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Continuous Improvement initiatives for Dynamic Capabilities development: A systematic literature review

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Structured abstract

Purpose: This study analyses the existing literature on continuous improvement (CI) initiatives and dynamic capabilities (DCs) development to answer the question whether CI initiatives foster development of DCs in organizations.

Design/methodology/approach: We performed a systematic literature review (SLR), following several steps. After an exhaustive search of the main scholarly databases (EBSCOhost, Web of Knowledge, Scopus, ProQuest and Emerald Insight), we chose 19 studies and analysed them in depth.

Findings: The results obtained identify issues such as a growing trend in the publication of studies, the dominant position of the US, and the predominance of empirical papers. We classified the literature according to whether it considers CI as a DC in itself, as an enabler of DC or as a result of the DC. We also identify the main critical success factors to be implemented in CI initiatives (CIIs) in order to enhance the development of DCs. Finally, based on the following and on analysis of the specific DCs literature, we include 10 theoretical propositions for possible future research.

Originality/value: CIIs such as Lean Management, Six Sigma and Total Quality Management have been widely implemented in organizations. Despite their reputation, the effects of these initiatives on long-term benefits are fraught with controversy, which motivates our SLR of CIIIs and DCs. DCs theory tackles the question of how firms can sustain their advantage and profits in the long term, making this perspective ideal for tackling controversy on the benefits of CIIIs.

Keywords: Lean, Six Sigma, Total Quality Management, Continuous Improvement, Systematic Literature Review, Dynamic Capability

Article Classification: Literature review

Introduction

Organizations are composed of a set of interrelated processes that, if improved continuously, enable them to satisfy consumers' increasingly strict demands (Dean and Bowen, 1994), as continuous improvement (CI) develops a series of routines that articulate the way to improve these processes (Bessant et al., 2001; Nilsson-Wittell et al., 2005). Defined as a "systematic effort to seek out and apply new ways of doing work i.e. actively and repeatedly making process improvements" (Anand et al., 2009, p.444), CI becomes one of the ways the organization can contribute most significantly to organizational performance (Lam et al., 2015; Yeung et al., 2005).

Due to its importance for organizational success, CI has been implemented in organizations through numerous initiatives. CIIIs range from original approach such as the Deming Cycle (Deming, 1982), based on Shewart's contribution (Shewart, 1931) or the Juran Trilogy (Juran, 2003), to various contemporary initiatives for CI, such as Total Quality Management (TQM), Lean Management and Six Sigma (Voss, 2002). The

literature has shown the positive effects of these initiatives on organizational performance, as in the cases of TQM (Kaynak, 2003; Samson and Terziovski, 1999), Lean Manufacturing (Shah and Ward, 2003), Six Sigma (Linderman et al., 2006; Swink and Jacobs, 2012) and Lean Six Sigma (Antony et al., 2012; Gutierrez-Gutierrez et al., 2016).

Despite this success, there is no absolute consensus on the positive effects of CIIs on organizational performance. For instance, Six Sigma has been criticised for failing to deliver performance benefits over time (Nair et al., 2011), and the question of how to sustain the advantages that these initiatives generate over time is a significant challenge for not only industries implementing these strategies for business process improvement but also for academics who pursue research on this topic. Little is known about the relationship between CIIs and organizational strategic long-term benefits, such as environmental adaptation or obtaining sustainable competitive advantages (SCA). This study therefore performs a systematic literature review (SLR) of CIIs and the development of dynamic capabilities (DCs) as a theoretical approach that tackles the problem of SCA.

At present, the DCs perspective is one of the most well-established theories explaining how organizations can obtain SCA in today's dynamic environments (Eisenhardt and Martin, 2000; Teece et al., 1997; Teece, 2007; Zollo and Winter, 2002). Scholars have adapted the resource-based view (RBV) of the firm to today's dynamic and turbulent environments, and the DCs view emerged from the RBV (Teece et al., 1997; Eisenhardt and Martin, 2000; Helfat and Peteraf, 2003). DCs are *“(t)he firm’s ability to integrate, build and reconfigure internal competencies and thus to address rapidly changing environments”* (Teece et al., 1997, p. 516). Zollo and Winter (2002) define a DC as *“a learned and stable pattern of collective activity through which the organization*

systematically generates and modifies its operating routines in pursuit of improved effectiveness” (p. 340). DCs involve an organization’s ability to reallocate or reconfigure resources to adapt to change in the future (Helfat et al., 2007; Pavlou and El Sawy, 2011). The most agreed-upon examples of DCs include the capabilities of new product development and alliance management (see, e.g., Pavlou and El Sawy, 2011; Schilke, 2014; Vanpoucke et al., 2014).

Although the DCs literature has been embroiled in great controversy in recent decades, research seems to agree on some basic elements of DCs: (i) level of environmental change, (ii) organizational processes or routines, (iii) resource configuration, (iv) managers’ decision making, and (v) learning mechanisms (Albort-Morant et al., 2018; Fukuzawa, 2015). To make these capabilities concrete, they can be divided into three underlying processes (sensing, seizing and reconfiguring), understood as the components of DCs that grant them their dynamic nature (Teece, 2007).

Although the literature has demonstrated the positive effects of DCs on organizational performance (Lin and Wu, 2014; Protogerou et al., 2014), recent studies have called for research connecting DCs theory to other related fields, such as HR management and QM (Gutierrez-Gutierrez et al., 2018; Vogel and Gutel, 2013). Along these lines, some studies call for identification of specific mechanisms for developing DCs (Albort-Morant et al., 2018; Argote and Ren, 2012; Teece, 2007). In the area of operations management specifically, Su et al. (2016) argue that the DCs perspective can explain how to maintain quality performance over time.

