# The Relationship between Dynamic Capabilities and Firm Performance

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## Informação e Sistemas Empresariais

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# Resumo

Nas últimas décadas, entre os investigadores da área da gestão estratégica, a importância atribuída às Capacidades Dinâmicas tem vindo a crescer sobretudo em contextos muito dinâmicos, devido ao papel que têm revelado na forma como as organizações reajustam todos os seus recursos e competências, como reacção e constante readaptação, ao ambiente cada vez mais volátil em que operam e como isso impacta no seu Desempenho e sustentabilidade como negócio.

O objectivo desta tese é caracterizar a relação entre Capacidades Dinâmicas e o Desempenho empresarial, por isso foi necessário verificar o estado da arte da pesquisa sobre esta questão. Para isso, foi feita uma revisão sistemática da literatura de estudos empíricos que exploram a relação actual entre estas Capacidades e o Desempenho. Um total de 44 artigos com suporte empírico, foram incluídos nesta revisão, focados principalmente na exploração das relações entre as Capacidades Dinâmicas (relacionando-se com outras variáveis) e o seu impacto no Desempenho da empresa.

A revisão revelou, em geral, que existe uma forte evidência empírica a suportar o impacto positivo das Capacidades Dinâmicas, directa e indirectamente, no Desempenho das empresas. Destaca-se a importância da relação entre as Capacidades Dinâmicas da organização, como estas surgem e como se interrelacionam com outros recursos, capacidades e o ambiente externo. Cada organização deve procurar seu próprio conjunto de Capacidades Dinâmicas, considerando o seu contexto específico (interno e externo), coerente com os seus objectivos.



## Palavras-chave

Capacidades Dinâmicas; Vantagem Competitiva; Desempenho; Revisão Sistemática de Literatura.

# Abstract

In recent decades, among researchers in the field of strategic management, the importance given to dynamic capabilities (DCs) has been growing specially in very dynamic contexts, due to the role they have revealed in the way organizations readjust all their resources and competences as a reaction, and constant re-adaptation, to an increasing volatile environment in which they operate, and how this impacts their performance and sustainability as a business.

The aim of this thesis is to characterize the relationship between DCs and firm Performance so it was necessary to check the state of the art of the research concerning these issues. A systematic literature review (SLR) of empirical studies exploring the current relationship between DCs and Performance was made for this purpose. A total of 44 research papers were included in this SLR mainly focused in the exploration of the relationships between DCs (interrelating with several other variables) and their impact on firm Performance.

The SLR revealed, in general, that there is a strong empirical evidence to support the positive impact of DCs, both directly and indirectly, in firms Performance. It is highlighted the importance of the relationship between the organization's DCs, how they emerge and how they interrelate with other resources, capabilities and the external environment. Each organization must seek for its own set of DCs, considering its specific context (internal and external), coherent with its goals.



## Keywords

Dynamic Capabilities; Competitive Advantage; Performance; Systematic Literature Review.

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# Acronyms

BDA: Big Data Analytics
BDAC: Big Data Analytics Capability
CA: Competitive Advantage
DC: Dynamic Capability
DCV: Dynamic Capabilities View
DT: Digital Transformation
EMF: Emerging-market Firm
HR: Human Resources
IS: Information System
IT: Information Technology
PDC: Process-Oriented Dynamic Capability
R&D: Research and Development
RBV: Resource-based View
RQ: Research Question
SCA: Supply Chain Agility
SCI: Supply Chain Integration
SLR: Systematic Literature Review
SME: Short and Medium sized Enterprise
UK: United Kingdom
USA: United States of America
VRIN: Valuable, Rare, Inimitable and Non-substitutable

# 1. Introduction

In an environment of increasing volatility, companies face increasing challenges, to which they have to react and (re)adapt, arising from a constantly changing reality. In addition to having to adapt to increasingly global and demanding markets, and an increasingly heterogeneous and also more demanding set of stakeholders, the company must look for a unique and inimitable combination of resources and outcomes in order to achieve a competitive advantage (CA) and ensure a superior Performance for the business.

In this scenario, it is not surprising that researchers in the areas of business management and business strategy, as well as in the area of information technologies, have gained, in recent years, a greater awareness that Dynamic Capabilities (DCs) are extremely important due to the impact they can have on the competitiveness of a company, being fundamental for its performance and sustainability as a business. Therefore, the concept of DCs is often associated with those of CA and Performance and the number of research studies concerning these relationships has been increasing.

For example, in the last years, climate change has made ecological awareness increase in public opinion and this has put pressure on states and world organizations, such as the European Union, to create rules and regulations that, for instance, limit polluting emissions. This has caused, and will continue to cause, profound changes in transport, industry, agriculture, services, etc. In the specific case of the automotive industry, we are all aware of the impact that these standards have had on the technology incorporated in today's cars and the constant changes they have been causing over time. In this context, companies have to react strategically, quickly and assertively, to meet the market, not neglecting all other stakeholders, and ensuring the sustainability of the business.

More recently we have experienced the disruptions in the global supply chain that started after the World Health Organization declared the coronavirus disease outbreak to be global health emergency at the end of January 2020. Such a crisis affects the supply network at the source and destination, has extreme effects on global supply chain. Globally, organizations have been shutting down shops, deleting orders, and suspending production. Some sectors like garment, mining, jewelry, and automobiles have been suffering as the employees in these sectors are among the most vulnerable and being affected by the pandemic [Magableh GM. (2021)].

Afterwards, the quick reopening of economies and the lifting of pandemic-related restrictions led to a strong increase in aggregate demand, underpinned by pent-up demand and increased savings. Consumers and businesses started spending what they could not before due to the quarantines and the lockdowns imposed by governments to contain the pandemic. Unfortunately, aggregate supply failed to meet this increased aggregate demand due to the global value chain disruptions and world trade frictions caused by the pandemics. Gradually, the main factor behind rising inflation came to be the higher energy prices and transport costs, after the abrupt surge in global demand for energy, as the economies exited fast the recession of 2020. Especially after the Russian invasion of Ukraine and

because of the ongoing war, energy prices and inflation increased further, giving rise to reasonable concerns about the anchoring of inflation expectations [Catiforis, Christos (2022)].

The aim of this thesis is to characterize, as accurately as possible, the relationship between DCs and firm Performance. To achieve that it was necessary to check the state of the art of the research concerning the impact of DCs in firms Performance and its relationship with other mediator/moderator variables. Therefore, a systematic literature review (SLR) of empirical studies exploring the current relationship between DCs and Performance was made for this purpose. A total of 44 research papers were included in this SLR mainly focused in the exploration of the relationship between DCs (interrelating with other variables) and their impact on firm Performance. This research focuses on the effect caused by the interrelation between different variables (such as external environmental elements, several firm resources, specific skills, technologies, routines, management orientations, level of entrepreneurship, etc.) and DCs, and the way that effect impacts on firm Performance.

This thesis is structured as follows. Chapter 2 presents the research background with an explanation of the concepts of DC, CA and Performance according to several scholars. Chapter 3 explains the chosen research methodology (SLR). Chapter 4 describes the motivation for this research, the addressed research question (RQ) and the review protocol. Chapter 5 presents the application of the review protocol and the data extraction results. Chapter 6 presents the findings from the review and the answer to the research question. Chapter 7 concludes this document, including its contributions for theory and practice, its limitations as well as guidelines for future work.

# 2. Research background

## 2.1 Dynamic Capabilities

As stated by Porter (1990), only firms themselves can achieve and sustain a CA through recognizing the “uncomfortable truth” that innovation grows out of pressure and challenge and it takes leadership to create a dynamic and challenging environment. CA arises from the leadership that amplifies the adequate “forces” (internal and external) to promote innovation and upgrading [Porter ME (1990)]. Also, the most important agglomeration economies are dynamic rather than static efficiencies and revolve around the rate of learning and the capacity for innovation [Porter ME (1996)].
DCs are defined, in the literature, as the firm's ability to integrate, build, and reconfigure internal and external competences to address rapidly changing environments. DCs thus reflect an organization's ability to achieve new and innovative forms of CA given path dependencies and market positions. The term 'Dynamic' refers to the capacity to renew competences so as to achieve congruence with the changing business environment; certain innovative responses are required when time-to-market and timing are critical, the rate of technological change is very fast, and the nature of future competition and markets difficult to determine. The term 'Capabilities' emphasizes the key role of strategic management in appropriately adapting, integrating, and reconfiguring internal and external organizational skills, resources, and functional competences to match the requirements of a changing environment [David J. Teece, Gary Pisano, & Amy Shuen (1997)].

Considering the RBV, firm resources include all assets, capabilities, organizational processes, attributes, information, knowledge, etc, controlled by a firm that enable the firm to conceive of and implement strategies that improve its efficiency and effectiveness. Some studies suggest that firms obtain a CA by implementing strategies that exploit their internal strengths, through responding to environmental opportunities, while neutralizing external threats and avoiding internal weaknesses [Barney J. (1991)].

The functionality of DCs can be duplicated across firms because their value for CA is in the different resources configurations they can create, not in the capabilities themselves. DCs are necessary, but not sufficient, to achieve a CA, so they can be used to enhance existing resource configurations in the pursuit of a sustained CA [Kathleen M. Eisenhardt & Jeffrey A. Martin (2000)]. A resource can be defined as an “input to production (tangible or intangible) that an organization owns, controls, or has access to on a semi-permanent basis,” a “capability refers to the ability of an organization to perform a coordinated set of tasks, utilizing organizational resources, for the purpose of achieving a particular end result” [Helfat and Peteraf (2003)].

For analytical purposes, DCs can be disaggregated into the capacity to sense and shape opportunities and threats, to seize opportunities, and to maintain competitiveness through enhancing, combining, protecting, and, when necessary, reconfiguring the business enterprise’s intangible and tangible assets. DCs include difficult-to-replicate enterprise capabilities required to

adapt to changing customer and technological opportunities. They also embrace the enterprise's capacity to shape the ecosystem it occupies, develop new products and processes, and design and implement viable business models [Teece, David J. (2007)].

Newbert (2008) finds evidence that the competencies and DCs that a firm cultivates are useful for improving organizational Performance and the access to resources facilitates better market Performance. More specifically, it seems that access to physical resources as well as access to capabilities that enable the exploitation of both the firm's human resources and its organizational resources may enable firms to attain an advantage over its competitors with respect to external indicators such as growth in sales, profitability and market share [Newbert, Scott L. et al. (2008)].

