


RESEARCH ARTICLE

Dynamic capabilities and performance: How has the relationship been assessed?

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Abstract

The contribution of dynamic capabilities (DCs) to firm performance remains unclear and at the centre of debate. Based on a systematic literature review of 92 quantitative articles, the purpose is to explore how the DC–performance relationship have and should be assessed in the future. The most promising approach seems to be indirect, as it appears that DCs primarily causes change and intermediate outcomes, though far from being the most hypothesized relationship. Moreover, investigations employ a continuum of conceptualizations, ranging from very specific DCs to generic sets with theoretical divergences and overlapping. The same applies to the varied performance measures adopted, evidencing that the literature still has a long way to go. Based on a structured synthesis and analysis of existing studies, a conceptual model, recommendations and future avenues are proposed, along with areas of attention, which have both managerial and practical relevance, contributing to advancement within this research stream.

Keywords: systematic literature review; dynamic capabilities; performance; DC–performance relationship

Introduction

The dynamic capability view (DCV) is currently considered one of the most promising frameworks in the strategy agenda, aimed at identifying drivers of long-term firm survival and growth (e.g., Barrales-Molina, Martínez-López, & Gázquez-Abad, 2014; Laaksonen & Peltoniemi, 2016). In fact, research on dynamic capabilities (DCs) stands amongst the most prolific streams of research within the field of management for the last two decades (Albort-Morant, Leal-Rodríguez, Fernández-Rodríguez, & Ariza-Montes, 2018), since the two seminal works by Teece, Pisano, and Shuen (1997) and Eisenhardt and Martin (2000) (Burisch & Wohlgemuth, 2016). Although the concept has been widely explored with recent efforts to consolidate both definitional and theoretical divergences (e.g., Eriksson, 2014; Laaksonen & Peltoniemi, 2016; Schilke, Hu, & Helfat, 2018; Wilden, Devinney, & Dowling, 2016), the literature remains fragmented, disparate and equivocal (Pezeshkan, Fainshmidt, Nair, Lance Frazier, & Markowski, 2016). Inconsistency between definitions, conceptualizations and measurements of key constructs and variables, along with tested relationships prevails. Perhaps, the most important relationship within this field of research is the one between DCs and performance (Barreto, 2010). Yet, how the nature of such should be quantitatively assessed remains somewhat unclear and deserves attention (e.g., Di Stefano, Peteraf, & Verona, 2014; Wilden, Devinney, & Dowling, 2016), representing a literature gap.

Regardless of the ongoing progress made in the empirical inquiry regarding the DC effects, it seems that a limited number of studies have provided comprehensive synthesized insight focusing particularly on how the empirical relationship between DC and performance have and should be

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assessed. A recent meta-analysis reveals that empirical evidence for the relationship between DCs and performance is rather inconsistent (Pezeshkan et al., 2016). Trying to culminate this gap, the purpose of this paper is two folded. Firstly, it is aimed to present a comprehensive in-depth synthesis of the existing quantitative studies testing the DC–performance relationship, in order to understand what have been done so far, contributing to a more structured sense and coherence to the disperse body of knowledge, while, secondly, based on the systematic analysis, propose a conceptual model for assessing the influence of DCs on performance along with recommendations, guidelines and avenues for future research. To this end, a systematic sight of the current state of the DCV, regarding its quantitative relationship with performance is offered. Through a systematic literature review (SLR) of 92 quantitative articles on performance outcomes related to DCs, an attempt to compile empiric grounds and provide a more updated discussion is made. Accordingly, the nature of their relationship and the inherent aspects are explored, addressing questions like: *How has the relationship between DC and performance been assessed in empirical investigations? Which variables (antecedents, mediators, moderators and outcomes) have been applied throughout the literature for empirically assessing the influence of DCs on performance? How should the DC–performance relationship be assessed in future studies?* This study synthesizes and maps documentation thus far accumulated, distinguishing between types of relationships along with the presentation of the inherent variables used when investigating the influence of DCs on performance outcomes, offering consistency and unification to the scattered empirical literature and a structured way to address the enduring discussion. The analysis reflects the richness of the research, and by revealing concerns and research possibilities, it contributes towards a forward-looking theoretical and empirical development.

The primary findings from analysis evidence that two divergent groups of conceptual natures of DC–performance relationship (direct and indirect) are represented in the literature. The indirect approach is by far the most dominant, as only 36 of the 92 articles employ an exclusively indirect approach for assessing the influence of DCs on performance outcomes. Regarding the operationalization, empirical studies appear to employ a continuum of conceptualizations, ranging from very specific DCs to generic sets. The majority of the studies measure DCs as generic. The same applies to the varied performance measures adopted. A tendency for using subjective aggregated measures to determine wide-range performance is identified. This indicates that the DC literature still has a long way to go before constituting a robust integrated framework. Based upon the analysis, the most promising research approach seems to be that DCs per se do not directly cause superior firm performance, but rather cause chance that leads to intermediate outcomes, such as change of operational capabilities and process-level performance. That is, DCs appear to be necessary, but an insufficient condition for achieving superior performance directly, evidencing a more complex relationship than firstly put out to be in the literature, as their effects seem to be mediated by operational capability change and development, while simultaneous being contingent upon diverse moderators.

The section below provides a brief theoretical overview of the DCV. The next section introduces the methods used in this SLR, followed by the analysis and discussion in terms of the nature of the DC–performance relationship, conceptualizations of DC variables used and performance measures. Finally, the last section presents resumed conclusions, a conceptual model, recommendations for future research and limitations.

Theoretical Framework

The dynamic capability view

How firms achieve competitive advantage and superior performance remain at the heart of strategic management (Protogerou, Caloghirou, & Lioukas, 2012; Schilke, Hu, & Helfat, 2018). The resource based view (RBV) emerged as one of the key frameworks explaining competitive

diversity and performance based on internal resources, serving as a response to overcome the limits of industrial economics to explain superior firm performance (Barney, 1991; Bledy, Ali, & Ibrahim, 2018; Penrose, 1959; Stonehouse & Snowdown, 2007). However, it appears that the RBV struggles to explain how firms maintain these advantages over time in dynamic environments, as it gives a static view of a firm's resource portfolio, laying ground for the DVC (e.g., Giniuniene & Jurksiene, 2015; Wilden, Devinney, & Dowling, 2016). The DCV intends to extend the RBV (Burisch & Wohlgemuth, 2016), serving as a more time-based reaction to the deficiencies of the RBV within the new knowledge and innovation economy conditions, considering how firms develop, reconfigure and renew resources and capabilities over time in turbulent environments (e.g., Bledy, Ali, & Ibrahim, 2018; Giniuniene & Jurksiene, 2015; Teece, 2018; Teece, Pisano, & Shuen, 1997; Winter, 2003). The DCV goes beyond the idea that sustainable competitive advantage is based merely upon a firm's acquisition of valuable, rare, inimitable and organizational (VRIO) resources (Barney, 1991; Barney & Hesterly, 2006), as it takes into consideration the concern of time, evolution and change (Arndt & Bach, 2015; Bledy, Ali, & Ibrahim, 2018; Galvin, Rice, & Liao, 2014). In short, this view emerges as an approach for understanding strategic change (Teece, Pisano, & Shuen, 1997), seeking to provide a framework to understand how firms develop and maintain a competitive advantage over time in turbulent markets, while aiming to identify underlying drivers of long-term success (Wilden, Devinney, & Dowling, 2016).

Throughout the years, an impressive body of published DC research have widely revised, discussed and extended the concept, resulting in a number of conceptualizations (see e.g., Albort-Morant et al., 2018). Bibliographic reviews (e.g., Peteraf, Di Stefano, & Verona, 2013) suggest that the fragmented literature, although partially complementary, does not necessarily share one clear common theoretical grounding (Burisch & Wohlgemuth, 2016). It is commonly agreed that the DC concept has largely been developed under the influence of two main papers – Teece, Pisano, and Shuen (1997) and Eisenhardt and Martin (2000), which largely represent two somewhat different DC research streams (e.g., Albort-Morant et al., 2018; Di Stefano, Peteraf, & Verona, 2014; Giniuniene & Jurksiene, 2015; Ringov, 2017). In fact, these two approaches have different theoretical underpinnings, different assumptions about the nature of DCs, employ different types of reasoning and adopt a different perspective regarding the influence on performance (Peteraf, Di Stefano, & Verona, 2013). DCs have been defined as both abilities (Teece, Pisano, & Shuen, 1997) and processes, best practices or routines (Eisenhardt & Martin, 2000). Teece, Pisano, and Shuen (1997) originally defined DCs as the firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environments. Following Teece, Pisano, and Shuen (1997), some authors have considered DCs to be a capability, skill or capacity (e.g., Winter, 2003; Zahra, Sapienza, & Davidsson, 2006). Whereas Eisenhardt and Martin (2000) relate DCs to the firm's processes that use resources; specifically, the processes to integrate, reconfigure, gain and release resources to match and even create market change. In this way, DCs are understood as identifiable strategic routines, such as product development and strategic decision making, by which firms achieve new resource configurations as markets emerge, collide, split, evolve and die (Eisenhardt & Martin, 2000).

Regardless of the theoretical underprint, in an effort to understand the nature of DCs, it is imperative to distinguish between DC and operational capabilities (Albort-Morant et al., 2018). In fact, making an empirical distinction between operational capabilities that change and DCs that cause the change is crucial for avoiding tautological arguments (Laaksonen & Peltoniemi, 2016). DCs work differently than operational capabilities, which are generally static and operate independently (Vijaya, Ganesh, & Rahul, 2019). DCs are not resources in the traditional RBV sense, they are more like abilities or processes, which react upon resources (Ambrosini & Bowman, 2009; Eisenhardt & Martin, 2000; Teece, 2007). Operational capabilities can be described as more basic capabilities that allow firms to pursue defined sets of activities (Teece, 2018). These can be viewed as the capability to execute day-to-day activities, while DCs represent the firm's ability to reconfigure and adapt operational capabilities by sensing

the environment needs and opportunities and integrating the existing capabilities with knowledge, generating new value-creating strategies (Ambrosini & Bowman, 2009; Eisenhardt & Martin, 2000; Pavlou & El Sawy, 2013; Teece, 2007). Dynamic indicates the role they play in renewal, and 'capabilities' stresses that they are strategic responses to adapt to a new context (Barrales-Molina, Martínez-López, & Gázquez-Abad, 2014).

