O. (2025). The Role of Dynamic Capabilities in Creating Product Innovations. *Strategic Decisions and Risk Management*, 16(4): 404–408. DOI: 10.17747/2618-947X-2025-4-404-408.

动态能力在产品创新中的作用

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摘要

本研究阐述了在新产品开发领域开展创新活动对于提升组织竞争力的重要性。文章梳理了当前企业资源与能力领域的理论基础，重点关注最前沿的动态能力理论，并提出了用于论证企业特定能力如何影响产品创新实施效果的四大高级动态能力：感知能力 (sensing capability)、捕捉机会能力 (seizing capability)、转型能力 (transformation capability) 以及管理层的企业家能力 (entrepreneurial capability)。结果研究确立了核心论点并构建了理论模型，该模型可用于实证研究，并能在企业实际产品创新案例中进一步验证。

关键词：公司的资源和能力、数字化转型、战略分析

供引用：

Semenov P.O. (2025). 动态能力在产品创新中的作用。《战略决策和风险管理》，16(4)：404–408。DOI：10.17747/2618-947X-2025-4-404-408。

This paper begins by explaining why product innovations are important for organizations and why their effective and efficient implementation is critical. The issue is examined from the perspective of firm competitiveness and the role of product innovation in sustaining and enhancing competitive positions.

In today's business environment, economic and operational efficiency along are insufficient to ensure competitiveness. Firms must achieve a sustainable competitive advantage that enables them to attain and maintain a leading market position. As M. Porter argues—and as this paper also maintains—sustainable competitive advantage arises from performing different activities from rivals or performing similar activities in different ways [Porter, 1996].

In line with this reasoning, competitive firms should strive to develop sustainable competitive advantage. Innovative activity, particularly in form of product innovation, enables firms to achieve such advantages; therefore, the development of resources and competencies related to innovation is of critical importance.

Having outlined the concept of competitiveness and sustainable competitive advantage within the context of this study, the discussion now turns to the definition of innovation and the specific role of product innovation.

The term innovation was first introduced by the Austrian economist and sociologist J.A. Schumpeter. In *The Theory of Economic Development* (1911), Schumpeter described innovation as a key driver of economic progress and a fundamental source of economic dynamics.

One of Schumpeter's central ideas concerns the importance of the entrepreneurial spirit. He emphasized that entrepreneurs, as initiators and implementers of innovation, are the core agents of economic development. Schumpeter also identified several types of innovation, one of which—"the creation of a new product or provision of a new service"—corresponds to product innovation as defined in this paper.

C. Christensen's research on *disruptive innovation* represent another major contribution to innovation theory and strategic management. Christensen defines disruptive innovation as new technologies, products, or business models that initially emerge in niche or underserved market segments and later transform or displace established market structures by offering a fundamentally different value proposition. A distinctive feature of such innovations is that they are initially focused on small market segments that are underestimated by large players; over time, however, they displace traditional products and gain a large market share. In contrast, Christensen also identifies *sustaining innovations*, which improve existing products and help dominant firms maintain their market positions [Christensen, 1997].

The theories of Schumpeter and Christensen are consistent with one of the interpretations of digital transformation adopted in this paper. According to this perspective, digital transformation involves the creation of digital platforms that enable interaction between sellers and buyers [Teece, 2007], which may be understood as a form of product innovation in the digital domain.

Based on the above discussion, the following definition of product innovation is proposed. Product innovation refers to the creation of new products or the improvement of existing ones through the adoption of innovative technologies, solutions, and approaches. In the context of digital business transformation, product innovation is closely associated with the use of digital

tools and platforms to enhance product quality, improve customer experience, and optimize production and delivery processes. As a result, firms increase their competitiveness by achieving sustainable competitive advantages. Product innovations enhance product quality by enabling new functionalities and performance improvements that increase customer satisfaction.