More recently some researchers, like Schilke (2014), have made a distinction between a first-order and a second-order DCs. Basically, the first-order DCs are identified as the routines that reconfigure the organizational resource base, and the second-order DCs are the routines that reconfigure the first-order DCs. With the introduction of this distinction it is enhanced the theoretical precision by specifying what it is that the organizational routine aims to change. One of the distinctive features of second-order DCs is that they do not improve performance directly but rather work indirectly by embedding first-order DCs into the firm. This logic suggests a mediation model, with first-order DCs mediating the impact of second-order DCs on Performance [Schilke Oliver (2014)].

As noted by Fabrizio (2021), despite countless studies where it's observed that DCs are at the root of CA, there's still limited knowledge about how access to company based resources and changes in these factors affect the development of dynamic resources. It is important to highlight that changes in resource bases have a more influential role in the development of DCs than resource stock variables measured at an earlier stage of company development. This provides empirical support for the notion of treating a company as having a dynamic flow of resources rather than a static stock [Fabrizio CM, Kaczam F, de Moura GL, da Silva LSCV, da Silva WV, da Veiga CP (2021)].

## 2.2 Competitive Advantage and firm Performance

According to Barney and Hesterly (2010), CA can be seen as a company's entrepreneurial capacity to generate greater economic value than its rivals, that is, to distinguish itself from its competitors. Different resources and capabilities can create and sustain a CA and can affect business Performance [Barney, J. B., & Hesterly, W. S. (2010)].

Also, other researchers like Morgan and Strong (2003), stated that firms emphasizing aggressiveness, proactiveness, and riskiness in strategic orientation need to examine the costs of maintaining competitive strategy versus the payoff in short-term, intermediate, and long-term Performance attributes. This should form a key issue in firms review tasks and performance diagnoses [Morgan RE, Strong CA (2003)]. Once there were identified Performance gaps between organizational goals and realized outcomes that will need to be addressed concerning competitive posture, marketplace

opportunity, and more importantly, the composition of optimal resource base, capabilities and strategic orientation to ensure business Performance improvement [Kaplan RS, Norton DP (1996)].

Intuitively, and according to [Baia E, Ferreira JJ, Rodrigues R. (2020)] CA and Performance are strongly related and therefore very often used as synonyms, although conceptually distinct. CA is conceptualized as the implementation of a unique value-creating strategy, dependent on the efficient exploitation of resources and capabilities and their combinations (RBV), which facilitate cost reduction, exploitation of market opportunities, and/or neutralization of competitive threats [Barney J. (1991)]. According to [Ma (2000)] we can argue that CA, since it helps a firm create value for its customers, it contributes directly to firm Performance through cost advantage and differentiation advantage. Also, CA, be it discrete or compound, resource-based or market-positioned-based, is expected to be positively related to firm Performance [Ma, Hao (2000)].

CA can be measured by subjective indicators [Griffith, Noble, & Chen (2006)], or by objective measures [Zhang (2007)]. Other researchers have used a combination of objective and subjective measures [Morgan, Vorhies, & Mason (2009)]. The reputation has an important role in value creation and CA [Sheehan & Stabell (2010)]. A company achieves CA when it creates more value for the customers than competitors, so that the customers find that company's products and services better than the competitors. Creating value can be achieved through the supply of products and services with lower price or higher quality, or more benefits. CA is measured in terms of cost, quality, competence and speed [Ambe (2010)]. The dimensions of employee empowerment have a significant positive effect on CA [Kahreh, Mohammad Safari, et al. (2011)].

CA can be identified as the rate of return higher than the average [Wang & Ahmed (2007)]. In terms of Performance, CA can operate alone or in a combination of multiple advantages interacting with each other as an integrated entity. In first case, it is considered as the sustainable CA; and in connection with time, it has a long-lasting function time and easily accessible by competitors [Kumar & Pansari (2016)].

Performance can be defined as the final economic rent accrued by a firm, as a result of the implemented strategy and its realization, typically measured, in conventional (financial) terms, by indicators such as market share, sales growth, and profitability [Baia E, Ferreira JJ, Rodrigues R. (2020)]. There are also scholars, like [Santos, Juliana Bonomi, and Luiz Artur Ledur Brito (2012)] that conducted research using a multidimensional view of Performance where it is defined, besides the financial Performance, a 'Strategic Performance' construct that includes items like 'customer satisfaction', 'quality', 'innovation', 'employee satisfaction' and 'reputation'. This leads to a wider concept of firm Performance that implies to measure: 'Profitability', 'Market Value', 'Growth', 'Employee Satisfaction', 'Customer Satisfaction', 'Environmental Performance' and 'Social Performance' [Santos, Juliana Bonomi, and Luiz Artur Ledur Brito (2012)].

Figure 1 illustrates the theoretical core concepts, and their interrelations, behind this thesis. (This figure was my own creation based on the analyzed theoretical concepts).

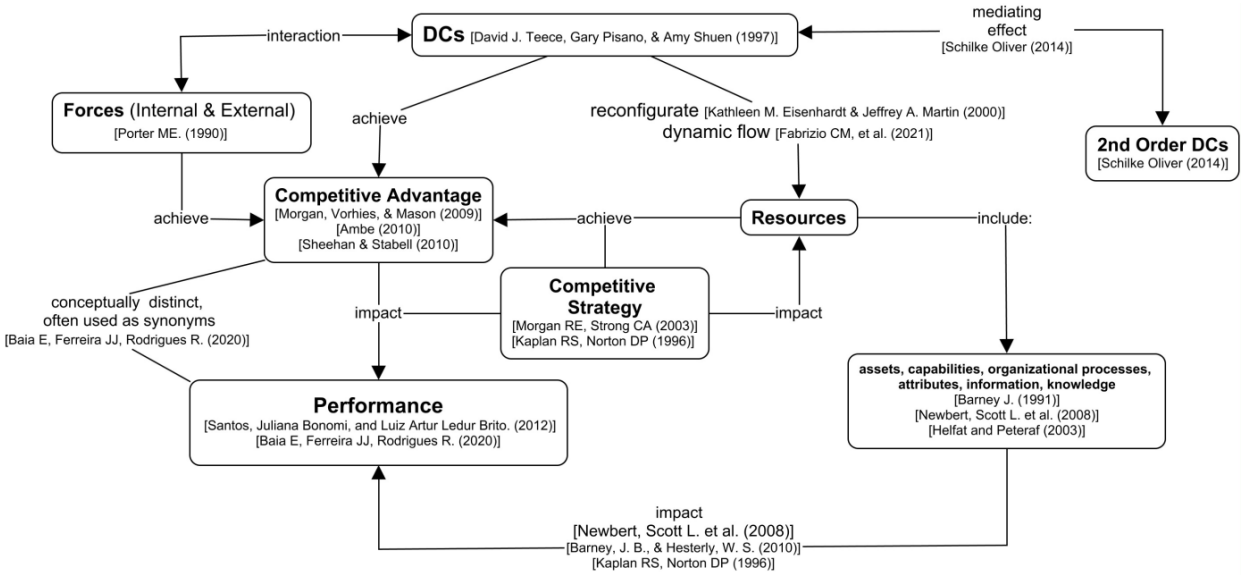


**Figure 1:** Theoretical background for this thesis

# 3. Research methodology

In this section it is described the Research Methodology used to prepare this thesis.

## 3.1 Systematic Literature Review (SLR)

Since the objective of this thesis is to characterize the relationship between DCs and firm Performance it was necessary to assess the state of the art with regard to research on the theme of the impact of DC on CA and Performance, then it seemed interesting to choose the systematic literature review (SLR) methodology according to the procedures from the paper 'Guidelines for performing systematic literature reviews in software engineering' [Kitchenham, B., & Charters, S. (2007)]. Figure 2 shows the steps of the SLR adapted to this particular case.

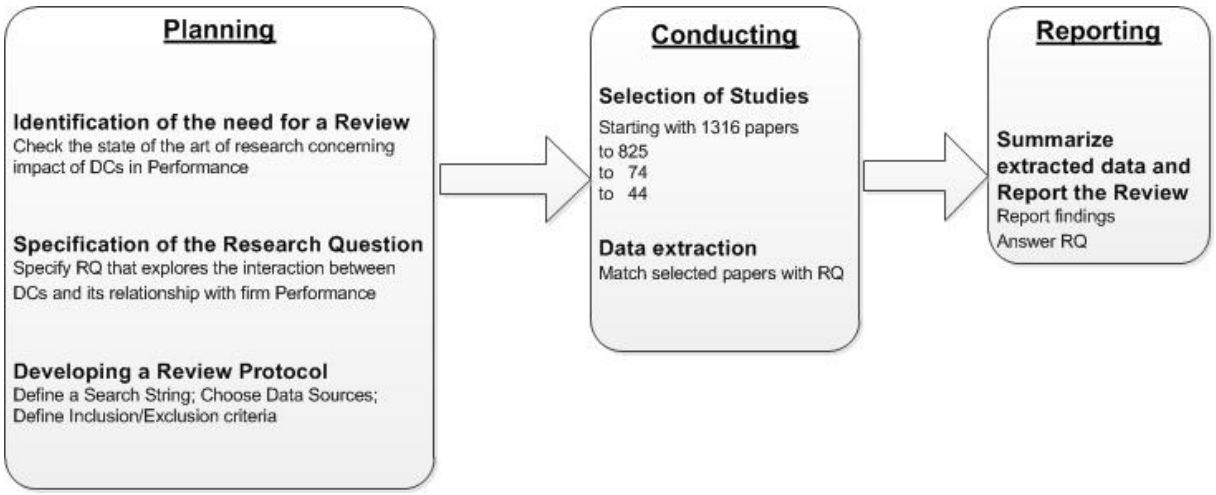


**Figure 2:** SLR adapted to this research

# 4. Planning the Review

In this chapter it is described the first part of the SLR Methodology. Firstly it's presented the motivation for this research. Then it's presented the Research Question (RQ) and finally the Review Protocol that was developed.

## 4.1 Research Motivation

In a constantly changing environment, and at an increasingly high pace, companies are faced with challenges that jeopardize their performance and their own sustainability as a business. Understanding how all internal mechanisms, such as DCs, interrelate with each other and how they relate to the company's external environment and impact its Performance and sustainability is a work that will always be in progress. For example, if we think about how disruptive digitization has been, in its most varied forms, that completely transformed the way many businesses, markets and even many aspects of today's economy work, we are left with the clear notion that the better we know the mechanisms that affect the internal functioning of a company, as it interrelates with its external environment, will be an asset.

The most recent events, such as the covid-19 pandemic, the invasion of Ukraine and the energy crisis, and their side effects on the economy represent very demanding challenges for companies and, therefore, to understand the mechanisms through which organizations can adapt more quickly to new circumstances, ensuring the performance expected by its stakeholders, seems to be fundamental.