DCs have frequently been operationalized as a set of distinct clusters of activities to explain how they work. According to Barrales-Molina, Martínez-López, and Gázquez-Abad (2014) these can be broadly divided into generally accepted features of DC processes, such as, reconfiguration, leveraging, learning, integration, coordination (Eisenhardt & Martin, 2000; Teece, Pisano, & Shuen, 1997), environmental sensing and opportunity seizing (Teece, 2007), learning processes, such as experience accumulation, knowledge articulation and knowledge codification (Zollo & Winter, 2002). Throughout the literature it becomes apparent that these components are some of the most common conceptualization of DCs, leading to a quantitative tendency, measuring DCs through their underlying processes (Barrales-Molina, Martínez-López, & Gázquez-Abad, 2014; Eriksson, 2014). Some organizational processes and capabilities have been considered as more specific identifiable DCs, such as dynamic marketing capabilities (e.g., new product development, customer relationship management) (e.g., Peng & Lin, 2017), dynamic managerial capabilities (e.g., Li & Liu, 2014), specific supply-chain capabilities (Lee & Rha, 2016) and dynamic it-enabled capabilities (e.g., Drnevich & Kriauciunas, 2011). Eriksson (2014) states that, generally, according to the former approach, DCs may be unique and hence difficult to imitate (Teece, Pisano, & Shuen, 1997), whereas the latter view implies commonalities among organizations, meaning that only the resource and capability configurations DCs create can be unique (Eisenhardt & Martin, 2000).

Dynamic capabilities and performance

According to Bledy, Ali, and Ibrahim (2018) intense criticisms have been levelled against the DCV, such as the nature of the DC term itself, the absence of clear models to measure these capabilities and how they actually affect firm performance (Zahra, Sapienza, & Davidsson, 2006; Zott, 2003). The purpose of DC research should be to explain sources of superior competitiveness (Teece, Pisano, & Shuen, 1997), indicating that firm performance is a key component of the theory and usually seen as the ultimate aim (Laaksonen & Peltoniemi, 2016). There seems to be a broad consensus that DCs positively influence firm performance in multiple ways (Wilden, Gudergan, Nielsen, & Lings, 2013); these extend or modify the resource base (Helfat & Peteraf, 2009), to match the changing environments (Teece, Pisano, & Shuen, 1997), as thus, improving firm effectiveness (Zollo & Winter, 2002), create market change (Eisenhardt & Martin, 2000) and support both the resource-picking and capability-building rent-generating mechanisms (Makadok, 2001). This will ultimately strengthen performance (Wilden et al., 2013). However, the discussion about the exact nature of the relationship between DCs and firm performance started about the same time as the concept itself (Dias & Pereira, 2017) and the question of how DCs actually affect firm performance remains unclear and at the centre of debate (Pezeshkan et al., 2016).

Different opinions exist as to whether a DC itself can be the source of superior performance (Wilden, Devinney, & Dowling, 2016). Actually, one of the greatest divergences between the Teece, Pisano and Shuen (1997) and Eisenhardt and Martin (2000) approaches regards the role of DCs in gaining superior firm results (Peteraf, Di Stefano, & Verona, 2013). At an early stage of the DCV, a direct relationship between firms' DCs and their performance was postulated (Makadok, 2001; Teece, Pisano, & Shuen, 1997). Teece, Pisano, and Shuen (1997) share fundamental assumptions with the RBV of which require resources to be VRIO-criteria. If DCs possess these characteristics, they can be a direct source of sustainable competitive advantages and thus superior performance (Barney, 1991; Teece, Pisano, & Shuen, 1997). In contrast, others have shown less confidence in the compulsory and direct link (Barreto, 2010). Eisenhardt and

Martin (2000) opposed that DCs are indeed necessary, but not sufficient for competitive advantage. Contrary to Teece, Pisano, and Shuen (1997) conceptualization, it is explicitly stated that DCs do not necessarily meet all of the VRIO (Eisenhardt & Martin, 2000). By depicting DCs as routines, Eisenhardt and Martin (2000) effectively implies that any competitive advantage that is attributable directly to DC is likely to be rather small and insignificant, because they are likely not to satisfy VRIO conditions, being more homogeneous than before assumed (Peteraf, Di Stefano, & Verona, 2013). In this view, long-term performance does not rely on DCs themselves, but on routines, resource configurations and change effect, that is, essentially how DCs are used (Barreto, 2010). Additionally, Helfat and Peteraf (2009) elaborate that performance effects of DCs should be assessed using the concept of both task performance, a more specific intermediate performance outcome, and evolutionary fitness, as the extend of evolutionary fitness depends on how well the DCs of an organization match the context in which the organization operates.

Apparently, DCs can influence firm performance in multiple ways. As a result of the fragmented literature and results, indications of while performance benefits from DCs, their effect may not be automatic, straightforward, nor apparent, can be retrieved. Their relationship may not be as linear and direct as the former theoretical assumptions. It becomes apparent that the nature of the DC–performance relationship, conceptualization, along with the amount and types of included additional variables when assessing firm performance, should be dependent upon the theoretical framework and definition of the concept itself, however, this is not always verified in the quantitative literature. As such, drawing a general overview of the quantitative evidence on the DC–performance relationship, through a synthesized and analytical lens, seems pertinent in order to evidence the current standpoint, concerns and gaps, enabling future studies.

Method

In order to analyse the nature and provide a more comprehensive overview of the investigated relationships between DCs and performance, a SLR of quantitative content was undertaken. Firstly, relevant studies were identified and the roles of DCs and employed relationship to performance outcomes were analysed. Accordingly, procedures and methodological aspects used by Newbert (2007), Pezeshkan et al. (2016), Eriksson (2014) and Laaksonen and Peltoniemi (2016) were followed for reliable guidance (Table 1). As journal articles seem to be the most respected and efficient way of disseminating research findings (Eriksson, 2014), they were chosen as the source material. Given the focus on evidence-based knowledge, this analysis is built on a review of empirical content, hence conceptual articles were excluded.

The search for articles was conducted in the ISI Web of Knowledge Social Sciences Citation Index, including articles from 2017, by the following procedures (Table 1):

- (1) To ensure relevance, the search criteria were drawn upon the terms ‘dynamic capabilit*’ and ‘performance’. ‘Dynamic capabilit*’ was required in the title and ‘performance’ should occur in at least one of the following parts: title, abstract or keywords (topic). To provide further relevance and quantitative empirical content, a requirement was the inclusion of at least one of the sequential methodological words in the topic: ‘empirical’, ‘test*’, ‘data’, ‘finding*’, ‘statistical’, ‘result*’, ‘quantitative’ or ‘evidence*’.
- (2) As it appears that DC has become a buzzword in many investigation areas (Eriksson, 2013), articles employing the concept in contexts other than business, (e.g., robotics, mechanics and engineering), was not considered of fundamental relevance for the review, hence excluded, along with any proceeding paper or review.
- (3) Read through the abstracts and discard the ones that did not indicate any quantitative work and empirical test of the DC–performance relationship, by for example mentioning roles of DCs, their influence on specific performance-related outcomes or quantitative

Table 1. Number of articles after each round of elimination

| Stage/ filter | Description | Article count remaining after applying filter |
|------------------|--|--|
| 1 | Search for articles with 'dynamic', 'capabilit*' in title, and 'performance' and at least one of the words* indicating empirical content in topic in ISI Web of Knowledge Social Sciences Citation Index | 409 |
| 2 | Scientific Articles with the former search criteria, applying the DC concept in a business context | 253 |
| 3 | Remaining abstracts read to ensure substantive (DC and performance study) and methodological relevance (quantitative empirical studies) | 182 |
| 4 | Retrieve full text versions of articles | 173 |
| 5 | Read through the articles and discard those that do not quantitatively study interactions between constructs explicitly labelled DCs and performance | 92 |

'empirical', 'test', 'data', 'finding*', 'statistical', 'result*', 'quantitative' or 'evidence*'.

measures employed. As a result, a number of articles were excluded from the review. At this stage, conceptual articles were left out, along with qualitative and case studies.

- (4) Full text of the remaining articles was retrieved.
- (5) Read through the articles and discard the ones that did not quantitatively study the interaction between constructs labelled DC and performance. At this stage, a rigorous analysis was performed, with the main aim of dividing the studies in types of DC–performance relationship. Articles were included in the final sample only if (a) discussed at least one construct explicitly identified as a DC, (b) specified their operationalization and measurement based on quantitative data (c), explicitly utilized the DC construct to analyse some sort of influence on performance-related outcomes (d) and indicated variables of performance, being used as an outcome. Hence, articles including only modelling and simulations (e.g., Liu et al., 2012), studies where capabilities were not suitably and explicitly identified and operationalized as DCs (e.g., Jeng & Pak, 2016) and performance was not an outcome variable (e.g., Nieves & Haller, 2014) were excluded.

As evidenced by Table 1, the first search yield 409 articles, then further refined by a business context, excluding 81 articles in, for instance, an engineering or robotic context, leaving 328 articles. Proceeding papers (58) and reviews (17) were excluded, leaving only scientific articles. Thus, 253 articles were left for reading through the abstracts. Close to half (79) of the excluded articles (161) from the 253 articles, were left out based on their conceptual (28) and qualitative nature (51). Based on the integral search criteria summarized in Table 1, 92 articles were left to be included in the analysis. This number may imply that while the ideas of DC research have been pervasive, operationalizing the concept continues to prove challenging (Laaksonen & Peltoniemi, 2016).

Analysis

Having collected all the relevant articles, categorization schemes were developed. The initial effort was the elaborate an overview-scheme of existing types of hypothesized relationship between DCs and performance, attempting to categorize the role of DCs used in assessing their influence on performance. That is, whether the DCs were conceived to have a direct, mediating or indirect role in determining performance outcomes. This scheme served as the basis for the analysis. Next, an attempt to schematize the variables (antecedents, mediators, moderators and outcomes) applied for examining the DC influence on performance was made, analysing possible patterns.

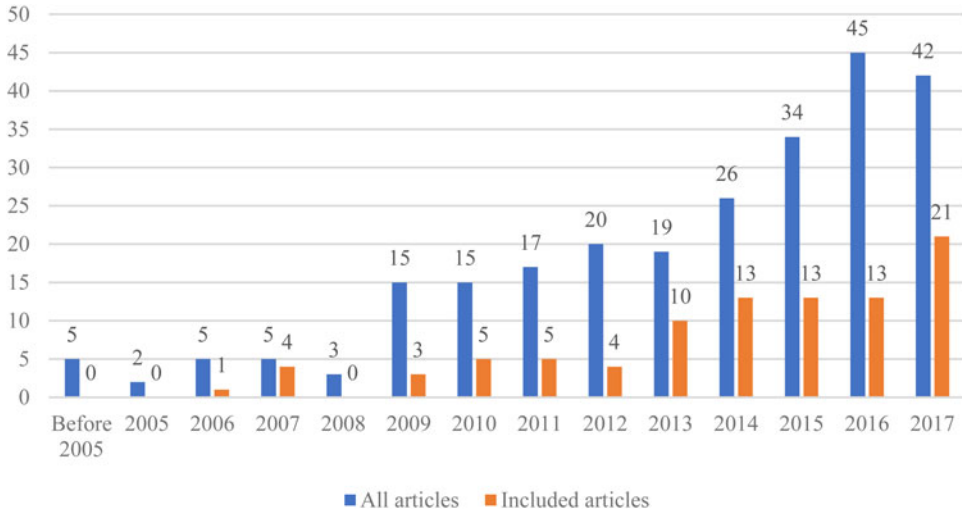


Figure 1. Articles per year.

