PERSPECTIVES

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AMBIDEXTERITY AND CO-EVOLUTION IN OPERATIONS: INTEGRATING THEORY AND PRACTICE

INTRODUCTION

What factors influence changes related to operations in companies? Usually, the operations management area prioritizes a technical view of its issues, often with limited theoretical support, consequently distancing itself from other areas of business administration. How could the co-evolution theory help this understanding by making contributions to research and practice of operations management? In this context, the development of a new product or business process leads to significant changes in the way a company configures its operations. The growth of e-commerce in recent decades illustrates how a change takes place not just in the company's strategy, but also in the operations along the entire supply chain. However, what would drive change? Several answers have been proposed. Initially, one thinks of internal resources as the main drivers of such changes. Even with criticism, the resource-based view (RBV) has assumed a predominant role in operations research (Bromiley & Rau, 2016). According to RBV, internal resources, including the business leader, are essential to strategies of and changes in the company's operations (Hitt, Xu, & Carnes, 2016). However, external causalities, such as the influence of the industrial sector, are also important. Considering this approach, it is valid to consider Michael Porter's influence in the way the strategy of companies has been thought for decades (Hayes & Pisano, 1996).

There are also external causes related to the local context. Aspects of the macro business environment, such as laws and regulations, can be mentioned. There is a wide range of aspects here, from labor issues to environmental standards.

Thus, both internal aspects and the external environment influence changes in companies' operations.

Therefore, when answering the initial question of what factors would cause changes in companies' operations, the answer is not unique; "the combination of several aspects" could be the most appropriate answer. Thus, the concepts of ambidexterity and co-evolution help in understanding the process of change.

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AMBIDEXTERITY AND CO-EVOLUTION

The concept of ambidexterity considers that companies explore their resources in two distinct ways. *Exploitation* is when they make use of their internal resources to seek the best results in the present (Kristal, Huang, & Roth, 2010). *Exploration* is when they make use of their resources, no longer with a focus on current operations, but considering the future, modifying and creating new competencies (O'Reilly

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& Tushman, 2004). Exploitation and exploration are processes that coexist and allow companies to strengthen their present performance and anticipate future changes (Birkinshaw & Gupta, 2013).

The concept of co-evolution, in turn, has clear interfaces with the processes of exploitation and exploration. For Lewin and Volberda (1999), co-evolution refers to the combination of managerial intentionality, competitive forces, and influences from the institutional environment. Thus, the decisions of leaders and functional areas of the company, the influence of the competitive environment, and the institutions that surround the company are key aspects in the changes of operations. However, the level of influence of each of these aspects is variable and dependent on the context (March 1994).

Thus, companies and their operations change because of influences coming from different levels: the micro level, or internal processes; the meso level, or the competitive environment, which includes the influence of competitors, customers, and suppliers; and the macro level, or the institutional environment, which includes the influence of government, associations, and unions, among other actors (Rodrigues & Child, 2003). Thus, multiple aspects at different levels influence changes in the operations of companies. In summary, this influence comes from a combination of aspects of choice/intention with reinforcement/adaptation at different environmental levels (micro, meso, and macro). A new product or a new process, when intentionally created by the company, may even affect the external competitive environment. One example would be the smartphone, which has created new sectors (such as the applications industry) and changed the way companies in this sector relate to consumers. The product created by Apple influenced other competitors and enabled a network of suppliers to create new products linked to the range of possibilities that arose with the emergence of the smartphone. At the same time, the institutional or competitive environment can also influence changes in the company. Pressures regarding environmental issues or working conditions often force companies to modify their operations, to comply either with legislation (government influence) or with pressure from society, often on ethical issues. Consumers may no longer accept brands suspected of using child labor at any stage of the supply chain, even in the manufacturing of components in other countries.

INTEGRATING OPERATIONS WITH A CO-EVOLUTIONARY VIEW

The dynamic process close to the concept of exploration, and which characterizes the co-evolutionary view, combines situations of choice and adaptation derived from internal initiatives (micro level) and external influences (meso and macro) (van den Bosch, Volberda, & de Boer, 1999). There are four distinct types in the process of co-evolution, according to Lewin and Volberda (1999): naive selection, managed selection, hierarchical renewal, and holistic renewal.