This is an environment of constant turmoil where the role of DCs, the way they interrelate with each other and with all other corporate resources as well as with external factors, seems to be fundamental. The better we understand how DCs work and how they impact business Performance and sustainability, the better.

## 4.2 Research Question

This SLR included a range of empirical studies, exploring the impact of DC in CA and firms Performance. Therefore, researches that merely presented a proposed framework or research design without any empirical assessment were omitted from the SLR. Basically, the SLR only included studies that have explored and examined data collected directly from companies through surveys or case studies.

This SLR aimed to answer the following research question (RQ): **How can we characterize the relationship between DCs and firm Performance?**

## 4.3 Review protocol

This review protocol includes: searching for papers concerning DCs and (Performance or CA); using Boolean AND/OR for linking the key terms like ‘dynamic capabilities’, ‘performance’, ‘competitive advantage’. According to research literature, CA and Performance are strongly related and therefore very often used as synonyms [Baia E, Ferreira JJ, Rodrigues R. (2020)] [Ma (2000)], so the key term ‘competitive advantage’ was also included in the search string in order to get a wider, and enriched, range of papers.

The following search string was then defined to search for the appropriate literature: ‘dynamic capabilities’ AND (‘performance’ OR ‘competitive advantage’). The search procedure involved the use of the digital online library EBSCO.

### 4.3.1 Inclusion/Exclusion Criteria

In this SLR, the following inclusion criteria were applied: studies exploring the impact of DCs in CA and firm Performance; studies with empirical assessment and English written papers, peer reviewed and with full text available in the assessed virtual library.

Regarding the exclusion criteria, studies that failed to provide any empirical evidence, as well as other studies that merely provided assumptions or opinions or descriptive frameworks without any empirical evidence were all omitted (which means that other SLRs were not considered either).Thesis were also excluded as well as some studies that provided empirical evidence from a very particular sector or economy, without global relevance. Some papers that did not focus on both DC and Performance were not included either. Table 1 resumes the inclusion/exclusion criteria.

**Table 1:** The Inclusion and Exclusion criteria

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| Studies, published between 2010 and 2022, exploring the relationship between DCs and Performance | Studies not focused in the relationship between DCs and Performance |
| Written in English | SLRs and Thesis |
| Peer reviewed | Without empirical evidences |
| With full text available | Studies with evidence only from a very particular sector or economy (without global relevance) |

# 5. Conducting the Review

This chapter shows the results of the SLR.

## 5.1 Selection of Studies

Using the defined search string in the virtual library EBSCO a total of 1316 papers were retrieved from the search process. After excluding the duplicates, there were left 825. After reading abstracts and applying the exclusion criteria, remained 74 papers. After reading full text, and apply the exclusion criteria to these 74 papers, a total of 44 were accepted for evaluation.

## 5.2 Extraction Analysis

Figure 3 summarizes the different phases of the SLR while Table 2 presents the selected papers for inclusion. Figure 4 shows the number of papers per year of publishing.

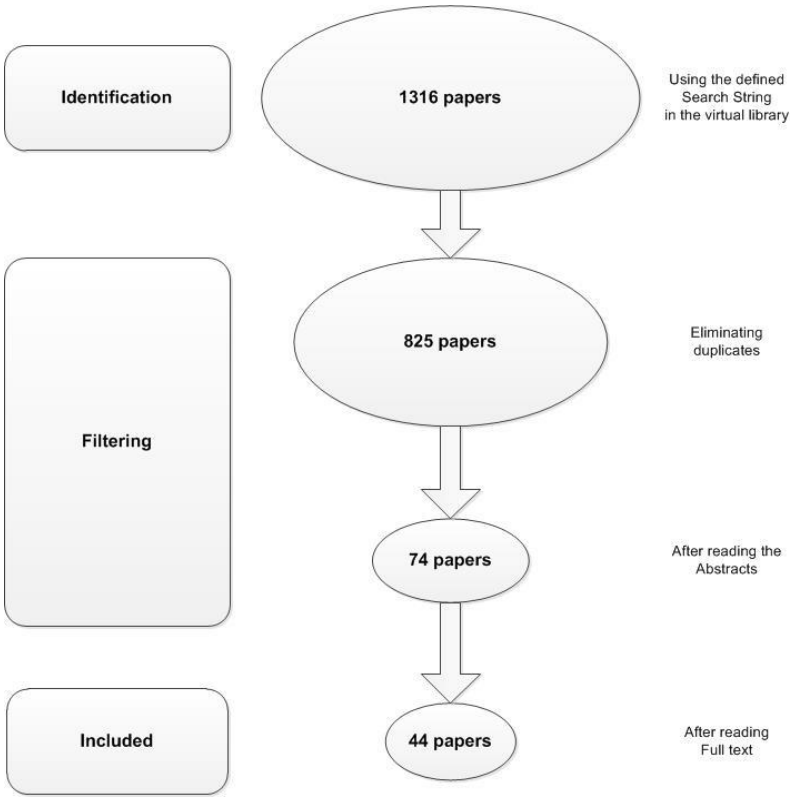


**Figure 3:** The different phases of the SLR

**Table 2:** The 44 papers included in the SLR

| Paper (Ref.) | Methodology | Data's Country | Data's Sector | Year of publishing |
|---|---|---|---|---|
| [Abu-Rumman, Ayman, et al. (2021)] | Survey | Jordan | Professional services | 2021 |
| [Dejardin, Marcus, et al. (2022)] | Survey | Portugal | Various | 2022 |
| Dias, Álvaro Lopes et al. (2020)] | Survey | Portugal and Brazil | Various | 2020 |
| Dias, Álvaro, and Pereira, Renato. (2017)] | Survey | Portugal | Various | 2017 |
| [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)] | Survey | Chile | Various | 2011 |
| [Eikelenboom, Manon, and Gjalt de Jong. (2019)] | Survey | Netherlands | Various | 2019 |
| [Eslami, Mohammad H., et al. (2021)] | Survey | Sweden | Manufacturing | 2021 |
| [Ferreira J, Cardim S, Coelho A. (2020)] | Survey | Portugal | Various | 2020 |
| [Ferreira J, Coelho A, Moutinho L. (2020)] | Survey | Portugal | Various | 2020 |
| [Ferreira, Jorge, Sofia Cardim, and Frederico Branco. (2018)] | Survey | Portugal | Various | 2018 |
| [García-Morales, Víctor Jesús, et al. (2012)] | Survey | Spain | Automotive & Chemical Indusrty | 2012 |
| [Girod, Stéphane JG, and Richard Whittington. (2017)] | Case Study | USA | Various | 2017 |
| [Gölgeci, Ismail, et al. (2019)] | Survey | Turkey | Industrial | 2019 |
| [Jiang, W., Chai, H., Shao, J., & Feng, T. (2018)] | Survey | China | Industrial | 2018 |
| [Khaligh, Alireza Abdolhosseini, et al. (2020)] | Survey | Iran | Electronics | 2020 |
| [Khan KU, Atlas F, Xuehe Z, Khan F, Khan S. (2020)] | Survey | China | Industrial | 2020 |
| [Kim, Gimun, et al. (2011)] | Survey | South Korea | Various | 2011 |
| [Ko, Wai Wai, and Gordon Liu. (2017)] | Survey | UK | Technology | 2017 |
| [Li, Da-yuan, and Juan Liu. (2014)] | Survey | China | Various | 2014 |
| [Li, Lixu, et al. (2022)] | Survey | China | Manufacturing | 2022 |
| [Lin, Yini, and Lei-Yu Wu. (2014)] | Survey | Taiwan | Various | 2014 |

| | | | | |
|---|---|---|---|---|
| [Liu, Hefu, et al. (2012)] | Survey | China | Industrial | 2012 |
| [Mathivathanan D, Govindan K, Haq AN. (2017)] | Survey | India | Industrial | 2017 |
| [Mikalef P, Krogstie J, Pappas IO, Pavlou P. (2020)] | Survey | Norway | Various | 2020 |
| [Mikalef P, Pateli A. (2017)] | Survey | Several / International | Various | 2017 |
| [Mikalef, Patrick, Adamantia G. Pateli, and Rogier van de Wetering. (2016)] | Survey | Several / International | Various | 2016 |
| [Mikalef, Patrick, Adamantia Pateli, and Rogier van de Wetering. (2021)] | Survey | Several / International | Various | 2021 |
| [Monferrer, Diego, et al. (2021)] | Survey | Spain | Industrial | 2021 |
| [Monteiro, Albertina Paula, Ana Maria Soares, and Orlando Lima Rua. (2019)] | Survey | Portugal | Various | 2019 |
| [Piening, Erk P., and Torsten Oliver Salge. (2015)] | Survey | Germany | Manufacturing & Services | 2015 |
| [Protogerou, Aimilia, Yannis Caloghirou, and Spyros Lioukas. (2012)] | Survey | Greece | Various | 2012 |
| [Pundziene, Asta, Shahrokh Nikou, and Harry Bouwman. (2021)] | Survey | Lithuania | Industrial | 2021 |
| [Rehman, Nabeel, et al. (2020)] | Survey | Pakistan | Manufacturing | 2020 |
| [Santoro, Gabriele, et al. (2019)] | Survey | Italy | Information & Communication technology | 2019 |
| [Schilke, Oliver. (2014)] | Survey | Germany | Chemicals, Machinery & Motors | 2014 |
| [Silva, Rui, and Cidália Oliveira. (2020)] | Case Study | Portugal | Various (innovative) | 2020 |
| [Singh, Sanjay Kumar, et al. (2022)] | Survey | Emirates | Manufacturing | 2022 |
| [Tu Lyu, Qiu Zhao, Huan Lin, Yisong Xu. (2021)] | Survey | China | Manufacturing | 2021 |
| [Valdez-Juárez, Luis Enrique, and Mauricio Castillo-Vergara. (2020)] | Survey | Mexico | Various | 2020 |
| [Wamba, Samuel Fosso, et al. (2017)] | Survey | China | Various | 2017 |
| [Wang, Catherine L., Chaminda Senaratne, and Mohammed Rafiq. (2015)] | Survey | UK | High-Tech | 2015 |
| [Wendra, W., E. T. Sule, J. Joeliaty, and Y. Azis. (2019)] | Survey | Indonesia | Manufacturing | 2019 |
| [Wilden, Ralf, et al. (2013)] | Survey | Australia | Various (large firms) | 2013 |
| [Zhou, Steven S., et al. (2019)] | Survey | China | Various | 2019 |

### 5.2.1 Methodology

Most of the papers, 42, used the methodology 'Survey'. In 2 were used the 'Case study' methodology.