The articles analysed range from 2006–2017. As evidenced by Figure 1, the complex DC–performance relationship has gained increasingly research attention, culminating in 2017, this being the year with most publication. This may counterargument the idea of the DC literature be entering a maturity phase defended by Albort-Morant et al. (2018).



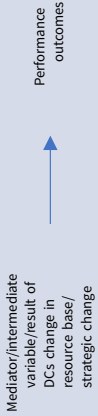

Hypothesized relationships between dynamic capabilities and performance

A vital reason for the increased interest in DCs is their proposed influence on important outcome variables (Schilke, Hu, & Helfat, 2018). Indeed, the performance-enhancing effect of DCs is often viewed as a key tenet of this literature (Fainshmidt, Nair, & Mallon, 2017). Consensus about DCs detaining an essential influence on performance outcomes seems to exist. Nearly all articles found a positive impact on varied performance outcomes. In fact, the discussion appears to have shifted from *whether* DCs relate to performance to *how* they relate (Wilden, Devinney, & Dowling, 2016). Immediate results of DCs have mainly been examined in terms of either direct performance or changes in operational capabilities, depending on the conceptualization of the hypothesized nature of the DC–performance relationship. Throughout the literature, DCs are given a variety of roles when assessing performance outcomes. They have primarily been used as independent, dependent and mediating variables. Out of the 92 studies, 24 tested the direct impact of the DCs on performance, while 32 used a mixed approach (both direct and indirect role of the DCs), where, at some point, the direct effect of DCs on performance was hypothesized and empirically tested. The remaining 36 studies hypothesized only an indirect role of the DCs for assessing performance outcomes. As such, in 56 of the articles a hypothesized direct relationship is identified, while 68 articles empirically tests, at some point, the indirect effects of DCs on performance outcomes.

Drawing on the analysis, four broad types of hypothesized relationships between DCs and performance were identified, illustrated in Table 2. In total, 56 empirically tested the first type of relationship, 38 tested the second, 29 tested the third and 1 tested the fourth.

The first identified type of hypothesized relationship is the direct one. Following Eriksson (2014), the direct relationship is discussed either in isolation or as influenced by moderating factors (Example 1, Table 2). Among these studies, only two (Alves, Barbieux, Reichert, Tello-Gamarra, & Zawislak, 2017; Sicotte, Drouin, & Delerue, 2014) postulated a direct

Table 2. Hypothesized relationships between DCs and performance

| # | Type of relationship/role of dynamic capabilities | Authors |
|----|--|--|
| 1. |  <p>DC → Performance outcomes</p> | <p>Agarwal and Selen (2013), Alves et al. (2017), Chen and Chang (2013), Cheng and Chen (2013), Cheng, Yang, and Sheu (2016), Cheng, Chen, and Huang (2014), Chien and Tsai (2012), Chiu, Chi, Chang, and Chen (2016), Dias and Pereira (2017), Drnevich and Kraaijenbrink (2013), Fainshmidt, Nair, and Mallon (2017), Falasca et al. (2017), Fang and Zou (2009), Gehardi, von Delft, and Guderhan (2016), Girod and Whittington (2017), Hang, Baizhou, and Jianxin (2014), Hsu and Wang (2012), Hung, Chung, and Lien (2007), Hung et al. (2010), Jiang, Mavondo, and Matanda (2015), Ju, Park, and Kim (2016), Karimi and Walter (2015), Kim, Shin, Kim, and Lee (2011), Kim and Boo (2010), Konwar et al. (2017), Kuo, Lin, and Lu (2016), Liao, Kickul, and Ma (2009), Lin and Chen (2017), Malik and Kotabe (2009), Mitrega and Pfaffar (2015), Monteiro, Soares, and Rua (2017), Nedzinskas et al. (2013), Park and Kim (2013), Peng and Lin (2017), Pinho and Prange (2016), Plattfaut, Niehaves, Voigt, Malsbender, Ortbach, and Poespelbuss (2015), Prasad and Green (2015), Ringov (2017), Schilke (2014a, 2014b), Shafia et al. (2016), Scotte, Drouin, and Delerue (2014), Swoboda and Olejnik (2016), Takahashi, Bulgacov, and Giacomini (2017), Wang, Senaratne, and Rafiq (2015), Wang and Hsu (2010), Wang, Klein, and Jiang (2007), Wilden et al. (2013), Wilhelm, Schlömer, and Maurer (2015), Wu (2007), Wu (2010), Wu (2006), Wu, Lin, and Hsu (2007), Zhan and Chen (2013), Zheng, Zhang, and Du (2011)</p> |
| 2. |  <p>Antecedents to DC/resource/processes/capability → Dynamic capability (mediator or intermediate outcome) → Performance outcomes</p> | <p>Blome, Schoenherr, and Reihusen (2013), Cheng, Chen, and Huang (2014), Chen and Tsai (2012), Fainshmidt, Nair, and Mallon (2017), Falasca et al. (2017), Fang and Zou (2009), Han and Li (2015), Hemmati et al. (2016), Hermanto and Martin-Cruz (2016), Hsu and Wang (2012), Hung, Chung, and Lien (2007), Kim et al. (2011), Ko and Liu (2016), Liao, Kickul, and Ma (2009), Lin and Wu (2014), Mitrega and Pfaffar (2015), Monterfer, Blesa, and Ripollés (2015), Monteiro, Soares, and Rua (2017), Park and Kim (2013), Peng and Lin (2017), Piening and Salge (2015), Pinho and Prange (2016), Plattfaut et al. (2015), Saragh, Rahayu, and Wibowo (2017), Sarkar, Coelho, and Maroco (2016), Swoboda and Olejnik (2016), Tsai and Shih (2013), Villar, Alegre, and Pla-Barber (2014), Wamba et al. (2017), Wang, Klein, and Jiang (2007), Wang, Senaratne, and Rafiq (2015), Wu, Chen, and Jiao (2016), Wu (2007), Wu (2006), Zhang and Wu (2017), Zheng, Zhang, and Du (2011)</p> |
| 3. |  <p>Dynamic capability → Mediator/intermediate variable/result of DCs change in resource base/strategic change → Performance outcomes</p> | <p>Arend (2010), Battisti and Deakins (2017), Bustiza, Molina, and Arias-Aranda (2010), Cai et al. (2014), Dias and Pereira (2017), Garcia-Morales, Jiménez-Barrionuevo, and Mihi-Ramirez (2011), Gnzy, Baker, and Grinstein (2014), Jiang, Mavondo, and Matanda (2015), Ju, Park, and Kim (2016), Karimi and Walter (2015), Kuo, Lin, and Lu (2016), Lee and Rha (2016), Leonidou et al. (2015), Lin and Chen (2017), Liu and Hsu (2011), Mikalef and Pateli (2017), Mu (2017), Pawlou and El Sawy (2013), Protogerou, Caloghrinou, and Lioukas (2012), Rashidrafi, Salimian, Soltani, and Fazeli (2017), Shaifa et al. (2016), Takahashi, Bulgacov, and Giacomini (2017), Vanpoucke, Vereecke, and Werzels (2014), Vickery, Koufteros, and Droge (2013), Wilden and Guderhan (2017, 2015), Yi et al. (2015), Zhan and Chen (2013)</p> |
| 4. |  <p>Dynamic capability → Change in resource base → Performance outcomes</p> | <p>Makkinen et al. (2014)</p> |

relationship without any moderating factors interfering with the relationship. The remaining studies grouped within the direct relationship approach all included a moderator, after testing the direct relationship between DCs and performance.

The number of studies hypothesizing a direct relationship is quite high, yet in accordance with other analytical results (e.g., Laaksonen & Peltoniemi, 2016). The earliest 13 studies ranging from 2006–2010 test a direct relationship, in accordance with the expected. However, the more recent adoption of this approach, is somewhat alarming, as the promotion of an indirect relationship has been a conceptual concern for quite some time (e.g., Barreto, 2010; Wilden, Devinney, & Dowling, 2016). A total of 56 of the analysed studies conceptualized, at some point, a direct approach for analysing the effects of DCs on performance, being 11 of them published as recent as 2017. A possible explanation can be attributed to the quantitative measures of DCs that may just oversimplify the phenomenon and research design (Eriksson, 2014) or evidence that there is still a long way to go, regarding a concise approach for assessing the DC–performance relationship for scholars to adopt.

Examples 2, 3 and 4 in Table 2 represent an indirect conceptualization of the DC–performance relationship. In total, 68 studies tested at some point an indirect relationship, whereas 36 of them adopted an exclusively indirect approach for assessing DCs' influence on performance outcomes. A total of 38 articles, 23 from the mixed approach and 15 from the indirect approach, adopted example 2 as the tested relationship, assuming DC as a mediator or intermediating variable. A total of 29 studies, 9 from the mixed approach and 20 from the indirect approach, viewed DCs as an independent variable (Example 3, Table 2), while only one article tested the relationship in example 4 (Table 2), including evolutionary fitness as a final outcome variable.

In the second type of relationship (Example 2, Table 2), DCs are recognized to have antecedents, serving as a mediating variable. Throughout the literature, DCs have been used as a mediating variable between organizational resources and performance (e.g., Liao, Kickul, & Ma, 2009; Lin & Wu, 2014; Wamba, Gunasekaran, Akter, Ren, Dubey, & Childe, 2017; Zhang & Wu, 2017), strategic orientation and performance (Sarkar, Coelho, & Maroco, 2016), organizational process alignment and performance (Hung, Yang, Lien, McLean, & Kuo, 2010), knowledge management practices and performance (Falasca, Zhang, Conchar, & Li, 2017; Villar, Alegre, & Pla-Barber, 2014), international diversification and performance (Wu, Chen, & Jiao, 2016) and among others.

According to Di Stefano, Peteraf, and Verona (2014), a direct relationship is not even a matter for debate anymore; it is nothing but a matter of confusion, in that it produces the same tautology of which the DCV has been accused of. Although the second type of relationship is a bit more complex than the anterior, Eriksson (2014) defends that viewing DCs as mediators or intermediaries, is still not enough, because some sort of direct relationship with performance is implied, due to the lack of change output that should derive from the DCs, before affecting the final performance outcome. Attributing DCs a direct influence on performance is in conflict with the idea of them involving change. Actually, results of anterior investigations, having left out operational capabilities, raise a question of validity of the positive influence documented, as the observed improved performance may not be caused by DCs (Laaksonen & Peltoniemi, 2016).