Modern digital platforms allow firms to better understand customer needs and preferences by offering personalized services and solutions, thereby strengthening firm–customer interaction, increasing customer loyalty, and driving sales growth [Dadoun et al., 2021]. Ultimately, firms that successfully innovate their products gain advantages over competitors by differentiating themselves in the market, attracting new customers, and maintaining leadership positions within their industries [Gil-Gomez et al., 2020].

Thus, contemporary product innovation enables firms to achieve sustainable competitive advantage and secure leading market position. However, the question remains how firms can effectively implement such innovations and what type of resources, competencies, and capabilities are required to do so.

The most recent stage in the development of the theory of firm resources and capabilities is the concept of dynamic capabilities, which was developed by D.J. Teece and his co-authors in 1997. In their article *Dynamic Capabilities and Strategic Management*, the authors describe dynamic capabilities as a firm's ability to integrate and reconfigure internal and external competencies in order to operate in a rapidly changing environment [Teece et al., 1997]. Consequently, as the authors note, dynamic capabilities make it possible to achieve new innovative forms of competitive advantage. In addition, achieving new forms of competitive advantage is one of the main goals of an organization's innovation activities. The concept of dynamic capabilities is the most recent theoretical development and, by definition, is more closely related to innovation processes; therefore, the model of product innovation capabilities formulated in this study is based on this concept of dynamic capabilities.

It should be noted that this concept does not negate the classical theories of the resource-based view and core competencies [Hamel, Prahalad, 1989; Barney, 1991]; rather, it extends them. It represents the next step in identifying firm capabilities that enable adaptation to the current business context and changing economic conditions.

Dynamic capabilities differ from static competencies in that they involve the continuous updating and improvement of internal processes and external interactions. They help organizations not only survive under conditions of uncertainty but also actively develop by exploring new markets and creating unique value propositions for customers.

Teece later refined his theory in an effort to make it more practically applicable. At this stage of the concept's development, three clusters of higher-level organizational capabilities were identified: sensing, seizing, and transformation [Teece, 2007]. Organizations and their management must engage in these activities to anticipate market and technological trends, devise strategies to capitalize on these insights, and restructure the firm in accordance with its strategic vision.

Further clarification of the dynamic capabilities concept concerns the role of managers themselves, particularly their

entrepreneurial actions and qualities. For dynamic capabilities to be strong, leadership must be entrepreneurial. This implies that managers should participate in developing and testing assumptions about new technological and market trends, refining business models, and managing the resources required within the organization [Teece, 2014].

According to Teece, this entrepreneurial approach should be extended throughout the entire organization. This view is also consistent with Schumpeter's argument regarding the necessity of entrepreneurial skills in corporate management for the development of innovation activities.

At this stage, the role of strategic management within the theory of dynamic capabilities is also clarified. It is argued that the firm strategy is not a derivative of dynamic capabilities. Rather, the deployment of dynamic capabilities must be aligned with a firm's strategy, which is developed by management; competitive advantage emerges from this combination.

Based on this framework, the present study relies on four higher-level organizational capabilities: sensing capability, seizing capability, transformation capability, and entrepreneurial management capability. These capabilities are proposed as the defining components of dynamic capabilities and are examined in greater detail below.

The firm's innovation activities are positioned between dynamic capabilities and competitive advantage. The study by [Zhou et al., 2019] contributes to demonstrating the impact of dynamic capabilities on organizational performance and competitive advantage. That study examines firm's dynamic capabilities influence competitiveness and overall productivity through the process of innovation. The authors identify three key aspects of dynamic capabilities – the abilities to perceive, integrate, and reconfigure—which contribute to different types of innovation [Zhou et al., 2019].