### 5.2.2 Year, Country and Sector

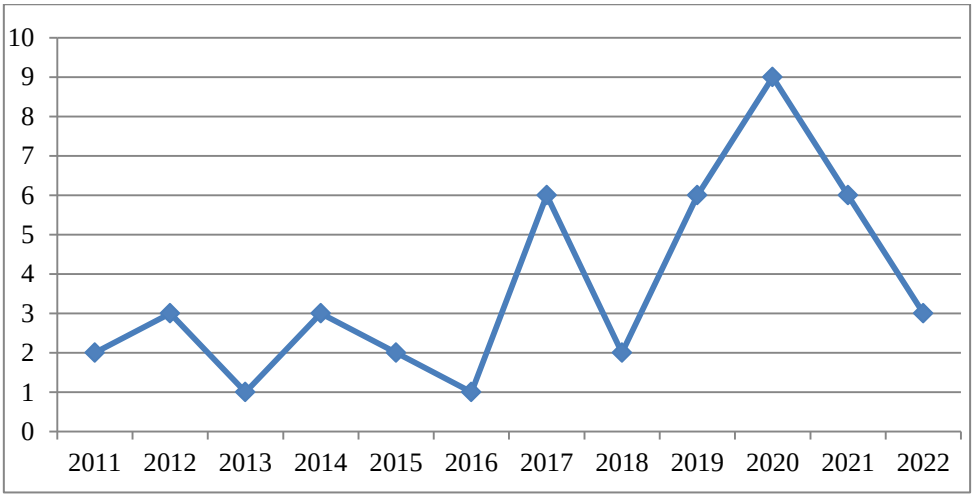


**Figure 4:** The number of papers, included in the SLR, per year of publishing

By analyzing figure 4, we can state that more than half of the included papers have less than 4 years that were published, and only 13 papers have more than 6 years.

By observing table 1 we can realize that 21 papers used data collected from companies across Europe; 8 papers collected data from Chinese firms. Then there is a variety of companies from different countries, used for data samples, like Australia, Chile, Emirates, Jordan, India, Indonesia, Iran, Mexico, Pakistan, USA, South Korea or Taiwan which enriches the research. Also, 3 papers use data from international companies that operate worldwide.

There are also samples from a very wide range of activity sectors such as industry, manufacturing, services, automotive, chemicals, electronics, high-tech. Also, most of the papers selected a sample with a very diverse range of various activity sectors.

# 6. Reporting the Review

In this chapter, and through its several sections, it will be answered the formulated **RQ**: **How can we characterize the relationship between DCs and firm Performance?**

In table 3 are shown all the **DCs** and other **Variables** (from internal and external origin) identified and tested by each paper, as well as the **'Total impact on Performance'** (that results from the effect of each DC and each Variable on Performance, with the combined effect from the interrelation DCs-Variables).

**Table 3**: DCs, Variables (internal & external) and total impact on Performance

| Paper (Ref.) | DCs | Variables | | Total Impact on Performance |
|---|---|---|---|---|
| | | Internal origin | External origin | |
| [Abu-Rumman, Ayman, et al. (2021)] | DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring) | Entrepreneurial Orientation | Entrepeneurial network | Direct / Positive |
| [Dejardin, Marcus, et al. (2022)] | Sensing; Conceptualizing; Coproducing and orchestrating; Scaling and stretching | | covid-19 pandemic crisis | Direct & Indirect / Positive & Negative |
| [Dias, Álvaro Lopes et al. (2020)] | Strategic Decision Flexibility; HR Capabilities on supporting dynamic decision making | Entrepreneurship; Knowledge Management | | Direct & Indirect / Positive |
| [Dias, Álvaro, and Pereira, Renato. (2017)] | Knowledge creation routines and Transfer Processes. | Marketing Capabilities | | Direct & Indirect / Positive |
| [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)] | DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring) | Ordinary Capabilities; Heterogenity of capability | Environmental dynamism | Direct & Indirect / Positive & Negative |
| [Eikelenboom, Manon, and Gjalt de Jong. (2019)] | Internal integrative dynamic capabilities; External integrative dynamic capabilities | Transformational leadership; Manager's perception of sustainability | | Direct & Indirect / Positive, Negative & Neutral |
| [Eslami, Mohammad H., et al. (2021)] | DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring); SCI; SCA | | Industry 4.0 digital technologies | Direct & Indirect / Positive |
| [Ferreira J, Cardim S, Coelho A. (2020)] | Exploitation & Exploration Capabilities | Innovation Capability; Organizational Learning Capabilitiy. | | Indirect / Positive |
| [Ferreira J, Coelho A, Moutinho L. (2020)] | DCs (in general); Exploitation and exploration. | Criativity; Innovation capability. | | Indirect / Positive |
| [Ferreira, Jorge, Sofia Cardim, and Frederico Branco. (2018)] | DCs (in general); Exploration and Exploitation capabilities. | Marketing Capabilities; Innovation Capabilities. | | Direct & Indirect / Positive |
| [García-Morales, Víctor Jesús, et al. (2012)] | Organizational learning; Organizational Innovation | Transformational leadership | | Direct & Indiret / Positive |
| [Girod, Stéphane JG, and Richard Whittington. (2017)] | Reconfiguration & Restructuring | | Environmental dynamism | Direct & Indirect / Positive & Negative |

| | | | | |
|---|---|---|---|---|
| [Gölgeci, Ismail, et al. (2019)] | Innovativeness, supply-chain agility (SCA) and Adaptability | | Institutional distance; Institutional development. | Direct & Indirect / Positive or Neutral |
| [Jiang, W., Chai, H., Shao, J., & Feng, T. (2018)] | Green Entrepeneurial Orientation (it was adopted as DC) | knowledge transfer and integration | green technology dynamism | Direct & Indirect / Positive & Negative |
| [Khaligh, Alireza Abdolhosseini, et al. (2020)] | DCs (in general) | Differentiation; Knowledge-based strategies | | Indirect / Positive |
| [Khan KU, Atlas F, Xuehe Z, Khan F, Khan S. (2020)] | Dynamic Managerial Capabilities ( Human Capital; Social Capital; Managerial Capabilities) | Dominant Logic (Proactivness and Routine) | External Environment | Direct & Indirect / Positive or Neutral |
| [Kim, Gimun, et al. (2011)] | Process-oriented dynamic capabilities | IT Capabilities | | Direct & Indirect / Positive or Neutral |
| [Ko, Wai Wai, and Gordon Liu. (2017)] | DCs (in general); Competence to create new abilities to explore new markets (marketing competence); R&D competence | Environmental strategy | | Direct & Indirect / Positive |
| [Li, Da-yuan, and Juan Liu. (2014)] | DCs (in general) | | Environmental Dynamism | Direct & Indirect / Positive |
| [Li, Lixu, et al. (2022)] | DT-enabled DCs (Digitalization Capabilities; Market capitalizing agility; Operational adjust. agility) | | | Direct & Indirect / Positive |
| [Lin, Yini, and Lei-Yu Wu. (2014)] | Integration; Learning and Reconfiguration. | valuable, rare, inimitable and non-substitutable (VRIN) resources; Non-VRIN resources | | Direct & Indirect / Positive |
| [Liu, Hefu, et al. (2012)] | Absorptive capacity; Supply chain agility (SCA) | Flexible IT infrastructure; IT assimilation | | Direct & Indirect / Positive |
| [Mathivathanan D, Govindan K, Haq AN. (2017)] | DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring) | | | n/a / Positive |
| [Mikalef P, Krogstie J, Pappas IO, Pavlou P. (2020)] | DCs (in general); Operational capabilities | Big data analytics capability; Marketing capabilities; Technological capabilities. | | Direct & Indirect / Positive |
| [Mikalef P, Pateli A. (2017)] | IT enabled dynamic capabilities | Organizational Agility | Environmental uncertainty | Direct & Indirect / Positive |
| [Mikalef, Patrick, Adamantia G. Pateli, and Rogier van de Wetering. (2016)] | IT enabled dynamic capabilities | IT flexibility; IT Governance Decentralization | | Direct & Indirect / Positive |
| [Mikalef, Patrick, Adamantia Pateli, and Rogier van de Wetering. (2021)] | IT enabled dynamic capabilities | IT architecture flexibility; IT governance decentralisation | External environment | Direct & Indirect / Positive |
| [Monferrer, Diego, et al. (2021)] | Ambidextrous DCs (Adaptation; Absorption, Innovation) | Interfirm strategic orientations (Network market orientation; Network entrepeneurial orientation) | | Direct & Indirect / Positive |
| [Monteiro, Albertina Paula, Ana Maria Soares, and Orlando Lima Rua. (2019)] | DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring) | Intangible resources; Entrepreneurial orientation | | Direct & Indirect / Positive |
| [Piening, Erk P., and Torsten Oliver Salge. (2015)] | Breadth of innovation activities: Process Innovation Propensity and Process Innovation Effectiveness | | Environmental Turbulence ( Market turbulence+Technological Turbulence) | Indirect / Positive or Neutral |
| [Protogerou, Aimilia, Yannis Caloghirou, and Spyros Lioukas. (2012)] | DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring) | Operational Capabilities; Marketing Capabilities and Technological Capabilities | Environmental Dynamism | Direct & Indirect / Positive |
| [Pundziene, Asta, Shahrokh Nikou, and Harry Bouwman. (2021)] | DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring) | Open Innovation Capability | | Direct & Indirect / Positive |

| | | | | |
|---|---|---|---|---|
| [Rehman, Nabeel, et al. (2020)] | Absorptive capacity; Corporate Entrepreneurship | IT Capabilities | | Direct & Indirect / Positive |
| [Santoro, Gabriele, et al. (2019)] | DCs (in general); Exploitation and exploration. | Knowledge Management Orientation; Ambidexterity; Ambidextrous entrepreneurial intensity. | | Direct & Indirect / Positive |
| [Schilke, Oliver. (2014)] | Alliance management capability; New product development capability | | Environmental dynamism | Direct & Indirect / Positive or Neutral |
| [Silva, Rui, and Cidália Oliveira. (2020)] | DCs (in general); Innovation | Knowledge; Learning and Growth and Intellectual Capital; Tangible and Intangible resource allocation; Balanced Scorecard | Market Turbulence and Technological Intensity | Direct & Indirect / Positive |
| [Singh, Sanjay Kumar, et al. (2022)] | Green DCs | Green innovation | Stakeholder pressure | Direct & Indirect / Positive |
| [Tu Lyu, Qiu Zhao, Huan Lin, Yisong Xu. (2021)] | Supply chain DCs: supply chain sensing, supply chain agility and supply chain adaptability | | Environmental dynamics | Direct & Indirect / Positive or Neutral |
| [Valdez-Juárez, Luis Enrique, and Mauricio Castillo-Vergara. (2020)] | DCs (in general); Technological Capability | Open Innovation; Eco-Innovation | | Direct & Indirect / Positive or Neutral |
| [Wamba, Samuel Fosso, et al. (2017)] | Process-oriented dynamic capabilities | IT Capability; Big Data Analytics Capability | | Direct & Indirect / Positive |
| [Wang, Catherine L., Chaminda Senaratne, and Mohammed Rafiq. (2015)] | DCs (in general) | Success traps; Firm Strategy | Market dynamism | Direct & Indirect / Negative or Neutral |
| [Wendra, W., E. T. Sule, J. Joeliaty, and Y. Azis. (2019)] | Strategic sensing; Decision making; Change implementation | Intelectual Capital | | Direct & Indirect / Positive |
| [Wilden, Ralf, et al. (2013)] | Sensing, seizing and reconfiguring | Organic Organizational structure | Competitive intensity | Direct & Indirect / Positive |
| [Zhou, Steven S., et al. (2019)] | Sensing, integrating and reconfiguration capabilities | | Technological innovation; Market innovation | Direct & Indirect / Positive or Neutral |