Naive selection is characterized by inertia or random choices, leading to changes and choices that are often weakly connected to the environment. The change occurs from scarce resources, and there is an attempt to maintain the status quo in the long term, that is, offer the same products and processes. Companies with such characteristics are described in operations management research as internally neutral: the company only minimizes the negative aspects of its operations (Wheelwright & Hayes, 1985), and exploitation processes are prioritized. This type of co-evolution is linked to companies or sectors that lose their competitiveness and may even disappear in the medium or long term. A company that does not adapt to the ongoing changes in the environment may be driven out of the market soon. In a second situation, the company is highly complacent with the inefficiency of its operations. At the limit, we can mention the case of Vale and its method of operations in recent years in Brazil. Despite the existence of safer technologies for dealing with ore waste, which are already used in other countries, it historically prioritized cost and kept its operations unchanged, even with the major risks associated with the use of the upstream technology in its dams. The institutional environment, with high levels of complacency from environmental agencies and local governments, allowed the company to operate for years with outdated technologies, posing a high risk to society. Thus, the Brumadinho and Mariana disasters posed serious questions to Brazil's environmental policy and Vale's ethical issues involving the technologies used in its dams. The institutional environment represented by its different stakeholders has led to an urgent need for the company to reconfigure its operations, as they were pressured to immediately prioritize safety, and not just a cost-based approach that may result in serious consequences for society.

Managed selection presupposes a targeted choice of existing practices, even if performed in a trial and error approach. There is a more complex environment at the micro level that critically analyzes the current period and the existing resources (Galunic & Eisenhardt, 1996). The company seeks to achieve only parity with its competitors, being described as externally neutral (Wheelwright & Hayes, 1985), still emphasizing exploitation processes, but with incipient movements toward building future competencies. Thus, there is an initial concern that leads to exploration processes.

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Fragmented sectors are examples in this case. The customized furniture market in Brazil is an example of this type of co-evolution. Todeschini is the leading company in the Brazilian market. However, those that compete closely with the leader have very similar operations, having their own manufacturing process and exclusive stores and developing customized projects and services for installation and maintenance of the furniture sold. Process technologies, from manufacturing to marketing, are disseminated among the main companies in the sector. More specific technologies, such as the project software used, are not exclusive. Thus, what varies between companies and their different brands would be the value proposition and the consequent positioning of the company in the market. Automation in manufacturing is another example of change promoted by these companies in recent years and that is disseminated today among market leaders. The influences are primarily at the meso level, arising from the competitive environment. Thus, the fierce competition leads companies to adopt new operational processes that are often already used by their competitors or that they can adopt in the short term.

In the hierarchical renewal, there is a clear strategic intent to choose the practices and competencies that change the company's operations. There is a balance between the efficient use of internal resources (exploitation) and the presence of actions aimed at building the future (exploration). In this situation, the changes reflect the strategic orientations of the business and not only the search for competitive parity with competitors. There is a top-down orientation in which the co-evolutionary process is mostly rational and proactive and have monitored goals. The different business units access practices and competencies often within and between units, with the aim of achieving organizational goals. Natura is as an example of a company that encompasses this kind of co-evolution. Its business strategy clearly has a sustainability orientation. The changes that drive the operational area begin internally with direct action by senior management and management leaders (Hashiba & Paiva, 2016). At the competitive level, the company strongly influences its network of suppliers with its sustainability strategy orientation. Some suppliers of natural products, such as communities that live in Amazon regions, also influence the company with specific knowledge about local products and components. At the macro level, in addition to complying with environmental legislation, the company anticipates future trends, such as the elimination of product testing with animals. Therefore, the company develops operational actions that continuously support its business strategy, thus being characterized as internally competitive.