The ability to perceive involves scanning the external environment to identify new opportunities and threats. This is generally consistent with the sensing capability discussed earlier. The integration aspect refers to combining internal and external resources to create new products and services. The authors emphasize several important elements of integration. Internal coordination plays a critical role, particularly the ability to integrate the activities of different departments and specialized units to facilitate effective knowledge and technology exchange. In addition, external resources exchange is also essential, including the integration of knowledge and technologies acquired through cooperation with partners, suppliers, or customers. This enables firms to access new ideas and opportunities. This aspect is closely related to organizational learning and knowledge processes and corresponds to seizing capability. The third aspect of dynamic capabilities identified by [Zhou et al., 2019] is reconfiguration, which refers to adapting business processes and organizational structures to changing conditions and corresponds to the transformation capability. Returning to the relationship between dynamic capabilities and firm performance, [Zhou et al., 2019] argue that innovation is the primary mechanism through which dynamic capabilities affect performance. Notably, the authors do not explicitly distinguish entrepreneurial management capability; therefore, the theory of dynamic capability formation is supplemented by taking this capability into account.

In the context of digital transformation, the relationship between dynamic capabilities and product innovation is examined through four key higher-level capabilities identified above:

- 1) sensing capability;
- 2) seizing capability;
- 3) transformation capability;
- 4) entrepreneurial management capability.

In digital transformation, the process of developing new products or improving existing ones begins with sensing capability, that is, identifying opportunities related to emerging or underutilized technologies and assessing how they may address customer needs. Digital technologies enable rapid and cost-effective testing and refinement of hypotheses about customers and technologies, which is particularly important for product innovation. Firm activities associated with sensing capability include scanning, searching, and exploring innovation opportunities [Teece, 2007], which require investments in research and technological experimentation. Prior studies indicate that information and resources influence innovation and firm development [Yam et al., 2011] and that experienced organizations employ specific search routines to enhance innovation outcomes [Nelson, Winter, 1982]. Sensing capability also involves understanding consumer demand, market evolution, and anticipated competitor responses. As a result, when opportunities emerge, sensing capability enables firms to determine which technologies are worth testing and applying and which market segments to target [Teece et al., 1997].

A firm's ability to recognize and act on opportunities is essential for establishing a viable business model for a new product; this constitutes the seizing capability. For a product to be sustainable, it must offer value that allows the firm to charge prices sufficient to cover costs and generate profit, thereby enabling growth. Seizing capability also includes the dissemination, codification, and articulation of knowledge within the organization and the application of this knowledge in digital transformation and corporate innovation systems. As noted by P. Drucker, "Innovation is the application and use of knowledge to create new knowledge" [Drucker, 1993]. This capability places particular emphasis on the presence of effective knowledge management systems among employees involved in product innovation and digital transformation. Seizing capability facilitates organizational learning and the diffusion of know-how and expertise [Teece, 2014]. It also involves attracting external resources, including the integration of knowledge about customers, markets, and technologies acquired during search stage [Jansiti, Clark, 1994]. Previous research suggests that seizing capability represent, to some extent, the conversion of resources and knowledge into innovation [Dutta et al., 2005]. Studies have shown that effective integration of internal and external technological and market knowledge increases the likelihood that firm will incorporate successful features into new products [Marsh, Stock, 2006].

Transformation capability is required for implementing digital solutions and innovations, as well as for making key strategic decisions. This capacity enables firms to identify deficiencies in their existing capabilities. Such gaps may be addressed through internal development, acquisitions, or the formation of strategic alliances. Transformation capability also supports organizational performance over time and helps firms avoid adverse path

dependencies [Teece, 2007]. It encompasses actions through which firms add, recombine, or divest resources and business units [Karim, Capron, 2016]. Internal knowledge exchange can be enhanced through appropriate reallocation of human resources and restructuring of business units [Nonaka, 1994]. Employees who possess critical knowledge but are not engaged in key tasks may be reluctant to make necessary decisions, thereby hindering organizational progress [Wang et al., 2009]. Consequently, a loyal and engaged workforce, together with an appropriate degree of autonomy in decision-making within the innovation processes, is a crucial organizational resource.