(n/a: not applicable)

## 6.1 Tested DCs and Variables

**Table 4**: The most tested DCs

| DCs | Nº of papers |
|---|---|
| DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring) | ***18*** |
| Exploitation & Exploration | ***4*** |
| IT-enabled DCs | ***4*** |
| SCA | ***4*** |

‘DCs (in general)’ were identified and tested in 18 of the 44 selected papers. ‘Exploitation & Exploration’, ‘IT-enabled DCs’ and ‘SCA’ were studied by 4 papers each. All the other identified DCs were tested by 1 or 2 papers.

**Table 5**: The most tested Variables

| Variables | Nº of papers |
|---|---|
| Environmental dynamism | ***6*** |
| Marketing capabilities | ***4*** |
| Flexible IT infrastructure | ***4*** |
| SCA | ***4*** |
| Innovation capability | ***3*** |

Concerning the Variables, ‘Environmental dynamism’ was tested in 6 papers. ‘Marketing capabilities’, ‘Flexible IT infrastructure’ and ‘SCA’ were studied in 4 papers each. And closing this top 5, ‘Innovation capability’ was tested by 3 papers. All the rest of the Variables were studied in 1 or 2 papers.

‘SCA’ was studied both as a DC and as Variable. In total it was tested in 8 papers. This means that, after ‘DCs (in general)’, it was the most tested by the selected papers, followed by ‘Environmental dynamism’.

In **appendix A** there is a table with all the studied DCs and Variables, and the respective papers where they were tested.

## 6.2 Research Models Typologies

The Research Models represent the type of connection between DCs-Variables-Performance that the researchers wish to test. In other words, they summarize the hypothesis being tested in each paper. These models are also named, depending on the paper, ‘Conceptual model’ or ‘Theoretical framework’ but, in the end, it means the same. Also, in some papers this model is not represented graphically but, by analyzing the hypothesis being tested, the model can be easily deduced.

After studying all the Research Models of the 44 papers it was possible to create 6 main different types and group the papers by each type. Figures 5 to 10 show the different types of Models and the respective papers that can be associated with each typology.

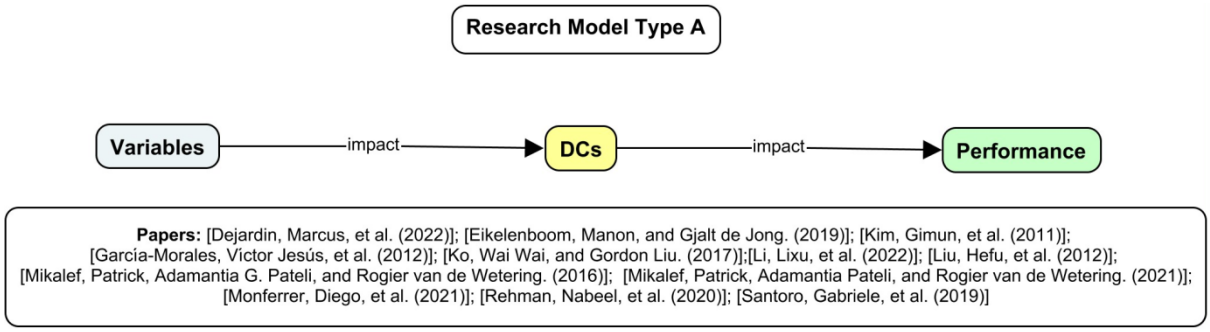


**Figure 5:** Research Model Type A

Figure 5 represents the Research Model type A. It was possible to associate 12 papers to this model which makes it the most used out of the 6 types. This model tests the effect of Variables on DCs and then how the DCs impact on Performance.

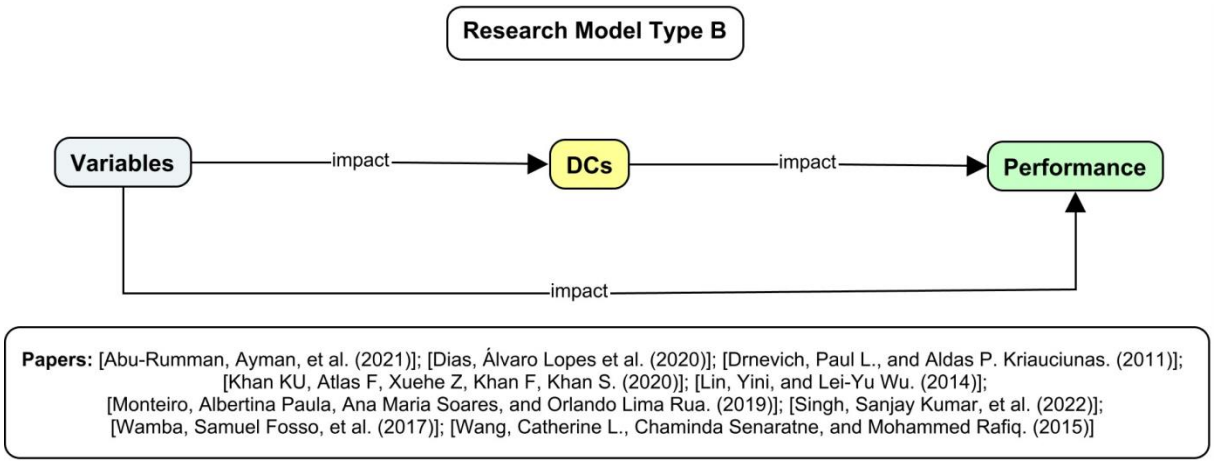


**Figure 6:** Research Model Type B

Research Model type B is represented by figure 6. In this model it is tested the impact of Variables both on DCs and on Performance directly, as also the impact of DCs on Performance. There are 9 papers included in this typology.

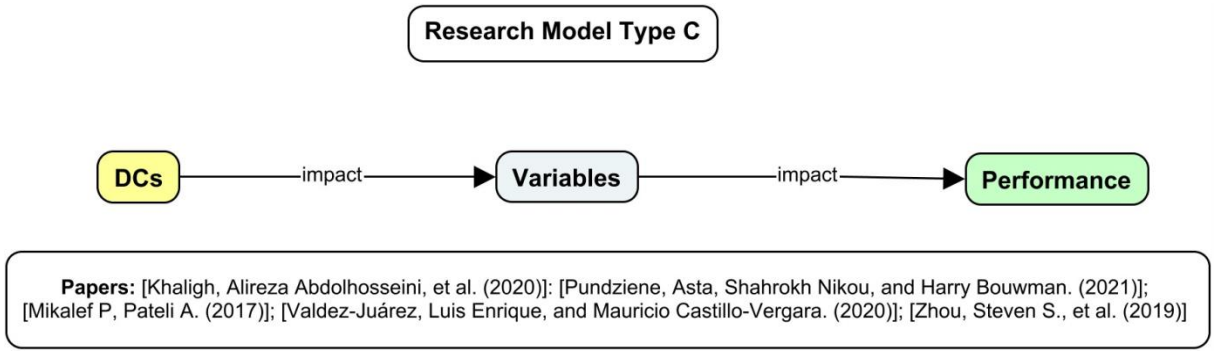


**Figure 7:** Research Model Type C

There are 5 papers that can be associated with Research Model type C (Figure 7). In this typology the hypothesis test the impact of DCs on Variables and the impact of those Variables on Performance. It suggests, right away, an indirect impact of the DCs on the Performance.

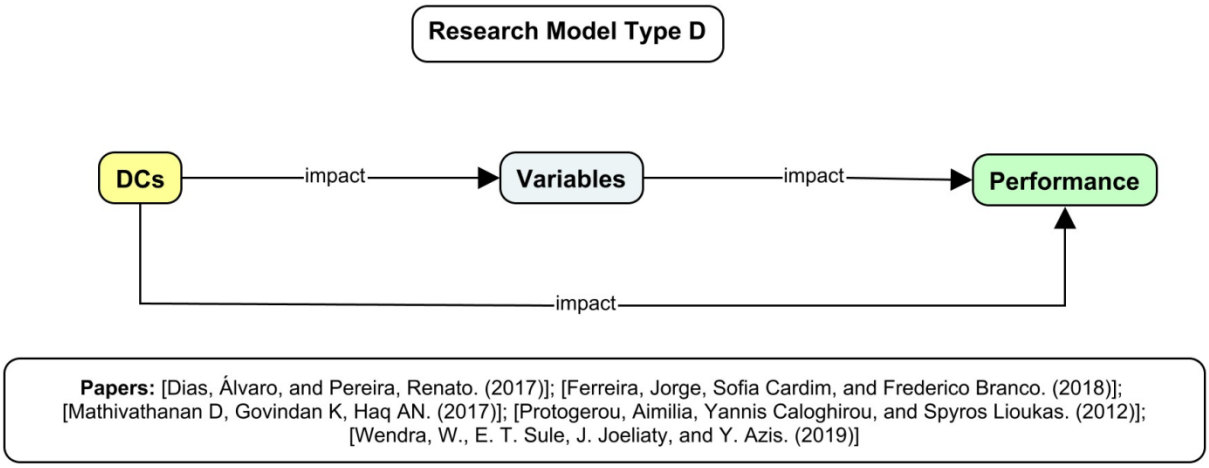


**Figure 8:** Research Model Type D

The Research Model type D, in figure 8, represents the testing the hypothesis that DCs can impact both in Variables and on Performance directly. DCs would have a direct and an indirect effect on Performance. There are 5 papers associated with this model.