Consequently, attributing DCs an indirect role, in the form of examples 3 or 4 (Table 2), appears to be the most promising approach, portraying the DC construct in a more in-depth manner (e.g., Barreto, 2010; Laaksonen & Peltoniemi, 2016; Wilden, Devinney, & Dowling, 2016). This stream of quantitative research investigates the performance implications of DCs by considering the mediating role of the organizational resource base, change and improvements. Amongst these studies, results indicate an indirect association enhanced by local integration and marketing program adoptions (Gnizy, Baker, & Grinstein, 2014), speed of strategic change (Yi, He, Ndofor, & Wei, 2015) and product and process innovation (Ju, Park, & Kim, 2016). Others examine changes in specific operational capabilities as a direct result of DCs (e.g., Mu, 2017; Pavlou & El Sawy, 2013; Wilden & Gudergan, 2015). On a broader level, studies focus on organizational change in general (Makkonen, Pohjola, Olkkonen, & Koponen, 2014), business

process improvements (Yoshikuni & Albertin, 2017), competitive advantage (Kuo, Lin, & Lu, 2016) or operational performance, including increased process flexibility and efficiency (Vanpoucke, Vereecke, & Wetzels, 2014) as an immediate outcome of DCs.

Assuming the indirect approach as the most pertinent, forthcoming investigations should use a configurational framework to assess both the performance of the individual system elements and the outcomes of the entire configuration (Wilden, Devinney, & Dowling, 2016). Helfat and Peteraf (2009) recommend that empirical assessments of the DC–performance relationship should firstly address the DC effect on intermediate outcomes, such as operational or strategic change, and, subsequently, measure the effect of these intermediate outcomes on task-oriented performance and hence, survival and growth, measured in the context of evolutionary fitness. This represents the illustrated relationship in example 4 (Table 2). The study of Makkonen et al. (2014) is the only strong example assessed through this lens. This study investigates the indirect effect of DCs, though the effect of organizational change (intermediate outcome of DC) and product innovation performance (specific task performance), for, lastly, assessing the influence on the evolutionary fitness (general performance growth over time). In sum, the investigations included in the third and fourth example (Table 2) have in common the consideration of DCs' connection to change, implying an effect on performance, however indirectly, by reconfiguring operational capabilities into new ones that better fit the environment. These are one step closer to overcome the critique of DCs being tautologically linked to performance (Pavlou & El Sawy, 2013). Consequently, assessing the change aspect in a more exhaustive manner presents opportunities for further refinement of the DC, as it enhances the understanding of solid consequences of DCs.

Conceptualization of dynamic capabilities

Throughout the analysis, a lack of homogeneity regarding the conceptualizations of DCs and related variables, along with overlapping are denoted. Generally, the analysed investigations appear to employ a continuum of conceptualization, making it a challenge to identify tendencies or clear categorizations. Tables 3 and 4 are provided for better clearance. Table 3 gives an overview of the conceptualization of DCs used in the direct approach, whereas Table 4 presents the variables used as DCs in the indirect approach.

In accordance with the discussion offered by Eriksson (2014), two main tendencies are identified: focus on specific or more generic DCs. Both are indeed represented in the literature, regardless of the relationship hypothesized, as evidenced by Tables 2 and 3. It was found that the DC concept mainly has been defined and operationalized as organizational skills (e.g., Bustinza, Molina, & Arias-Aranda, 2010; Fang & Zou, 2009), managerial skills (e.g., Gnizy, Baker, & Grinstein, 2014; Nedzinskas, Pundzienė, Buožiūtė-Rafanavičienė, & Pilkienė, 2013), organizational routines (e.g., Agarwal & Selen, 2013) and/or organizational processes (e.g., Piening & Salge, 2015).

Studies conceptualizing DCs as specific tend to focus on marketing DCs (e.g., Falasca et al., 2017; Ko & Liu, 2016; Yi et al., 2015), innovation DCs (e.g., Cheng & Chen, 2013; Hsu & Wang, 2012; Hung et al., 2010), technological/IT related DCs (Drnevich & Kriauciunas, 2011; Mikalef & Pateli, 2017; Yoshikuni & Albertin, 2017), managerial DCs, such as timely decision-making capacity (Li & Liu, 2014) and asset management capability (Fainshmidt, Nair, & Mallon, 2017), business process related DCs, such as business relationship process management (Mitrega & Pfajfar, 2015) and research and development DCs (e.g., Hsu & Wang, 2012). However, the mainstream of studies uses a more generic approach for operationalization of DCs, in line with Eriksson (2014) findings, meaning that they are not confined to any function or task domain throughout the organization (Barreto, 2010). When adopting a direct approach, the use of generalized DCs seems to be the election choice. For the indirect approach, approximately half of the studies use a generic assessment of DCs. The most frequent generalized

Table 3. Conceptualization of DCs – direct relationship

| Generic DCs | Specific DCs |
|---|--|
| <p>Reconfiguration</p> <p>Chiu et al. (2016), Gelhard, von Delft, and Gudergan (2016), Girod and Whittington (2017), Kuo, Lin, and Lu (2016), Monteiro, Soares, and Rua (2017), Nedzinskas et al. (2013), Ringov (2017), Shafia et al. (2016), Takahashi, Bulgacov, and Giacomini (2017), Wilden et al. (2013), Wilhelm, Schlömer, and Maurer (2015), Wu (2007)</p> | <p>Innovation DCs</p> <p>Agarwal and Selen (2013), Alves et al. (2017), Cheng and Chen (2013), Plattfaut et al. (2015), Sicotte, Drouin, and Delerue (2014), Wu, Lin, and Hsu (2007)</p> |
| <p>Reconstruction</p> <p>Girod and Whittington (2017), Hang, Baizhou, and Jianxin (2014)</p> | <p>Marketing DC</p> <p>Falasca et al. (2017), Fang and Zou (2009), Hsu and Wang (2012), Konwar et al. (2017), Peng and Lin (2017), Wang and Hsu (2010)</p> |
| <p>Sensing</p> <p>Cheng, Yang, and Sheu (2016), Cheng, Chen, and Huang (2014), Chien and Tsai (2012), Dias and Pereira (2017), Wang and Hsu (2010), Zheng, Zhang, and Du (2011)</p> | <p>Dynamic accounting information system capability</p> <p>Prasad and Green (2015)</p> |
| <p>Seizing</p> <p>Cheng, Yang, and Sheu (2016), Cheng, Chen, and Huang (2014), Chien and Tsai (2012), Dias and Pereira (2017), Wang and Hsu (2010), Zheng, Zhang, and Du (2011)</p> | <p>Supply-chain DC</p> <p>Ju, Park, and Kim (2016)</p> |
| <p>Learning</p> <p>Gelhard, von Delft, and Gudergan (2016), Lin and Chen (2017), Monteiro, Soares, and Rua (2017), Takahashi, Bulgacov, and Giacomini (2017), Wu (2007), Wu (2010), Wu (2006)</p> | <p>New product development capability</p> <p>Schilke (2014a)</p> |
| <p>Grasping</p> <p>Hang, Baizhou, and Jianxin (2014)</p> | <p>Managerial DC</p> <p>(e.g., asset management, alliance management)</p> <p>Fainshmidt, Nair, and Mallon (2017), Li and Liu (2014), Schilke (2014a, 2014b)</p> |
| <p>Knowledge-based DC</p> <p>Cheng, Yang, and Sheu (2016), Cheng, Chen, and Huang (2014), Chien and Tsai (2012), Dias and Pereira (2017), Wang and Hsu (2010), Wang, Klein, and Jiang (2007), Zheng, Zhang, and Du (2011)</p> | <p>IT enabled DC</p> <p>Drnevich and Kriauciunas (2011)</p> |
| <p>Exploitation</p> <p>Zhan and Chen (2013)</p> | <p>Operational flexibility</p> <p>Wu, Lin, and Hsu (2007)</p> |
| <p>Exploration</p> <p>Zhan and Chen (2013)</p> | <p>Meeting planners' DC</p> <p>Kim and Boo (2010)</p> |
| <p>Coordination</p> <p>Takahashi, Bulgacov, and Giacomini (2017)</p> | <p>Research and development</p> <p>Hsu and Wang (2012), Wang and Hsu (2010)</p> |
| <p>Integration</p> <p>Jiang, Mavondo, and Matanda (2015), Liao, Kickul, and Ma (2009), Monteiro, Soares, and Rua (2017), Takahashi, Bulgacov, and Giacomini (2017), Wu (2007), Wu (2010), Wu (2006)</p> | <p>Production capability</p> <p>Wang and Hsu (2010)</p> |
| <p>Transforming</p> <p>Park and Kim (2013)</p> | <p>Dynamic internationalization capabilities</p> <p>Pinho and Prange (2016)</p> |
| <p>Absorptive DC</p> <p>Wang, Senaratne, and Rafiq (2015)</p> | <p>Dynamic entrepreneurial orientation</p> <p>Swoboda and Olejnik (2016)</p> |
| | <p>Organizational DC</p> <p>Hung, Chung, and Lien (2007, 2010)</p> |
| <p>Change response</p> <p>Karimi and Walter (2015), Monteiro, Soares, and Rua (2017), Wu (2007), Wu (2006)</p> | <p>Green DC</p> <p>Chen and Chang (2013), Lin and Chen (2017)</p> |
| | <p>Business process DCs</p> <p>Kim et al. (2011), Mitrega and Pfajfar (2015)</p> |

variables of DCs are: Knowledge-based DCs, learning, integration, sensing, seizing and reconfiguration.

Although different names, some of the generic DCs, are fairly similar or at least overlapping. For example, Makkonen et al. (2014) used terms as regenerating and renewing capabilities for operationalizing DCs. Yet, regenerative capabilities are in more detail referring to reconfiguration, leveraging and learning, while renewing capabilities regards knowledge creation, sensing, seizing and integration. Some designate DCs as adaptive capability (e.g., Sarkar, Coelho, & Maroco, 2016), which is largely related to the organizational capacity to identify and seize opportunities (Wilden, Devinney, & Dowling, 2016). The same happens with specific DCs. Some label DCs directly as a new product development capability (Schilke, 2014b), others (e.g., Cheng & Chen, 2013) as innovative capability, which, in turn, is strongly related to the organizational ability to create new products (Wilden, Devinney, & Dowling, 2016). These pieces of evidence may prove some reasoning to the idea that DCs continue to be vague and poorly comprehended, in need of further operational clearance, before constituting a robust framework (Barreto, 2010).