Finally, as noted earlier, this study argues that entrepreneurial management capability should also be considered a key component of dynamic capabilities. The entrepreneurial capabilities of management have only relatively recently been emphasized as an important element of dynamic capabilities [Teece, 2014]. Beyond dynamic capability framework, prior research indicates that managers with entrepreneurial capabilities enhance organizational strategic flexibility and adaptability – an argument that aligns closely with the dynamic capabilities perspective [Bartlett, Ghoshal, 1987]. Firms with strong entrepreneurial capabilities also demonstrate long-term success through sustained values and an entrepreneurial culture [Collins, Porras, 1994]. Accordingly, entrepreneurial culture must be supported by top management to ensure successful adaptation and growth [Kotter, 1996]. Research shows that granting managers the freedom to experiment and develop innovative ideas enhance firm competitiveness [Hackman, 2002].

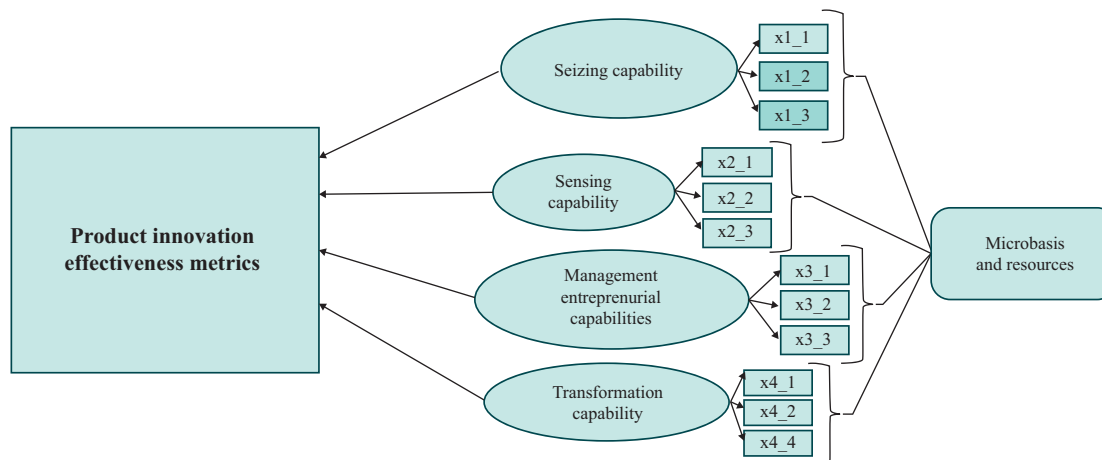
Thus, in the context of product innovation, dynamic capabilities should be considered not as processes, operations, or

routines within an organization, but as higher-level abilities that are set by top management, permeate the organization’s human resources, and enable the rapid and effective implementation of product innovations in a firm’s digital products.

Based on the review of the existing literature, the following argument is proposed: four groups of higher-level dynamic capabilities should be identified – sensing capability, seizing capability, transformation capability, and entrepreneurial management capability. These groups of capabilities are defined by specific competencies, or *microfoundations*, that contribute to a firm’s product innovation activities. Sensing capability enables the identification of opportunities related to new or not yet widespread technologies and their potential to meet customer needs. Seizing capability enables firms to create profit-generating mechanisms and includes planning and configuring the organization’s value chain. Transformation capability enables firms to close capability gaps and expand existing competencies through internal development or partnerships with other firms. Entrepreneurial management capability contributes to the development of organizational strategic flexibility and adaptability, as well as to the strengthening of the other three higher-level dynamic capabilities.

Further research should adopt an empirical approach to testing this theoretical framework and applying it to real-world scenarios involving the development of new products within organizations that have cultivated dynamic capabilities based on the microfoundations discussed in the preceding sections of this paper. The model proposed below (see Figure) is intended for use in subsequent empirical studies.

Fig. Theoretical framework of product innovation based on dynamic capabilities



Source: authors’ adaptation of theoretical concepts of dynamic capabilities.

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The article was submitted on 03.11.2025; revised on 05.12.2025 and accepted for publication on 20.12.2025. The author read and approved the final version of the manuscript.

文章于 03.11.2025 提交给编辑。文章于 05.12.2025 已审稿。之后于 20.12.2025 接受发表。作者已经阅读并批准了手稿的最终版本。