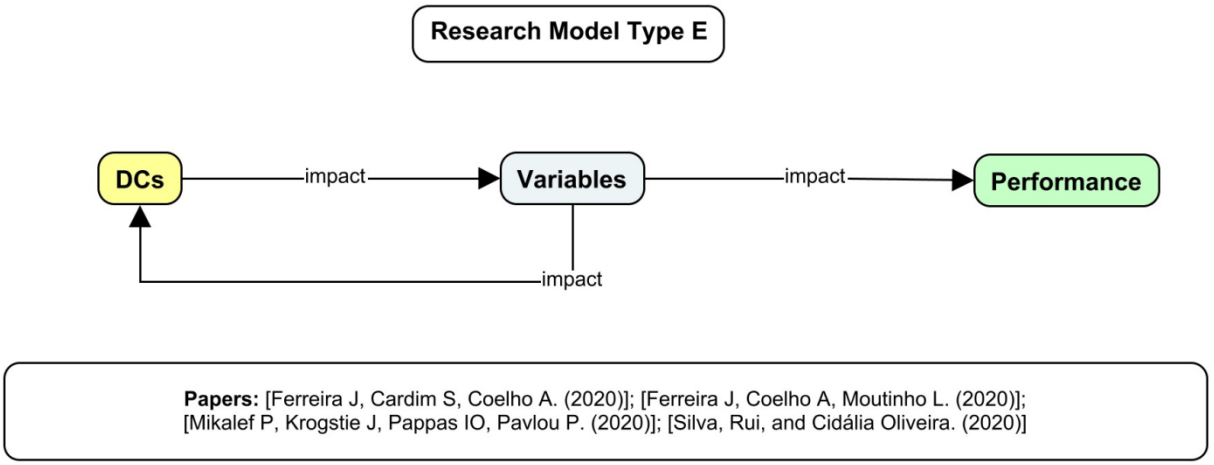


**Figure 9:** Research Model Type E

The Research Model in figure 9 (Type E) is very similar to the Type C but it also tests the effect of the Variables on DCs. It suggests a mutual influence between DCs and Variables and an indirect impact of DCs on Performance. There are 4 papers associated with this group.

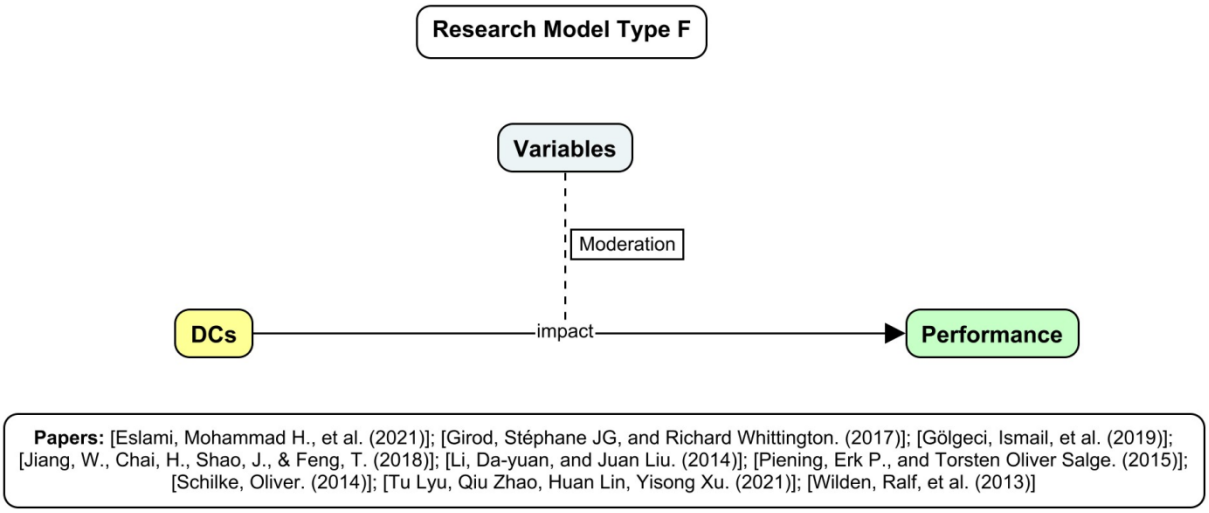


**Figure 10:** Research Model Type F

Figure 10 shows the Research Model type F. This model is quite unique once that it represents the testing of the impact DCs-Performance but under certain particular conditions, meaning that what is being tested is the impact of Variables over another impact (and not over Performance, DCs or other Variables). That is the reason to call it “moderation” since these Variables “moderate” the impact between DCs and Performance. In all 9 papers associated with this typology the Variables that are being tested are from external origin: ‘Environmental dynamism’, ‘Competitive intensity’, ‘Environmental turbulence’, ‘Institutional distance and Institutional development’, ‘Industry 4.0 Technologies’ and ‘Green technology dynamism’.

## 6.3 Analysis of the results

The SLR revealed, in general, that there is a strong empirical evidence to support the positive impact of DCs, both directly and indirectly, in firms Performance. As we can state, by analyzing table 3, the majority of the papers identified, and tested, diverse DCs that, by interrelating with each other and/or with other identified “mediating” or “moderating” Variables, were mostly perceived as having a real positive impact in the achievement of a superior business Performance. This is in line with other recent researches like [Cyfert, Szymon, et al. (2021)] where it is suggested that “the individual activities in the process of developing DCs are interconnected, and through mutual interactions and couplings, they positively affect the economic effectiveness of an enterprise”.

We can verify that there are cases where the same Variables were tested as DCs in one paper and as a Variable in other paper, for example ‘SCA’. In any case the key issue was the result of the interrelation between them and how that actually impacted on the Performance. As already mentioned, that impact was mostly perceived as positive, directly and/or indirectly. Also, when testing external Variables, there were evidences that, the more dynamic the environment, the stronger is the correlation between DCs and Performance.

However, there are some cases where that “positive” impact on Performance was not totally evidenced: [Eikelenboom, Manon, and Gjalt de Jong. (2019)]; [Gölgeci, Ismail, et al. (2019)]; [Khan KU, Atlas F, Xuehe Z, Khan F, Khan S. (2020)]; [Kim, Gimun, et al. (2011)]; [Piening, Erk P., and Torsten Oliver Salge. (2015)]; [Schilke, Oliver. (2014)]; [Tu Lyu, Qiu Zhao, Huan Lin, Yisong Xu. (2021)]; [Zhou, Steven S., et al. (2019)]. In these cases it was also evidenced a non-impact or an insignificant impact.

The paper [Gölgeci, Ismail, et al. (2019)] adopts ‘SCA’, ‘Innovativeness’ and ‘Adaptability’ as DCs, and identifies two external Variables (‘Institutional development’ and ‘Institutional Distance’) and they conclude that “DCs, though important, are only part of the critical success factors for succeeding in various institutional settings which shows that institutional development and distance may play a paradoxically moderating role, especially in the way SCA and adaptability translate into EMFs’ international performance”.

In a few other papers it was also revealed a “negative” impact on the Performance: [Dejardin, Marcus, et al. (2022)]; [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)]; [Eikelenboom, Manon, and Gjalt de Jong. (2019)]; [Girod, Stéphane JG, and Richard Whittington. (2017)]; [Jiang, W., Chai, H., Shao, J., & Feng, T. (2018)]; [Wang, Catherine L., Chaminda Senaratne, and Mohammed Rafiq. (2015)].

In the paper [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)] the combined impact has a negative side because it was found evidence that ‘environmental dynamism’ (external Variable) negatively affects the contribution of ‘ordinary capabilities’ (internal Variable) but positively affects the contribution of DCs to relative firm Performance and also the ‘heterogeneity of capabilities’ strengthens the contribution of DCs to relative firm Performance. It was found evidence that in dynamic environments “reconfiguration outcomes turn positive, while restructuring outcomes turn negative” [Girod, Stéphane JG, and Richard Whittington. (2017)] & [Dejardin, Marcus, et al. (2022)].

The paper [Eikelenboom, Manon, and Gjalt de Jong. (2019)] predicted that ‘internal integrative DCs’ positively relate to the social, environmental and economic Performance of a SME, but this hypothesis was not supported because the correlation between them was insignificant while the correlation between these DCs and ‘environmental Performance’ was significant but negative. Thus, ‘internal integrative DCs’ did not positively relate to the social, economic and environmental Performance of the firms. ‘Success traps’, ‘firm strategy’ and ‘market dynamism’ were the variables tested in the paper [Wang, Catherine L., et al. (2015)] and they found that the development and application of DCs is related to internal factors rather than external factors (such as ‘market dynamism’) and, on the other hand, ‘success traps’ have a significant, strong negative effect on DCs, which in turn weakens the positive effect on firm Performance.

In paper [Jiang, W., Chai, H., Shao, J., & Feng, T. (2018)], ‘Green Entrepreneurial Orientation’ was adopted as DC and the tested hypothesis indicated that it has positive influence on both environmental and financial Performance, but ‘green technology dynamism’ (external Variable) negatively moderates the relationship between green entrepreneurial orientation and environmental Performance, while ‘knowledge transfer and integration’ (internal Variable) positively moderates the

relationships between ‘green entrepreneurial orientation’ and environmental and financial Performance.

Some of the papers that analyzed Variables from external origin, highlighted the importance of the relationship between the organization’s DCs, how they emerge, how they interrelate with the external environment and how that can impact on Performance. This is aligned with previous research that stated that organizations operating in a highly or moderately dynamic context will require different patterns of micro-foundations of DCs considering that employee adaptability and proactivity are likely to play out differently in their contribution to sustainability DCs in different contexts, and identified individual differences and organizational practices which enable these behaviors [Strauss, Karoline, et al. (2017)].

## 6.4 Discussion

Figure 10 illustrates the issues that have been evidenced so far of the relationship between DCs, Variables and Performance. It summarizes the global perspective of the analyzed papers combining it with the conclusions of previous researches and the already known literature. This figure 10 is my own creation.