In addition to the overlapping, another discrepancy is noted. To some degree, the literature is still in disagreement and confuses potential DCs with possible outcomes. For example, Drnevich and Kriauciunas (2011) measure their IT-enabled DC as the capability to develop new products/services, to implement new business processes, create new customer relationships and to change ways of doing business. Accordingly, Zahra, Sapienza, and Davidsson (2006) stressed that the qualifier 'dynamic' should distinguish the substantive ability to develop new products from the capability to reform the way the firm develops new products. A new routine for product development is a new operational capability, but the ability to change such capabilities is a DC. Some of the variables used in the study of Drnevich and Kriauciunas (2011) to measure DC are transaction capability, including the use of formal criteria to select its suppliers and operations capabilities, including using of statistical control of processes. These might be considered more as being a part of managerial and organizational processes that underlie and enable the deployment of DCs, being categorized as the micro foundations of them (Teece, 2007) or internal antecedents (Eriksson, 2014). These types of discrepancies produce confusions that might hinder an effective progress within this field of research. The literature needs to more evidently distinguish between organizational antecedents, such as organizational or managerial capabilities and processes that can facilitate the deployment of the DCs, mediators and intermediate outcomes from the DC concept itself. It is vital that researchers link their findings to previous research, so that knowledge can truly accumulate (Eriksson, 2014). Researchers also ought to be consistent about the level of analysis, as for whether they are concerned with individual managers or the organization as a whole (Laaksonen & Peltoniemi, 2016).

Another fundamental aspect is the definition of DCs that need to be considered carefully (Eriksson, 2014). Theoretically, all of the articles adopting an exclusively direct approach should conceptualize their DCs according to the vision of Teece, Pisano, and Shuen (1997). In most cases, this is verified. However, some (e.g., Hang, Baizhou, & Jianxin, 2014; Konwar, Papageorgiadis, Ahammad, Tian, McDonald, & Wang, 2017) do not take a clear stand of which theoretical perspective they are undertaking. The same goes for the indirect approach. The majority identifies Teece, Pisano, and Shuen (1997) line of ideas as their base for operationalizing their study, while only seven articles clearly state that their study is operationalized following the line of Eisenhardt and Martin (2000) (e.g., Arend, 2014; Makkonen et al., 2014; Protogerou, Caloghirou, & Lioukas, 2012). Many of the articles vividly cite both perspectives, and in the end, they do not make a clear theoretical standpoint for the subsequent operationalization of DCs. Investigators need to explicitly choose as whether they define DCs as organizational and strategic processes and/or routines, viewed as best-practices (Eisenhardt & Martin, 2000) or unique abilities, skills or capacities (Teece, Pisano, & Shuen, 1997), because this will influence the theoretical development and operationalization of the DC construct. An understandable example is as follows: Eisenhardt and Martin (2000) are stronger in their assertions

Table 4. Conceptualization of DCs – indirect relationships

| Relationship 2 | | Relationship 3 | | | Relationship 4 |
|---|---|--|--|---|----------------|
| Generic DC | Specific DC | Generic DC | Specific DC | Generic DC | Specific DC |
| Reconfiguration Lin and Wu (2014), Monteiro, Soares, and Rua (2017), Saragih, Rahayu, and Wibowo (2017), Wu (2007) | Innovation DCs Hsu and Wang (2012), Piening and Salge (2015), Plattfaut et al. (2015), Sarkar, Coelho, and Maroco (2016) | Reconfiguration Kuo, Lin, and Lu (2016), Shafia et al. (2016), Takahashi, Bulgacov, and Giacomini (2017), Wilden and Gudergan (2017, 2015) | IT enabled DC Mikalef and Patel (2017), Yoshikuni and Albertin (2017) | Reconfiguration Makkonen et al. (2014) | |
| Sensing Park and Kim (2013), Saragih, Rahayu, and Wibowo (2017), Zhang and Wu (2017) | Marketing DC Falasca et al. (2017), Fang and Zou (2009), Ko and Liu (2016), Peng and Lin (2017) | Sensing Kuo, Lin, and Lu (2016), Mu (2017), Pavlou and El Sawy (2013), Rashidrad et al. (2017), Shafia et al. (2016), Takahashi, Bulgacov, and Giacomini (2017), Wilden and Gudergan (2017, 2015) | Marketing DC Dias and Pereira (2017), Yi et al. (2015) | Sensing Makkonen et al. (2014) | |
| Seizing Park and Kim (2013), Zhang and Wu (2017) | Supply-chain DC Blome, Schoenherr, and Rexhausen (2013) | Seizing Kuo, Lin, and Lu (2016), Shafia et al. (2016), Takahashi, Bulgacov, and Giacomini (2017), Wilden and Gudergan (2017) | Supply-chain DC/dynamic supplier integrative capability Ju, Park, and Kim (2016), Lee and Rha (2016), Vanpoucke, Vereecke, and Wetzels (2014), Vickery, Koufteros, and Droge (2013) | Seizing Makkonen et al. (2014) | |
| Learning Lin and Wu (2014), Monteiro, Soares, and Rua (2017), Wu (2007), Wu (2006) | Managerial DC Faimshmidt, Nair, and Mallon (2017) | Learning Bustinza, Molina, and Arias-Aranda (2010), Pavlou and El Sawy (2013), Protogerou, Caloghirou, and Lioukas (2012), Rashidrad et al. (2017), Takahashi, Bulgacov, and Giacomini (2017) | Green DC Chen and Chang (2013), Leonidou et al. (2015), Lin and Chen (2017) | Learning Makkonen et al. (2014) | |
| Knowledge-based DC Cheng, Chen, and Huang (2014), Chien and Tsai (2012), Han and Li (2015), Monferrer, Blesa, and Ripollés (2015), Villar, Alegre, and Pla-Barber (2014), Wang, Klein, and Jiang (2007), Zheng, Zhang, and Du (2011) | Research and development Hsu and Wang (2012), Kuo, Lin, and Lu (2016) | Knowledge-based DC Bustinza, Molina, and Arias-Aranda (2010), Dias and Pereira (2017) | Technological DC Yi et al. (2015) | Knowledge-based DC (creation) Makkonen et al. (2014) | |
| Coordination Saragih, Rahayu, and Wibowo (2017) | Dynamic internationalization capabilities Pinho and Prange (2016) | Coordination Pavlou and El Sawy (2013), Protogerou, Caloghirou, and Lioukas | Market-linking DC Yi et al. (2015) | Leveraging Makkonen et al. (2014) | |

(Continued)

Table 4. (Continued.)

| Relationship 2 | | Relationship 3 | | Relationship 4 |
|---|--|---|--|---|
| Generic DC | Specific DC | Generic DC | Specific DC | Generic DC |
| Integration Liao, Kickul, and Ma (2009), Monteiro, Soares, and Rua (2017), Saragih, Rahayu, and Wibowo (2017), Wu (2007), Wu (2006) | Dynamic entrepreneurial orientation Swoboda and Olejnik (2016) | (2012), Rashidirad et al. (2017), Takahashi, Bulgacov, and Giacomini (2017) | Integration Battisti and Deakins (2017), Jiang, Mavondo, and Matanda (2015), Pavlou and El Sawy (2013), Rashidirad et al. (2017), Takahashi, Bulgacov, and Giacomini (2017) | External DC Cai et al. (2014) |
| Absorptive DC Wang, Senaratne, and Rafiq (2015) | Organizational DC Hung, Chung, and Lien (2007, 2010), Tsai and Shih (2013) | Proactive posture Battisti and Deakins (2017) | Strategic DC (e.g., strategic orientation) García-Morales, Jiménez-Barrionuevo, and Mihí-Ramírez (2011), Gnizy, Baker, and Grinstein (2014) | Integration (knowledge) Makkinen et al. (2014) |
| Change response Monteiro, Soares, and Rua (2017), Wu (2007), Wu (2006) | Business process DCs Kim et al. (2011), Mitrega and Pfajfar (2015), Wamba et al. (2017) | Change response Karimi and Walter (2015) | | |
| Transforming Park and Kim (2013) | Meeting planners' DC Kim and Boo (2010) | Transforming Mu (2017) | | |
| Opportunity recognizing Wu, Chen, and Jiao (2016) | Strategic agility Hemmati et al. (2016) | Shaping Mu (2017) | | |
| Opportunity capitalizing Wu, Chen, and Jiao (2016) | Portfolio DCs Hermano and Martin-Cruz (2016) | Quality of DC Arend (2014) | | |
| | | Methods for changing DC Arend (2014) | | |
| | | Strategic response Protogerou, Caloghirou, and Lioukas (2012) | | |
| | | Upgrading Liu and Hsu (2011) | | |
| | | Exploitation Liu and Hsu (2011) | | |

that DCs actually consist of identifiable and specific routines. Thus, their perspective of the DCV could be considered particularly suited when studying a more specific DC, as they strike how e.g., acquisitions, alliances and product innovation can be seen as real DCs. On the contrary, the vein of Teece, Pisano, and Shuen (1997) could be considered more prominent for analysing more generic DCs, such as seizing, sensing and reconfiguration (Eriksson, 2014). According to Laaksonen and Peltoniemi (2016), Eisenhardt and Martin (2000) logic of best practices suggest that DCs should not be measured by their quantity, but rather through a binary variable: a firm either has a best practice, or routine constituting a DC or it does not (see study of Arend, 2014). Differently, Teece, Pisano, and Shuen (1997) suggest that DCs are unique to the firm. This implies that, when DCs are operationalized, they should be measured by their type (Laaksonen & Peltoniemi, 2016). There is a strong need for accounting for the multilevel nature of DCs, a clearer distinguishing and conceptualization when realizing empirical studies and a need for rethinking rethink methodological approaches in a manner that aligns better to what is theoretically implied (Wilden, Devinney, & Dowling, 2016).

Antecedents to dynamic capabilities

Antecedents refer to the factors, which affect the emergence of DCs (Eriksson, 2014). For obvious reasons, the direct approach does not acknowledge antecedent for DCs for empirical purposes. However, scholars guided by the second type of relationship (Table 2) have generally recognized the existence of antecedent of DCs, in the assessment of the relationship between DCs and performance, presented in Table 5.