Holistic renewal presupposes collective learning among the different levels of the company, rather than the notably top-down orientation of hierarchical renewal. In this case, there is cyclical renewal that covers the various levels of the business developed between periods of stability and renewal. Thus, it is similar to the concept of dynamic capabilities (Teece & Pisano, 1994). In this situation, companies are usually proactive in changing their operations, seeking constant development and improvement of their skills. The processes of exploitation and exploration are combined (Kortmann et al., 2014). The company can create new competitive standards that often lead to changes in the competitive environment, that is, suppliers, consumers, and competitors are influenced by the new ways of competing created by the company.

According to Huygens et al. (2001), the most competitive companies are always proactive in the development of new competencies and ways to compete, while their competitors try to replicate these competencies based on available technologies if they are identified as capable of creating competitive advantage. In this situation, the constant search for competitive parity can lead to the rapid erosion of created competitive advantages (Lewin & Volberda, 1999).

An example of this is Amazon, which has been revolutionizing retail for decades. The company was a pioneer in e-commerce and caused profound changes in several sectors, starting with the book segment. Traditional networks of bookstores have faced increasing difficulties even in Brazil due to the profound changes in the publishing market. Amazon combined variety with competitive prices through e-commerce. Over time, it took over the distribution and logistics operations and expanded its business to a wide range of products, such as household appliances, clothing, and household utensils. With highly automated distribution centers, it has anticipated trends in its industry and achieved not only variety and competitive pricing, but also faster and more reliable deliveries. The constant interaction with its competitive environment and the leverage from its internal resources has led the company to seek to serve its consumers, expanding its network of suppliers and partners. For years, the company has maintained a prominent position in the e-commerce industry. Retail automation is its latest competitive move. Thus, by revolutionizing e-commerce, the company has become a reference for other companies in its segment as well as outside. At the beginning of its operations in Brazil, the local tax legislation was reinterpreted as tax generation to adapt to the new business model in expansion at the time. Thus, we see that the company creates new ways of competing that influence both the competitive level (meso) and the institutional level (macro), creating a continuous process of creation and adjustment of its competencies and operations.

DISCUSSION

Are there intermediate situations between the types described? The examples used for each type of co-evolution were described using the Weberian approach of ideal models. However, even in these cases, some characteristics may be more or less close to each type. Thus, a company or even a sector may have intermediate characteristics between one type of co-evolution and another.

Companies such as Zara of Spain, seem to represent this situation. Zara has several characteristics that bring it closer to the last two types of co-evolution. It has developed integrated operations between its design department, its own store network, and its distribution centers with a high level of automation, thus combining fast responses to the market with low inventory levels. Therefore, several changes in their operations were influenced by the micro and meso levels, which built and changed their competencies over the decades. At the same time, the company has been accused of indirectly using slave labor in second-order suppliers. The pressures of labor legislation and consumers taking place in their main markets bring elements of the most primary types of co-evolution, characterized especially by the disconnection of the company with the macro levels of the environment. Although highly competitive, the company can have its image weakened, and consequently, the business as a whole, if future actions do not eliminate such problems. Brand boycott movements started on social networks when such problems surfaced. Companies less susceptible to changing their operations in situations such as this, or that which ignore current technological advances are subject to loss of competitiveness in the medium and long term.

CONCLUSIONS

A better understanding of the phenomenon of changes in operations allows operations management research to advance to a perspective closer to the "real world." The closed system view or the view that only considers productivity has historically limited the search in the area and especially the interface with other areas of knowledge. Thus, by combining a broader view of operations with advanced research methods, such as the co-evolution and ambidextrous approach, conditions are created for the development of research capable of combining scientific rigor with academic and practical relevance, which is increasingly important.

The types of co-evolution presented illustrate how companies modify their operations, especially from movements of exploration, that is, in the search for the construction of future competences, and of exploitation, for the reinforcement of existing competencies.

In short, companies or sectors close to the first type of co-evolution have little connection with the external environment, with emphasis placed on exploitation of their resources. This orientation can lead to serious problems of competitiveness if we consider the disconnect with new technologies, that is, at the meso level (competitive), or even disconnect with legal and ethical issues (macro or institutional level). At the most advanced stages, the three levels relate to each other in a dynamic process, with the growing importance of exploration processes, that is, the search for the anticipation of future trends. The company creates new ways to compete, influencing its industrial sector or even other industries. At the same time, the presence in the most advanced types of exploitation actions, allows the company to quickly respond to market advances and the demands and pressures of the institutional environment.