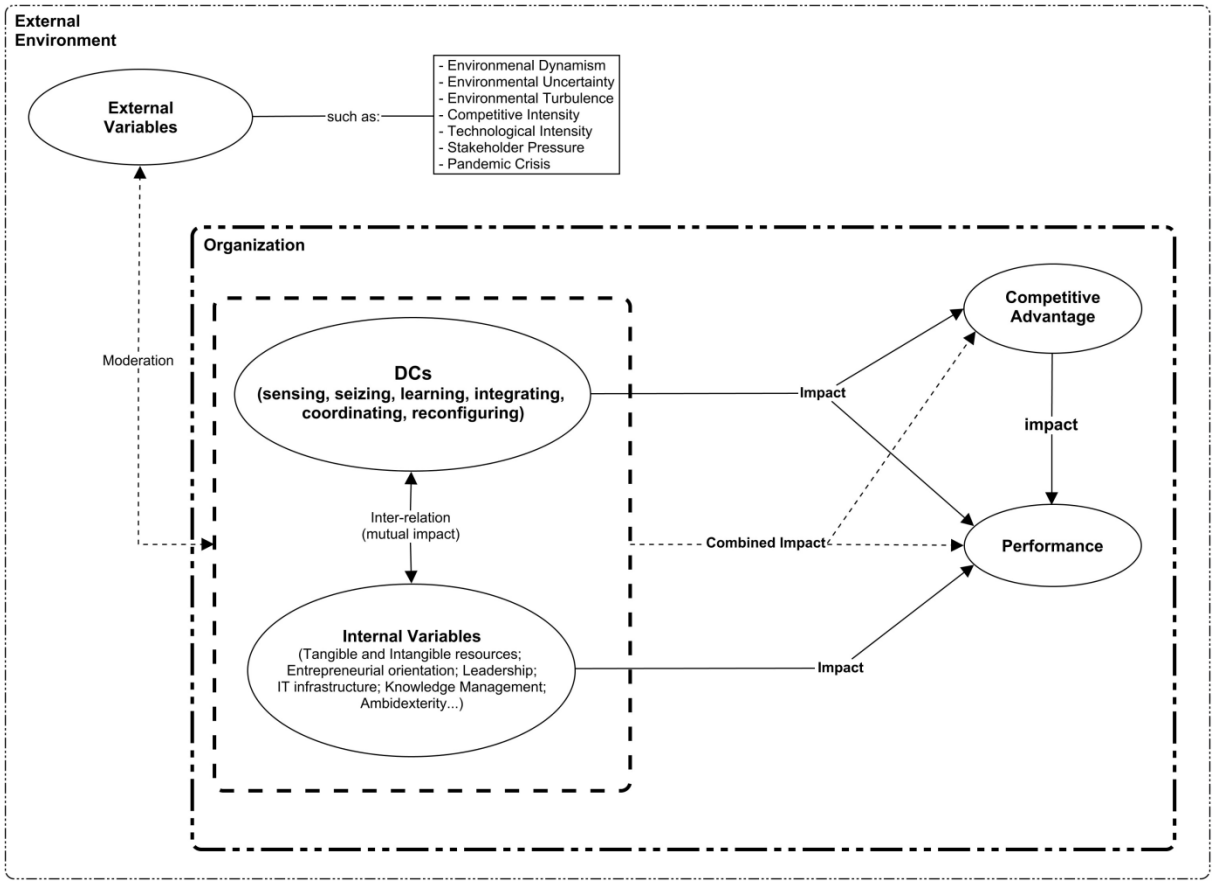


**Figure 11:** The Relationship between DCs, Variables and Performance

As already commented in the previous section, the general results obtained, from the analysis of the papers, confirm the positive relationship between DCs and a superior level of Performance. So, the discussion point ends up being the development process of the DCs, and its maintenance over time. The more DCs a firm demonstrates, the greater is likely to develop particular capabilities which can be a consequence of the firm's strategy. Also, the more dynamic the environment, the stronger is the direction of companies to display DCs due to the external pressure [Meirelles, Dimária Silva, and Álvaro Antônio Bueno Camargo. (2014)].

Previous research found evidence that, given the context, it is necessary to analyze the dynamic process through which organizational assets and structures are developed in order to identify micro-foundations for the establishment of dynamic strategies. Micro-foundations are understood to be skills, processes, procedures, organizational structures, decision rules and disciplines that are formed (at the firm level) by the detection, apprehension and (re)configuration of capabilities, being difficult to develop and implement by managers [Teece, David J. (2007)]. Therefore, the DCs are related to the environment of the firm in the intra-industry, that is, in its competition environment [de Almeida Guerra, Rodrigo Marques, et al. (2016)].

This leads to emphasize the role of the external environment in the process of developing DCs. This process must be, somehow, customized to the reality, internal and external, of each organization. That will result in a set of DCs coherent with its global context but also ready to meet its own targets. Then, the mutual influence between those DCs, all intangible and tangible resources, and the external context of the organization, should be positively reflected in its Performance.

On the other hand, firms that promote, and cultivate, the processes that allow them to reach the right set of DCs will, probably, be more capable of being disruptive and create a unique resource combination enhancing the achievement of a CA and ensuring a superior Performance. Moreover, that may have influence on their external environment.

# 7. Conclusion

In this chapter it will be presented some contributions, for theory and practice, enhanced by the results of this SLR. Its limitations are also stated as well as guidelines for future work.

## 7.1 Contributions

DCs are considered as the company's ability to make the necessary changes, in a volatile environment, and productively use existing resources to create new and unique configurations of routines and resources [Giniuniene, Jurgita, and Jurksiene. (2015)]. Although the concept of DCs is broad enough, the main definitions of the current concept point to the various organizational processes such as sensing, seizing, learning, integrating, coordinating and reconfiguring. Theoretically, these capabilities interrelating with each other, with all the existing resources and other capabilities, and with the organization's external environment, can lead to achieve a sustained CA and a superior Performance.

Generally, the empirical evidence, that came across the several analyzed papers, end up being compatible with the argument, among the various researchers, that DCs really impact in increasing the company's Performance and the achievement of a sustained CA. The value and rareness of a firm's resource–capability combination contributes to its CA and that advantage, in turn, contributes to an increasing Performance and mediates the relationship between those 'value added' combinations, enhanced by DCs, and firm's Performance.

By studying the combined effect of the interrelation between DCs and different resources, it enriches the understanding of the role and importance of the resource and capability combinations for organizational success since certain DCs are more important than others considering the specific context of each firm. It is also highlighted that, in some cases, having certain DCs or the DCs (only by themselves), may not mean a positive impact on Performance.

As already stated in previous research, "DCs are used to achieve a CA but over time what is dynamic today becomes a market practice and converts into ordinary and static organizational capabilities" [Bari, Nadeem, et al. (2022)]. As also theorized by Teece (2019), "Capabilities are diverse; ordinary capabilities for operations, administration, and governance can often be bought, or 'rented', and they diffuse relatively quickly; DCs are harder to develop and they must be built as they cannot be bought, while strong DCs enable the effective selection and deployment of ordinary capabilities" [Teece, David J. (2019)].

DCs have to be built through a process of investment in discovery, knowledge generation, and learning. So, each organization must cultivate and seek for the assertive set of DCs having in consideration its own internal and external context, obviously aligned with its own goals. Moreover this

may influence the way in which managers can make strategic decisions to promote the right resource/capability combination, considering their specific contexts, in order to enhance CA and improve their own business Performance.

## 7.2 Limitations

In this SLR, “only” 44 articles were analyzed, which, in some way, is always a limitation despite the fact that they meet the inclusion/exclusion criteria. The hypotheses tested are those that the respective researchers, from their perspective, defined as the most assertive, taking into account the DCs and variables they intended to study. On the other hand, we were also conditioned to these same DCs and variables that were defined by the researchers of each paper. We will always have to hypothesize that many other DCs and Variables could have been identified and studied, perhaps even more relevant in terms of impact on firms' Performance.

## 7.3 Future work

If we look back to the last two and a half years, the covid-19 pandemic has definitely had detrimental impacts on people and societies and has revealed the extent of economic interconnection at a global level as a result of economic globalization. While the tragic nature of such events can stain the pages of history, perhaps future historical accounts will recognize the catalytic effects that this public health emergency had on civilization and progress, as individuals and communities coordinated and overcame immense difficulties to step up to the challenge [Delardas, Orestis, et al. (2022)].

In a recovery scenario, post Covid-19 pandemic, where imbalances in supply chains caused severe increases in prices, the armed conflict in Ukraine, still with no end in sight, further aggravated this problem, causing major problems in energy and food supply, and further escalation of inflation across the globe [van Meijl, Hans, et al. (2022)]. The current social, political and, particularly, economic context has created an extremely turbulent environment around all economic agents and, in particular, for companies.

Once DCs may be considered as the company’s ability to undertake volatile environment’s changes and productively use existing resources for creating new configurations of routines and resources [Giniuniene, Jurgita, and Jurksiene. (2015)], as they also embrace the enterprise’s capacity to shape the ecosystem it occupies [Teece, David J. (2007)], it seems to me pertinent that more studies emerge to understand, in this current turbulent context, what are the most relevant DCs, and which other variables they interrelate with, and how this is reflected in the Performance of today’s organizations.

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# Appendix A

DCs and Variables identified (and the respective papers where they were tested)

| DCs: paper(s) | Variables: paper(s) | |
|---|---|---|
| | **Internal** | **External** |
| **Absorptive capacity**: [Liu, Hefu, et al. (2012)]; [Rehman, Nabeel, et al. (2020)] | **BDAC**: [Mikalef P, Krogstie J, Pappas IO, Pavlou P. (2020)]; [Wamba, Samuel Fosso, et al. (2017)] | **Competitive intensity:** [Wilden, Ralf, et al. (2013)] |
| **Adaptability**: [Gölgeci, Ismail, et al. (2019)] | **Corporate entrepreneurship**: [Rehman, Nabeel, et al. (2020)] | **Covid-19 pandemic crisis:** [Dejardin, Marcus, et al. (2022)] |
| **Alliance management capability**: [Schilke, Oliver. (2014)] | **Criativity:** [Ferreira J, Coelho A, Moutinho L. (2020)] | **Entrepreneurial network:** [Abu-Rumman, Ayman, et al. (2021)] |
| **Ambidextrous DCs:** [Monferrer, Diego, et al. (2021)] | **Differentiation:** [Khaligh, Alireza Abdolhosseini, et al. (2020)] | **Environmental dynamism:** [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)]; [Girod, Stéphane JG, and Richard Whittington. (2017)]; [Li, Da-yuan, and Juan Liu. (2014)]; [Protogerou, Aimilia, Yannis Caloghirou, and Spyros Lioukas. (2012)]; [Schilke, Oliver. (2014)]; [Tu Lyu, Qiu Zhao, Huan Lin, Yisong Xu. (2021)] |
| **Change implementation:** [Wendra, W., E. T. Sule, J. Joeliaty, and Y. Azis. (2019)] | **Eco-innovation:** [Valdez-Juárez, Luis Enrique, and Mauricio Castillo-Vergara. (2020)] | **Environmental uncertainty:** [Mikalef P, Pateli A. (2017)] |
| **Conceptualizing:** [Dejardin, Marcus, et al. (2022)] | **Entrepreneurial Orientation:** [Abu-Rumman, Ayman, et al. (2021)]; [Monteiro, Albertina Paula, Ana Maria Soares, and Orlando Lima Rua. (2019)] | **External environment:** [Khan KU, Atlas F, Xuehe Z, Khan F, Khan S. (2020)] |
| **Coproducing and orchestrating:** [Dejardin, Marcus, et al. (2022)] | **Entrepreneurship:** [Dias, Álvaro Lopes et al. (2020)] | Green technology dynamism: [Jiang, W., Chai, H., Shao, J., & Feng, T. (2018)] |
| **Corporate Entrepreneurship:** [Rehman, Nabeel, et al. (2020)] | **Environmental strategy:** [Ko, Wai Wai, and Gordon Liu. (2017)] | **Industry 4.0 digital technologies:** [Eslami, Mohammad H., et al. (2021)] |