From Tables 2 and 5, it becomes apparent that scholars continue to remain interested in the origins of DCs. Consistent with Teece, Pisano, and Shuen (1997) original presentation of the DC perspective and in line with the findings of Schilke, Hu, and Helfat (2018), existing resources continue to receive attention among relevant organization-level drivers of DCs. Internal operational resources and capabilities that enable a firm to perform activities on an on-going basis, maintaining status quo (Vijaya, Ganesh, & Rahul, 2019), seems to be the choice of election concerning the antecedents to DCs, followed by strategic variables, such as firm orientation (e.g., Peng & Lin, 2017; Sarkar, Coelho, & Maroco, 2016) and firm strategy (e.g., Tsai & Shih, 2013). Scholars have argued that resource-rich firms tend to have greater capability to plan, execute and maintain strategic change (Fang & Zou, 2009; Helfat & Peteraf, 2009; Schilke, Hu, & Helfat, 2018). The existent resource base within a firm has been found to be conducive to DCs, facilitate and influence its development, among them, financial resources (e.g., Monteiro, Soares, & Rua, 2017), technological resources (e.g., Liao, Kickul, & Ma, 2009) and entrepreneur resources (e.g., Wu, 2007). This indicates that the majority of the studies adopting the second example of relationship assumes that DCs have somewhat of a mediating effect for achieving superior firm performance. Of these, few authors have included external variables as antecedents. For example, Saragih, Rahayu, and Wibowo (2017) concluded that DCs act as a mediator between the external environment (e.g., technological and economic change, barning power of supplier and rivalry) and business performance, while Fainshmidt, Nair, and Mallon (2017) found that firms operating in dynamic industries develop stronger asset management capabilities. These investigations highlight that firms' efforts to build DCs do not occur in a vacuum, but are substantially affected by the broader organizational environment (Schilke, Hu, & Helfat, 2018). The inclusion of macro environmental variables, as antecedents to DCs has been modest, as these have predominantly been included as moderators. This is one notable aspect of the DC–performance research, that is, several of the antecedents in the framework depicted in Table 5 are also used as moderators of the relationship. For example, environmental/industry dynamism has both been stated to be an antecedent to DC (Fainshmidt, Nair, & Mallon, 2017; Saragih, Rahayu, & Wibowo, 2017) and a moderator of the DC–performance effect (Schilke, 2014b). Overall, it becomes clear that there is not a single source for DC, in line with the results of Schilke, Hu, and Helfat (2018). In fact,

Table 5. Antecedents/influencers to DCs

| Antecedents to DC | Authors |
|---|--|
| Success traps | Wang, Senaratne, and Rafiq (2015) |
| Knowledge management practice | Falasca et al. (2017), Kim and Boo (2010), Villar, Alegre, and Pla-Barber (2014) |
| Firm orientation: Strategic orientation Network market orientation Entrepreneurial orientation Institutional orientation | Peng and Lin (2017), Sarkar, Coelho, and Maroco (2016) Monferrer, Blesa, and Ripollés (2015) Monteiro, Soares, and Rua (2017) Cheng, Chen, and Huang (2014) |
| Specific firm strategy: Environmental strategy Responsible downsizing strategy | Ko and Liu (2016) Tsai and Shih (2013) |
| Organizational resources and capabilities (e.g., financial, human, marketing, technological resources, entrepreneur resources, equipment, management capability, cooperative alliance experience, reputation, know-how/knowledge, relational and intellectual capital, information, big data analytical capability and social networking capability/social networks) | Chien and Tsai (2012), Han and Li (2015), Hemmati et al. (2016), Hsu and Wang (2012), Kim and Boo (2010), Liao, Kickul, and Ma (2009), Lin and Wu (2014), Monteiro, Soares, and Rua (2017), Pinho and Prange (2016), Plattfaut et al. (2015), Wamba et al. (2017), Wu (2007), Wu (2006), Zhang and Wu (2017) |
| Resource magnitude | Fang and Zou (2009) |
| Resource complementarity | Fang and Zou (2009) |
| Supplier selection | Mitrega and Pfajfar (2015) |
| Planning and scanning | Swoboda and Olejnik (2016) |
| Information technology infrastructure flexibility | Cheng, Chen, and Huang (2014) |
| IT support for knowledge management | Wang, Klein, and Jiang (2007) |
| Knowledge reconstruction | Park and Kim (2013) |
| Organizational slack | Park and Kim (2013) |
| Exploration | Park and Kim (2013) |
| Network embeddedness | Zheng, Zhang, and Du (2011) |
| Organizational process alignment | Hung, Chung, and Lien (2007, 2010) |
| Organizational learning culture | Hung et al. (2010) |
| Resource reconfigurability | Kim and Boo (2010) |
| Technology adeptness | Kim and Boo (2010) |
| Top management involvement | Hernano and Martín-Cruz (2016) |
| International diversification | Wu, Chen, and Jiao (2016) |
| Innovation related activities | Piening and Salge (2015) |
| External environment | Saragih, Rahayu, and Wibowo (2017) |
| Supply-side competencies | Blome, Schoenherr, and Rexhausen (2013) |
| Industry dynamism | Fainshmidt, Nair, and Mallon (2017) |
| Demand-side competencies | Blome, Schoenherr, and Rexhausen (2013) |
| Willingness for external partner cooperation | Wu (2007) |
| Willingness for associated support firms' cooperation | Wu (2006) |

Table 6. Mediators and intermediate outcomes

| Mediators and intermediate outcomes | Authors |
|--|---|
| Process business improvement | Yoshikuni and Albertin (2017) |
| Competitive strategies | Rashidirad et al. (2017), Vickery, Koufteros, and Droge (2013) |
| Competitive advantage | Kuo, Lin, and Lu (2016), Leonidou et al. (2015) |
| Change in resource base/operational capabilities (service, educational marketing, flexibility, managerial, costumer operation, innovation and technological) | Arend (2014), Battisti and Deakins (2017), Bustinza, Molina, and Arias-Aranda (2010), Dias and Pereira (2017), Jiang, Mavondo, and Matanda (2015), Kuo, Lin, and Lu (2016), Mu (2017), Pavlou and El Sawy (2013), Protogerou, Caloghirou, and Lioukas (2012), Shafia et al. (2016), Takahashi, Bulgacov, and Giacomini (2017), Wilden and Gudergan (2017, 2015) |
| Intermediate performance outcomes (operational, innovation and costumer performance) | García-Morales, Jiménez-Barrionuevo, and Mihi-Ramírez (2011), Vanpoucke, Vereecke, and Wetzels (2014), Vickery, Koufteros, and Droge (2013), Yoshikuni and Albertin (2017) |
| Technological and service innovation. | Ju, Park, and Kim (2016), Lin and Chen (2017) |
| Green creativity | Chen and Chang (2013) |
| Organizational learning process | García-Morales, Jiménez-Barrionuevo, and Mihi-Ramírez (2011) |
| Speed of strategic change | Yi et al. (2015) |
| Marketing program adoptions | Gnizy, Baker, and Grinstein (2014) |
| Organizational change | Makkonen et al. (2014) |
| Supply chain ambidexterity | Lee and Rha (2016) |
| Business scope | Liu and Hsu (2011) |
| Reconfiguration of cooperation mechanism | Cai et al. (2014) |
| Local integration | Gnizy, Baker, and Grinstein (2014) |
| Digital platform capabilities | Karimi and Walter (2015) |
| Organizational agility | Mikalef and Pateli (2017) |

despite the largely consistent findings regarding the facilitating role of the existing resource base in the development of DC, Schilke, Hu, and Helfat (2018) further argue that scholars should be aware that the relationship between operational resource and capabilities, DCs and outcomes may be more complicated than originally assumed within this type of postulated relationship (Example 2, Table 2).

Mediators and intermediate outcomes of dynamic capabilities

The researchers adopting the third and fourth example regarding the type of relationship presented in Table 2 acknowledge that DCs enable superior performance, by adding worth to a firm, through systematic change, for example, by altering its operational capabilities or resource base to facilitate strategic management (Vijaya, Ganesh, & Rahul, 2019) or enhance operational efficiency and enable an increased alignment with the environment (Di Stefano, Peteraf, & Verona, 2014; Peteraf, Di Stefano, & Verona, 2013). As evidenced by Table 6, examples of the mediators and intermediate outcomes of DC applied so far are speed of strategic orientation

(Yi et al., 2015), process business improvement (Yoshikuni & Albertin, 2017), competitive advantage and strategies (e.g., Kuo, Lin, & Lu, 2016), change in operational capabilities (service, marketing, managerial, innovation and technological capabilities) (Pavlou & El Sawy, 2013; Protogerou, Caloghirou, & Lioukas, 2012), organizational change (Makkonen et al., 2014), change in process flexibility and efficiency (operational performance) (Vanpoucke, Vereecke, & Wetzels, 2014) and technological and service innovation (e.g., Ju, Park, & Kim, 2016; Lin & Chen, 2017).

More consistent with the theoretical positions of Eisenhardt and Martin (2000), Zott (2003), Zahra, Sapienza, and Davidsson (2006), among others, these studies have argued that DCs immediate purpose is to change the resource base, and that this change or renewal, in turn, explains performance variations. According to this argument, changes serve as mediators or intermediate variables, through which DCs affect performance (Schilke, Hu, & Helfat, 2018). Commonly in the studies hypothesizing the third or fourth type of relationship, DCs were found to help firms to bring about organizational change as well as to learn a variety of activities (Schilke, Hu, & Helfat, 2018). The most popular choice for measuring intermediate outcomes is incorporating change in a firm's resource base, that is, measuring the improvement of operational resources. These changes are the causal mechanisms through which DCs affect performance outcomes (Schilke, Hu, & Helfat, 2018). For instance, Protogerou, Caloghirou, and Lioukas (2012) found that DCs support and allow the firm to explore the existing resources, enhancing the reconfiguration and development of new marketing and technological capabilities, which in turn lead to higher competitive performance in terms of market share and profitability. These authors argue, for example, that the effective and efficient realizations of coordination processes, seen as DCs, enhance the integration of tacit and codified knowledge, allowing firms to more cost effectively deliver their products and acquire more information about their customers' needs. Furthermore, change and improvements have been assessed in a variety of ways. For example, Makkonen et al. (2014) measured change as new organizational structure embodying the operational capabilities resulting from the DCs as a proxy for organizational change. Yi et al. (2015) viewed the intermediate effect of DCs on performance as speed of strategic change, which consists of the decision-making speed and the speed to implement new strategies.

Influencing factors of the dynamic capability–performance relationship

Eriksson (2014) found that prior literature has addressed external factors as antecedents for developing DCs. Although this might be true, some studies (see Table 7) seem to consider that the various endogenous and exogenous factors ought to be addressed as moderators rather than antecedents, defending that these affect the strength of the relationship between DCs and consequences (Schilke, Hu, & Helfat, 2018). Many authors, regardless of the direct or indirect approach, used changing environmental conditions as the prime-selection moderator, such as environmental dynamism (e.g., Girod & Whittington, 2017; Wilhelm, Schlömer, & Maurer, 2015), technological turbulence (Wilden & Gudergan, 2015), environmental volatility (Wu, 2010), market dynamism (Wang, Senaratne, & Rafiq, 2015), supply complexity (Vanpoucke, Vereecke, & Wetzels, 2014), government policies (Malik & Kotabe, 2009) and competitive intensity (Wilden et al., 2013). Others have also incorporated firm-specific moderators such as the firm strategy (e.g., Leonidou, Leonidou, Fotiadis, & Aykol, 2015; Wang, Senaratne, & Rafiq, 2015), organizational structure (Wilden et al., 2013), technological resource base (Cai, Chen, Li, & Liu, 2014) and firm characteristics, such as size and age (Arend, 2014).

From Table 7 it becomes apparent that the authors testing the second and third type of relationship did not as commonly include moderating factors in their study. In fact, only eight articles adopting relationship 2 and nine adopting relationship 3 included moderators. The only author (Makkonen et al., 2014) testing the fourth relationship did not include any moderator. Even though moderators are not always included, this could indicate that the DC–performance literature is indeed moving, though slowly, towards the integrating of a contingency perspective.