Finally, the co-evolution approach adds a dynamic view to the process of change in operations. Thus, it enriches the understanding of the phenomenon and allows that studies of a given area interact more directly with studies of other areas of research, addressing more practical issues.

REFERENCES

Birkinshaw, J., & Gupta, K. (2013). Clarifying the distinctive contribution of ambidexterity to the field of organization studies. *Academy of Management Perspectives*, *27*(4), 287–298. doi:10.5465/amp.2012.0167

Bosch, F. A. J. van den, Volberda, H. W., & Boer, M. de. (1999). Coevolution of firm absorptive capacity and knowledge environment: Organizational forms and combinative capabilities. *Organization Science*, *10*(5), 551–568.

Bromiley, P., & Rau, D. (2016). Operations management and the resource based view: Another view. *Journal of Operations Management*, *41*, 95–106. doi:10.1016/j.jom.2015.11.003

Galunic, D. C., & Eisenhardt, K. M. (1996). The evolution of intracorporate domains: Divisional charter losses in high-technology, multidivisional corporations. *Organization Science*, *7*(3), 255–282. doi:10.1287/orsc.7.3.255

Hashiba, L., & Paiva, E. L. (2016). Incorporating sustainability in the new product development process: An analysis based on the resource-based view. *BASE-Revista de Administração e Contabilidade da Unisinos*, *13*(3), 188–199. doi:10.4013/base.2016.133.01

Hayes, R. H., & Pisano, G. P. (1996). Manufacturing strategy: At the intersection of two paradigm shifts. *Production and Operations Management*, *5*(1), 25–41. doi:10.1111/j.1937-5956.1996.tb00383.x

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ISSN 0034-7590

Hitt, M. A., Xu, K., & Carnes, C. M. (2016). Resource based theory in operations management research. *Journal of Operations Management*, *41*, 77–94. doi:10.1016/j.jom.2015.11.002

Huygens, M., Bosch, F. A. van den, Volberda, H. W., & Baden-Fuller, C. (2001). Co-evolution of firm capabilities and industry competition: Investigating the music industry, 1877–1997. *Organization Studies*, *22*(6), 971–1011.

Kristal, M. M., Huang, X., & Roth, A. V. (2010). The effect of an ambidextrous supply chain strategy on combinative competitive capabilities and business performance. *Journal of Operations Management*, *28*(5), 415–429. doi:10.1016/j.jom.2009.12.002

Kortmann, S., Gelhard, C., Zimmermann, C., & Piller, F. T. (2014). Linking strategic flexibility and operational efficiency: The mediating role of ambidextrous operational capabilities. *Journal of Operations Management*, *32*(7–8), 475–490. doi:10.1016/j.jom.2014.09.007

Lewin, A., & Volberda, H. (1999). Prolegomena on coevolution: A framework for research on strategy and new organizational forms. *Organization Science*, *10*(5), 519–534.

March, J. (1994). The evolution of evolution. In J. Baum, & J. Singh (Eds.), *Evolutionary dynamics of organizations* (pp. 39–52). New York, NY: Oxford University Press.

O'Reilly, C. A., III, & Tushman, M. L. (2004). The ambidextrous organization. *Harvard Business Review*, *82*(4), 74.

Rodrigues, S., & Child, J. (2003). Co-evolution in an institutionalized environment. *Journal of Management Studies*, *40*(8), 2137–2162. doi:10.1046/j.1467-6486.2003.00415.x

Teece, D., & Pisano, G. (1994). The dynamic capabilities of firms: An introduction. *Industrial and Corporate Change, 3*(3), 537–556. doi:10.1093/icc/3.3.537-a

Wheelwright, S. C., & Hayes, R. H. (1985). Competing through manufacturing. *Harvard Business Review*, *63*(1), 99–109.

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