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|---|---|---|
| **DCs in general (sensing, seizing, learning, integrating, coordinating, reconfiguring):** [Abu-Rumman, Ayman, et al. (2021)]; [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)]; [Eslami, Mohammad H., et al. (2021)]; [Ferreira J, Coelho A, Moutinho L. (2020)]; [Ferreira, Jorge, Sofia Cardim, and Frederico Branco. (2018)]; [Khaligh, Alireza Abdolhosseini, et al. (2020)]; [Li, Da-yuan, and Juan Liu. (2014)]; [Mathivathanan D, Govindan K, Haq AN. (2017)]; [Mikalef P, Krogstie J, Pappas IO, Pavlou P. (2020)]; [Protogerou, Aimilia, Yannis Caloghirou, and Spyros Lioukas. (2012)]; [Pundziene, Asta, Shahrokh Nikou, and Harry Bouwman. (2021)]; [Santoro, Gabriele, et al. (2019)]; [Silva, Rui, and Cidália Oliveira. (2020)]; [Valdez-Juárez, Luis Enrique, and Mauricio Castillo-Vergara. (2020)]; [Wang, Catherine L., Chaminda Senaratne, and Mohammed Rafiq. (2015)]; [Wilden, Ralf, et al. (2013)]; [Zhou, Steven S., et al. (2019)]; [Lin, Yini, and Lei-Yu Wu. (2014)] | **Flexible IT infrastructure:** [Liu, Hefu, et al. (2012)]; [Mikalef, Patrick, Adamantia Pateli, and Rogier van de Wetering. (2021)]; [Mikalef, Patrick, Adamantia G. Pateli, and Rogier van de Wetering. (2016)] | **Institutional development:** [Gölgeci, Ismail, et al. (2019)] |
| **Decision making:** [Wendra, W., E. T. Sule, J. Joeliaty, and Y. Azis. (2019)] | **Green innovation:** [Singh, Sanjay Kumar, et al. (2022)] | **Institutional distance:** [Gölgeci, Ismail, et al. (2019)] |
| **DT-enabled DCs:** [Li, Lixu, et al. (2022)] | **Heterogenity of capabilities:** [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)] | |
| **Dynamic Managerial Capabilities:** [Khan KU, Atlas F, Xuehe Z, Khan F, Khan S. (2020)] | **Innovation Capability:** [Ferreira J, Cardim S, Coelho A. (2020)]; [Ferreira J, Coelho A, Moutinho L. (2020)]; [Ferreira, Jorge, Sofia Cardim, and Frederico Branco. (2018)] | **Market dynamism:** [Wang, Catherine L., Chaminda Senaratne, and Mohammed Rafiq. (2015)] |
| **Exploitation & Exploration:** [Ferreira J, Cardim S, Coelho A. (2020)]; [Ferreira J, Coelho A, Moutinho L. (2020)]; [Ferreira, Jorge, Sofia Cardim, and Frederico Branco. (2018)]; [Santoro, Gabriele, et al. (2019)] | **Intangible resources:** [Monteiro, Albertina Paula, Ana Maria Soares, and Orlando Lima Rua. (2019)]; [Silva, Rui, and Cidália Oliveira. (2020)] | **Market innovation:** [Zhou, Steven S., et al. (2019)] |
| **External integrative DCs:** [Eikelenboom, Manon, and Gjalt de Jong. (2019)] | **Intelectual capital:** [Wendra, W., E. T. Sule, J. Joeliaty, and Y. Azis. (2019)]; [Silva, Rui, and Cidália Oliveira. (2020)] | Market turbulence: [Piening, Erk P., and Torsten Oliver Salge. (2015)]; [Silva, Rui, and Cidália Oliveira. (2020)] |
| **Green DCs:** [Singh, Sanjay Kumar, et al. (2022)] | **Interfirm strategic orientations:** [Monferrer, Diego, et al. (2021)] | **Stakeholder pressure:** [Singh, Sanjay Kumar, et al. (2022)] |
| **Green Entrepeneurial Orientation:** [Jiang, W., Chai, H., Shao, J., & Feng, T. (2018)] | **IT assimilation:** [Liu, Hefu, et al. (2012)] | **Technological innovation:** [Zhou, Steven S., et al. (2019)] |
| **HR Capabilities on supporting dynamic decision making:** [Dias, Álvaro Lopes et al. (2020)] | **IT capabilities:** [Kim, Gimun, et al. (2011)]; [Rehman, Nabeel, et al. (2020)] | **Technological Intensity:** [Silva, Rui, and Cidália Oliveira. (2020)] |
| **Innovativeness:** [Gölgeci, Ismail, et al. (2019)] | **IT governance decentralization:** [Mikalef, Patrick, Adamantia G. Pateli, and Rogier van de Wetering. (2016)]; [Mikalef, Patrick, Adamantia Pateli, and Rogier van de Wetering. (2021)] | **Technological Turbulence:** [Piening, Erk P., and Torsten Oliver Salge. (2015)] |
| **Internal integrative DCs:** [Eikelenboom, Manon, and Gjalt de Jong. (2019)] | **Knowledge:** [Silva, Rui, and Cidália Oliveira. (2020)] | |

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|---|---|---|
| **IT-enabled DCs:** [Mikalef P, Pateli A. (2017)]; [Mikalef, Patrick, Adamantia G. Pateli, and Rogier van de Wetering. (2016)]; [Mikalef, Patrick, Adamantia Pateli, and Rogier van de Wetering. (2021)]. | **Knowledge Management:** [Dias, Álvaro Lopes et al. (2020)]; [Santoro, Gabriele, et al. (2019)] | |
| **Knowledge creation routines:** [Dias, Álvaro, and Pereira, Renato. (2017)] | **Knowledge transfer and integration:** [Jiang, W., Chai, H., Shao, J., & Feng, T. (2018)] | |
| **Marketing competence:** [Ko, Wai Wai, and Gordon Liu. (2017)] | **Knowledge-based strategies**: [Khaligh, Alireza Abdolhosseini, et al. (2020)] | |
| **New product development capability:** [Schilke, Oliver. (2014)] | **Learning and Growth:** [Silva, Rui, and Cidália Oliveira. (2020)] | |
| **Operational capabilities:** [Mikalef P, Krogstie J, Pappas IO, Pavlou P. (2020)] | **Manager's perception of sustainability:** [Eikelenboom, Manon, and Gjalt de Jong. (2019)] | |
| **Organizational Innovation:** [García-Morales, Víctor Jesús, et al. (2012)] | **Marketing capabilities:** [Dias, Álvaro, and Pereira, Renato. (2017)]; [Ferreira, Jorge, Sofia Cardim, and Frederico Branco. (2018)]; [Mikalef P, Krogstie J, Pappas IO, Pavlou P. (2020)]; [Protogerou, Aimilia, Yannis Caloghirou, and Spyros Lioukas. (2012)] | |
| **Organizational learning:** [García-Morales, Víctor Jesús, et al. (2012)] | **Non-VRIN resources:** [Lin, Yini, and Lei-Yu Wu. (2014)] | |
| **Process Innovation Effectivness:** [Piening, Erk P., and Torsten Oliver Salge. (2015)] | **Open innovation capability:** [Pundziene, Asta, Shahrokh Nikou, and Harry Bouwman. (2021)]; [Valdez-Juárez, Luis Enrique, and Mauricio Castillo-Vergara. (2020)] | |
| **Process Innovation Propensity:** [Piening, Erk P., and Torsten Oliver Salge. (2015)] | **Operational capabilities:** [Protogerou, Aimilia, Yannis Caloghirou, and Spyros Lioukas. (2012)] | |
| **Process-oriented DCs:** [Wamba, Samuel Fosso, et al. (2017)]; [Kim, Gimun, et al. (2011)] | **Ordinary capabilities:** [Drnevich, Paul L., and Aldas P. Kriauciunas. (2011)] | |
| **R&D competence:** [Ko, Wai Wai, and Gordon Liu. (2017)] | **Organic organizational structure:** [Wilden, Ralf, et al. (2013)] | |
| **SCA:** [Eslami, Mohammad H., et al. (2021)]; [Gölgeci, Ismail, et al. (2019)]; [Liu, Hefu, et al. (2012)]; [Tu Lyu, Qiu Zhao, Huan Lin, Yisong Xu. (2021)] | Organizational agility: [Mikalef P, Pateli A. (2017)] | |
| **Scaling and stretching:** [Dejardin, Marcus, et al. (2022)] | **Organizational learning capability**: [Ferreira J, Cardim S, Coelho A. (2020)] | |

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|---|---|---|
| **SCI:** [Eslami, Mohammad H., et al. (2021)] | **Proactiveness:** [Khan KU, Atlas F, Xuehe Z, Khan F, Khan S. (2020)] | |
| **Strategic Decision Flexibility:** [Dias, Álvaro Lopes et al. (2020)] | **Routines:** [Khan KU, Atlas F, Xuehe Z, Khan F, Khan S. (2020)] | |
| **Strategic sensing:** [Wendra, W., E. T. Sule, J. Joeliaty, and Y. Azis. (2019)] | **Tangible resources:** [Silva, Rui, and Cidália Oliveira. (2020)] | |
| **Supply chain adaptability:** [Tu Lyu, Qiu Zhao, Huan Lin, Yisong Xu. (2021)] | **Technological capabilities:** [Protogerou, Aimilia, Yannis Caloghirou, and Spyros Lioukas. (2012)]; [Mikalef P, Krogstie J, Pappas IO, Pavlou P. (2020)] | |
| **Supply chain sensing:** [Tu Lyu, Qiu Zhao, Huan Lin, Yisong Xu. (2021)] | **Transformational leadership:** [Eikelenboom, Manon, and Gjalt de Jong. (2019)] | |
| **Technological Capability:** [Valdez-Juárez, Luis Enrique, and Mauricio Castillo-Vergara. (2020)] | **VRIN resources:** [Lin, Yini, and Lei-Yu Wu. (2014)] | |
| **Transfer Processes:** [Dias, Álvaro, and Pereira, Renato. (2017)] | | |