Table 7. Moderators

| | Relationship 1 | Relationship 2 | Relationship 3 |
|-------------------------------------|---|---|---|
| Environmental and market dynamism | Drnevich and Kriauciunas (2011), Fang and Zou (2009), Gelhard, von Delft, and Guderger (2016), Girod and Whittington (2017), Mitrega and Pfajfar (2015), Ringov (2017), Schilke (2014b), Takahashi, Bulgacov, and Giacomini (2017), Wang, Senaratne, and Rafiq (2015), Wilhelm, Schlömer, and Maurer (2015) | Fang and Zou (2009), Mitrega and Pfajfar (2015), Piening and Salge (2015), Wang, Senaratne, and Rafiq (2015), Wu (2006) | Pavlou and El Sawy (2013), Protogerou, Caloghirou, and Lioukas (2012), Takahashi, Bulgacov, and Giacomini (2017), Vanpoucke, Vereecke, and Wetzels (2014), Wilden and Guderger (2015) |
| Asset base complexity | Ringov (2017) | | |
| Open innovation activities | Cheng and Chen (2013) | | |
| Organizational inertia | Nedzinskas et al. (2013) | | |
| Internal organizational environment | Zhan and Chen (2013) | | |
| Heterogeneity | Drnevich and Kriauciunas (2011) | | |
| Government policies | Malik and Kotabe (2009) | | |
| Governance | Wang and Hsu (2010) | | |
| Competitive posture | Wang and Hsu (2010) | | |
| Firm/international strategy | Wang, Senaratne, and Rafiq (2015) | Wang, Senaratne, and Rafiq (2015) | Leonidou et al. (2015) |
| Industry munificence | Fainshmidt, Nair, and Mallon (2017) | Fainshmidt, Nair, and Mallon (2017) | |
| Organizational structure | Wilden et al. (2013) | | |
| Competitive intensity | Wilden et al. (2013) | | |
| Network power | | Zhang and Wu (2017) | |
| Process compliance | | Blome, Schoenherr, and Rexhausen (2013) | |
| Technological resource base | | | Cai et al. (2014) |
| Supply complexity | | | Vanpoucke, Vereecke, and Wetzels (2014) |
| Firm characteristics: size/age | | | Arend (2014) |

These studies represent an important refinement of empirical work on the consequences of DC, as they rest on the recognition that such effects tend to be highly context specific (Schilke, Hu, & Helfat, 2018). For example, Schilke (2014a) finds that the DC–performance link is to be stronger under intermediate levels of environmental dynamism, the most frequently studied moderator. Generically, the moderating variables have been evidenced to moderate effects of DCs, which indicates that DCs can vary with levels of turbulence in the external environment and internal

firm-specific factors, suggesting that their effects on firm performance are somehow context-dependent. The vast use of external conditions as moderators is not surprising, since it has been widely encouraged theoretically. Actually, it has been argued that DCs are more valuable in unstable environments (Teece, Pisano, & Shuen, 1997). DCs may create market change not only respond to it (Eisenhardt & Martin, 2000). This indicates that DCs and the environment evolution are not separate phenomena. They are context dependent (Winter, 2003), which makes it hard to generalize its influence on performance, without taking into account these context specific moderators. Furthermore, this leads to arguing that future direction for DC studies could be worked towards a contingency perspective, recognizing the environmental features, as moderators, cannot be excluded when analysing the DCs' influence on performance. Rather than seeking formulas for generalized effectiveness, it is important to recognize that the DCs contribute to performance, depending on the firm context. In a similar vein, contingency theory suggests that firm performance depends on the alignment of the organization with the environment (external fit), and the congruence of organizational elements with one another (internal fit) (Wilden et al., 2013). Thus, for future research, the inclusion of both organization specific and environmental moderators seems pertinent and necessary. In fact, Schilke, Hu, and Helfat (2018) defend that studies including moderators, when assessing the DC–performance relationship, help culminate and address earlier criticisms regarding the DCV's ill-defined boundary conditions.

Performance measures

A considerable variation of performance outcomes is verified when analysing the literature. These are presented in Table 8, according to the type DC–performance relationship.

As evidenced by Table 8, regardless of the type of hypothesized relationship, a considerable variation on what constitutes performance and how it should be operationalized is denoted. Many of the studies focus on firm/organizational performance in general (e.g., Sarkar, Coelho, & Maroco, 2016; Vanpoucke, Vereecke, & Wetzels, 2014; Wamba et al., 2017), whereas others consider, for example, innovation performance (e.g., Falasca et al., 2017; Makkonen et al., 2014; Wu, Lin, & Hsu, 2007), competitive/strategic performance (e.g., Fang & Zou, 2009; Hemmati, Feiz, Jalivand, & Kholghi, 2016; Shafia, Shavvalpour, Hosseini, & Hosseini, 2016) and economic/financial performance (e.g., Fainshmidt, Nair, & Mallon, 2017; Mu, 2017; Ringov, 2017). These seem to be the preferred outcome variables when assessing the DC–performance relationship, transversal to all types of relationship presented in Table 2. Thus, the most frequent conceptualization of performance is firm/organizational performance in general, followed by financial and economic based performance and innovation performance. It is striking that none of the articles regarding the third type of relationship denominated their final performance outcome as general innovation performance, an otherwise fairly used indicator. Only one study has included the evolutionary fitness construct as the final desired performance outcome (Makkonen et al., 2014) (Example 4, Table 2). By including the final performance outcome variable as evolutionary fitness, it embraces one on the fundamental aspects when investigating DCs, namely, the time/sustainability aspect (Eisenhardt & Martin, 2000; Teece, 2018), including indicators such as survival, growth and flexibility (Helfat & Peteraf, 2009; Schilke, Hu, & Helfat, 2018)

Because of this predominating wide-ranging performance approach, a need for investigating more specific aspects of performance to match existing practices in empirical work, rather than simply talking about performance in general when analysing the DC–performance relationship (Wilden, Devinney, & Dowling, 2016), is implied. Accordingly, some researchers have looked at more domain specific performance outcomes such as export performance (Monteiro, Soares, & Rua, 2017), accounting process performance (Prasad & Green, 2015), portfolio performance (Hermano & Martín-Cruz, 2016; Mitrega & Pfajfar, 2015) and product development performance (e.g., Park & Kim, 2013) and operational performance, including for example,

Table 8. Performance measures

| | Relationship 1 | Relationship 2 | Relationship 3 | Relationship 4 |
|---------------------------------|---|---|---|------------------------|
| Innovation performance | Agawal and Selen (2013), Alves et al. (2017), Cheng and Chen (2013), Cheng, Yang, and Sheu (2016), Cheng, Chen, and Huang (2014), Chiu et al. (2016), Falasca et al. (2017), Liao, Kickul, and Ma (2009), Plattfauf et al. (2015), Sicotte, Drouin, and Delerue (2014), Wu, Lin, and Hsu (2007), Zheng, Zhang, and Du (2011) | Cheng, Chen, and Huang (2014), Falasca et al. (2017), Han and Li (2015), Liao, Kickul, and Ma (2009), Plattfauf et al. (2015), Wu, Chen, and Jiao (2016), Zheng, Zhang, and Du (2011) | | Makkonen et al. (2014) |
| Economic/financial performance | Fainshmidt, Nair, and Mallon (2017), Fang and Zou (2009), Girod and Whittington (2017), Kim et al. (2011), Konwar et al. (2017), Ringov (2017), Wang, Senaratne, and Rafiq (2015), Wang and Hsu (2010), Wilden et al. (2013), Wu (2007) | Fainshmidt, Nair, and Mallon (2017), Ko and Liu (2016), Lin and Wu (2014), Piening and Salge (2015), Wang, Senaratne, and Rafiq (2015), Wu (2007) | Ju, Park, and Kim (2016), Leonidou et al. (2015), Liu and Hsu (2011), Mu (2017), Vickery, Koufteros, and Droge (2013), Yoshikuni and Albertin (2017) | |
| Job performance | Kim and Boo (2010) | Kim and Boo (2010) | | |
| Operation/process performance | Dnevich and Kriauciunas (2011), Ju, Park, and Kim (2016), Wilhelm, Schlömer, and Maurer (2015) | Blome, Schoenherr, and Rexhausen (2013) | Ju, Park, and Kim (2016) | |
| Organizational/firm performance | Chien and Tsai (2012), Dias and Pereira (2017), Hang, Baizhou, and Jianxin (2014), Hsu and Wang (2012), Hung, Chung, and Lien (2007, 2010), Jiang, Mavondo, and Matanda (2015), Kuo, Lin, and Lu (2016), Malik and Kotabe (2009), Nedzinskas et al. (2013), Peng and Lin (2017), Prasad and Green (2015), Takahashi, Bulgacov, and Giacomini (2017), Wang, Klein, and Jiang (2007), Wu (2006), Zhan and Chen (2013) | Chien and Tsai (2012), Fang and Zou (2009), Hsu and Wang (2012), Hung, Chung, and Lien (2007, 2010), Kim et al. (2011), Peng and Lin (2017), Saragih, Rahayu, and Wibowo (2017), Sarkar, Coelho, and Maroco (2016), Tsai and Shih (2013), Wamba et al. (2017), Wang, Klein, and Jiang (2007), Wu (2006) | Arend (2014), Battisti and Deakins (2017), Dias and Pereira (2017), García-Morales, Jiménez-Barrionuevo, and Miht-Ramírez (2011), Jiang, Mavondo, and Matanda (2015), Lee and Rha (2016), Mu (2017), Protopogerou, Caloghirou, and Lioukas (2012), Tuan and Yoshi (2010), Vanpoucke, Vereecke, and Wetzels (2014), Wilden and Gudergan (2017, 2015), Yi et al. (2015) | |
| Accounting process performance | Prasad and Green (2015) | | | |

(Continued)

Table 8. (Continued.)

| | Relationship 1 | Relationship 2 | Relationship 3 | Relationship 4 |
|--|---|--|--|------------------------|
| Competitive advantage/performance /strategic performance | Fang and Zou (2009), Gelhard, von Delft, and Gudergan (2016), Li and Liu (2014), Lin and Chen (2017), Schilke (2014a, 2014b), Shafia et al. (2016), Wu (2010) | Fang and Zou (2009), Hemmati et al. (2016) | Lin and Chen (2017), Mikalef and Pateli (2017), Shafia et al. (2016) | |
| Export performance | Monteiro, Soares, and Rua (2017) | Monteiro, Soares, and Rua (2017), Villar, Alegre, and Pla-Barber (2014) | | |
| Service performance | Plattfaute et al. (2015) | Plattfaute et al. (2015) | | |
| International performance | Pinho and Prange (2016), Swoboda and Olejnik (2016) | Monferrer, Blesa, and Ripollés (2015), Pinho and Prange (2016), Swoboda and Olejnik (2016) | | |
| Portfolio performance | Mitrega and Pfajfar (2015) | Hermano and Martin-Cruz (2016), Mitrega and Pfajfar (2015) | | |
| Product development performance | Chen and Chang (2013), Park and Kim (2013) | Park and Kim (2013), Zhang and Wu (2017) | Cai et al. (2014), Chen and Chang (2013), Mu (2017), Pavlou and El Sawy (2013) | |
| Project performance | | Hermano and Martin-Cruz (2016) | | |
| Customer performance | | | Yoshikuni and Albertin (2017) | |
| Response performance | Karimi and Walter (2015) | | Karimi and Walter (2015) | |
| Value creation | | | Rashidirad et al. (2017) | |
| Evolutionary fitness | | | | Makkonen et al. (2014) |

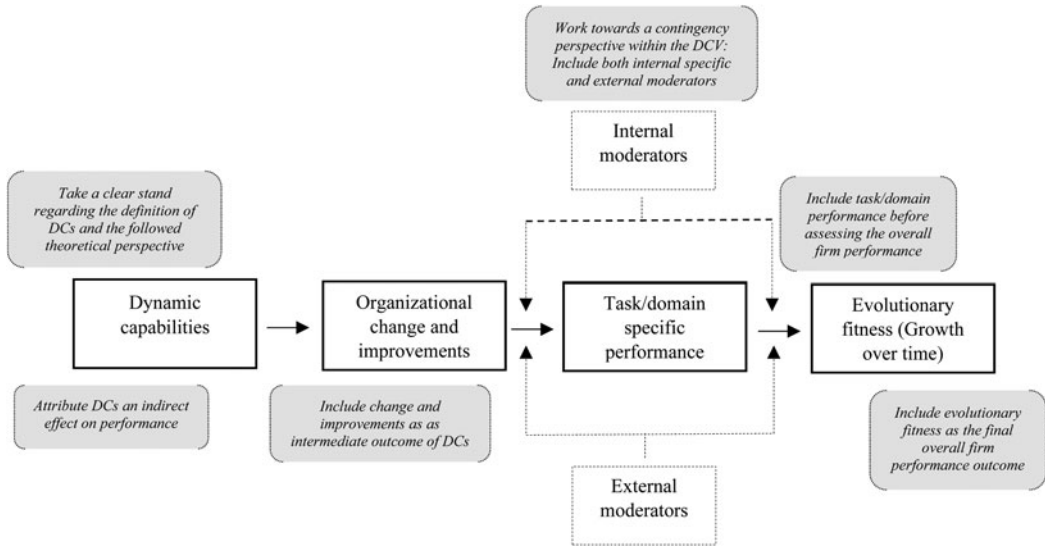


Figure 2. Proposed conceptual model for assessing the influence of DCs on performance.

flexibility and delivery improvement and innovation enhancement (Ju, Park, & Kim, 2016). These studies show that DCs can enhance a variety of domain-specific performance outcomes. For example, Hermanto and Martín-Cruz (2016) reported a positive mediating influence of portfolio DCs on portfolio performance. However, the assessment of these more specific performance outcomes is mostly denoted in the first and second types of relationships. In fact, there is not denoted as strong a variation in the performance measures as for the anterior relationships. Although this approach is relatively low represented in the sample, these are in line with anterior recommendations (Schilke, Hu, & Helfat, 2018) regarding the selection of outcome variables more closely related to the study's focal type of capability, instead of using a broad and aggregated measures. For example, even though a DC may be highly beneficial, a firm may still lack in overall performance for other reasons, making it more difficult to detect an effect of DCs (Schilke, Hu, & Helfat, 2018).

Mainly subjective measures are used and the two most apparent ways to conceptualize performance are: (1) firm performance as a latent broad construct with the various dimensions and (2) performance as separate constructs; e.g. new product development performance and financial performance (Mu, 2017) and non-financial and financial performance (Hang, Baizhou, & Jianxin, 2014). The vast majority of the studies adopt way 1 to assess performance, using an aggregated measure, including both financial and non-financial subjective indicators to measure broad firm-level performance. The most frequently used indicators are a combination of market share, sales, growth, profit and competitive advantage. Only one study was found to exclusively rely on non-financial measures for assessing firm performance, such as production method flexibility and product efficiency (Wu, 2006).

Another noteworthy mentioning is the almost absolute reliance managers' evaluations to evaluate both DCs and performance, compared to their competitors based on Likert scales (e.g., Dias & Pereira, 2017; Mikalef & Pateli, 2017; Shafia et al., 2016; Wamba et al., 2017; Wilden & Gudergan, 2015). In these studies, scores for both DC-related variables and performance were obtained from the same informant. This means that the same survey responses are used to construct both the independent and dependent variables, resulting in potential common method variance and the phenomenon of the halo effect (Laaksonen & Peltoniemi, 2016). The halo effect is a strong overall impression that blurs distinctions between dimensions or attributes,

resulting in overestimating of their own capabilities and performance, which may lead to misleading results (Nakayama & Sutcliffe, 2005). The tendency is for managers to evaluate their resources, practices, capabilities etc. according to their performance-level, without been able to evaluate items independently of each other (Laaksonen & Peltoniemi, 2016; Nakayama & Sutcliffe, 2005). Hence, firm with better previous performance tends to receive a more favourable evaluation in such survey-based ratings on capabilities, than those with poor performance (Santhanam & Hartono, 2003). As noted by Laaksonen and Peltoniemi (2016), this is a serious concern in DC–performance investigations, recommending the use of different data sources for DC and performance. Lastly, it was found to be rather common for data to be collected on past performance, in line with the conclusions of Laaksonen and Peltoniemi (2016). In the future, this can turn out to be problematic as current DCs impact on future and not past performance (Eriksson, 2013). Thus, another line for future research presents itself, trying to mitigate this problem.

Conclusions

The synthesizing analysis of the different investigated DC–performance relationships and the mapping of inherent variables can help bring more structure and coherence to the scattered DC literature, allowing a comprehension of what have been assessed and achieved so far. Despite the challenges in categorizing findings from very distinct articles, this paper tries to evidence where results are consistent and ambiguous, highlighting some concerns and research lacks. From the analysis it becomes clear; indeed, a major reason for the ongoing interest in DCs, is their potential for influencing a firm’s performance (Zahra, Sapienza, & Davidsson, 2006). However, the literature is greatly scattered and the DC effects remain unclear because of the variety of conceptualization, nature of variables and measurements. At this stage, it seems that the DCV still lacks consensual conceptualizations that allow general comparisons of empirical studies and advance for the theoretical and empirical understanding of the impact of DCs on performance.

Two divergent groups of conceptual natures of the investigated DC–performance relationship were found. The indirect approach is by far the most dominant. The large volume of studies assuming a direct relationship is quite surprising. Although this is supported by early conceptual contributions, the promotion of an indirect relationship has been a conceptual concern for quite some time. It is therefore recommended for future research to give DCs an indirect role when examining performance outcomes. The representation of the underlying assumptions regarding DCs such as the element of change (intermediate outcomes) and sustainability (evolutionary fitness) should also be incorporated, trying to consolidate theoretical foundation with methodology and overcome the critique of DCs being tautologically linked to performance.

The analysed empirical evidence appears to employ a continuum of conceptualization of DCs, ranging from very specific to a far more generic set of variables. Measuring DCs as more generic seems to be the most common choice. As a whole, overlapping is widely present in the empirical DC literature, making it a challenge trying to compare or even catalogue results. For starters, a recommendation for future studies is clearly distinguishing operational capabilities from DCs. A more consolidated approach to differentiate organizational antecedents that can facilitate the deployment of the DCs, mediators and intermediate outcomes from the DC concept itself is needed. Future research ought to strike to achieve a congruence of the concept of DC to ensue proper assumptions and take a clear stand of the nature of DCs, trying not to mix a variety of distinct conceptual perspectives. Widely accepted quantitative measures that can respect the nature of DC are important for more robust results. The evidence also indicates that the effects of DCs on performance are somehow context-dependent. This leads to arguing that future studies could be worked towards a contingency perspective, recognizing the impact of environmental and internal features.

The performance indicators used in the empirical research are varied. The majority use subjective measures for assessing firm performance either as an aggregated construct. The more complex studies employ a combination of subjective and objective measures. The predominating wide-ranging performance approach implies that future studies could investigate more specific aspects of performance. The use of different sources for DCs and performance data, trying to avoid the potential halo effect and measurement biases should be a methodological concern. Additionally, as it was found to be rather common for data to be collected on past performance and the current status of DC, a potential controversy may arise, because of current DC impacts on future. Future studies should try to mitigate this by incorporating time into research designs.

In sum, the most prominent approach for future research seems to be that DCs per se do not cause directly superior firm performance, but rather cause change, that leads to intermediate outcomes, such as change of operational capabilities and process-level performance. DCs appear to be necessary but not a sufficient condition for achieving superior performance directly. The relationship between DCs and firm performance is more complex than put out to be in the direct approach, as their effects seem to be mediated by operational capability change and development, while simultaneous being contingent upon both internal and external moderators. A suggestion for empirically assessing the relationship between DCs and performance is illustrated in [Figure 2](#).

This paper serves as a reinforcement of more recent arguments defending an indirect DC–performance relationship, providing future investigations with a fundament for conceptual and hypothesis developments, when it comes to empirically analyse DCs’ influence on performance and its related outcome. As such, resumed recommendations for future research are presented: Firstly, in order to avoid inconsistency and simultaneously facilitate the operationalization and measurement of DCs, it could be beneficial for scholars to take a clear stand regarding the adopted theoretical perspective right from the beginning. A decision on whether DCs are to have a direct or indirect influence, going to be assessed as organizational and strategic processes and routines or viewed as best-practices or unique abilities, skills or capacities and operationalize them accordingly. Another fundamental aspect when empirically studying DCs is to assure consistency about the level of analysis. It is worth defining as for whether the concern is with individual managers or the organization as a whole.

Based on the analysis, it is implied that future studies could benefit from attributing DCs an indirect role when assessing its consequences. Including change and improvements as the intermediate outcome of DCs seems highly pertinent, in order to assure theoretical congruence, for example, by applying a configurational framework to assess both task specific performance and firm performance, while considering the DCs’ effect on intermediate outcomes, such as strategic and operational capability change. The task/domain specific performance is recommended to be included before assessing overall firm performance. To upgrade and assure further empirical refinement of the DC–performance relationship, the construct of evolutionary fitness, as the final overall firm performance outcome, ought to be introduced.

Moreover, the DC–performance literature could gain from working towards a contingency perspective within the DCV, including both internal specific and external moderators. Finally, it is recommended for future studies to use different sources for DC data and performance data, along with longitudinal data in order to properly assess the change over time aspect.

Despite contributions, this review naturally has limitations. Firstly, this study only includes quantitative studies, which may have influenced the overall results. Secondly, the review draws only on articles from one research base, which could cause the exclusion of some relevant papers. Along the same line, the article selection and interpretations are based on a single evaluation, by which personal opinion and judgement may have prevailed and influenced. Thus, interpretations and the mapping of the conceptualizations should not be viewed as deterministic.

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