According to the foregoing, the goal of this SLR is to analyse the scholarly literature to date on the relationship between CII and development of DCs to address the needs of ever changing market needs for consumers of tomorrow. Specifically, we will

analyse the literature that can help to answer the following research question: *How can CIIIs boost DCs development within the organizations?*

To achieve this goal, our study is structured as follows: The next section describes the methodology followed to perform the systematic review. Following collection of all information, the third section includes the key findings obtained according to the different variables analysed. The fourth section analyses the literature on DCs and the possible relationships to CIIIs to answer our research question. This section includes ten theoretical propositions and a protocol for future research to study them. Finally, the last section includes the main conclusion derived from the research, corresponding limitations associated with the research and directions for future research.

Methodology

As mentioned above, the authors undertook a SLR for this study. According to Rowe (2014, p.243), “*a literature review synthesizes past knowledge on a topic or domain of interest, identifies important biases and knowledge gaps in the literature and proposes corresponding future research directions.*” Systematicity is an essential requirement for reaching these goals, and it is based on a solid review process. This review followed the methodology proposed by Fink (2010) and Rowe (2014), who distinguish seven phases to ensure systematicity of literature reviews: (1) selecting the research question; (2) selecting bibliographic or article databases, websites and other sources; (3) choosing search terms; (4) applying practical screening criteria; (5) applying methodological screening criteria; (6) conducting the review; and (7) synthesizing the results. Following Albliwi et al. (2014), Thomas et al. (2004) and Tranfield et al. (2003), we added two additional phases: (8) reporting, which describes the SLR and its key findings in detail, and (9) dissemination of results, which seeks to publish the SLR in an academic journal

to contribute to existing literature by explicitly addressing the fundamental research gaps. The reporting phase is found in the third section of the paper and the dissemination phase will happen once this study is published.

Selecting the research question(s)

The research question(s) chosen and formulation of the question(s) are very important, since they define the search and can reduce the risk of confusing results (Rowe, 2014). We therefore formulated and justified the research question(s) to be answered through this SLR in the previous section. The following phases of the methodology were adjusted to answer this question in the most precise way. Our research question is:

RQ: *How can CIIs boost development of DCs within organizations?*

Selecting bibliographic or article databases

To begin the process of searching for articles published in the main scholarly journals, we chose five databases that include the most significant publications in the area of the topic: *EBSCOhost, Web of Knowledge, Scopus, ProQuest* and *Emerald Insight*. These five databases were chosen because they include all important publications on business management in general, as well as on more specific areas such as *operations management, quality management* and *strategic management, which are very pertinent to the chosen research area*.

Choosing search terms

After choosing the databases, we began the search process by choosing the keywords. We combined keywords related to CIIs with keywords related to DCs, ultimately using the following pairs of terms to search the databases mentioned above:

“Lean” AND “dynamic capability/ies”, “Six Sigma” AND “dynamic capability/ies”, “Lean Six Sigma” AND “dynamic capability/ies”, “LSS” AND “dynamic capability/ies”, “total quality management” AND “dynamic capability/ies”, “TQM” AND “dynamic capability/ies”, and “continuous improvement” AND “dynamic capability/ies”. As these terms show, the search included both singular and plural forms of DCs, since some studies focus on a single capability while others tackle them together.

Applying practical screening criteria

Screening criteria are very important, since they ensure that all relevant publications are included in the study (Balaïd et al., 2016). The criteria used in our study included scholarly publications that listed the keywords presented above in their abstracts. The articles also had to have been published in peer-reviewed journals and written in English. Although CIIs such as Lean and Six Sigma have proliferated in the last two decades, we decided not to establish any time restriction in the search, as earlier studies related to TQM or CI in general could be useful. The criteria excluded (i.e., did not include in our study) articles which are published in sources such as books, magazines, conference papers, reviews, editorials etc., and in non-peer-reviewed journals. Articles published in languages other than English were also excluded.

Applying methodological screening criteria

Figure 1 summarizes the full selection process for the study. Note that 56 articles from all databases remained after the search was performed and the screening criteria applied. Of these, 34 were duplicates, leaving a total of 22 articles. A review process by the authors led to exclusion of three of these 22, which fulfilled the search criteria but whose content did not fit the objective of this study, as they provided only superficial

analyses of CIIIs and/or DCs. The final number of articles chosen for the review was thus 19 publications.

- Insert Figure 1-

Conducting the review

After choosing the most pertinent articles for our study, we performed the review. We extracted data from the articles selected and stored them on the data extraction form to reduce human error and bias (Tranfield et al., 2003). The information entered on the form included the following fields: article title, authors, journal, year of publication, abstract, type of study, authors' country of professional affiliation, abstract, country analysed, sample/industry, CII examined, research method utilised in the study, purpose, key findings, and proposed relationship to DCs. As can be seen, these fields fit the content of the research question and goal (Balaid et al., 2016). Next, using an Excel spreadsheet to facilitate summarized visual display of the articles (Denyer and Tranfield, 2009), we proceeded to read the articles and extract information.

Synthesizing the results

Finally, we must provide a synthetic description of the results of the literature review (Rowe, 2014)—that is, an interpretation of the information extracted from the review developed from the researchers' experience and the quality and content of the literature available (Fink, 2010). The following sections include various themes proposed to synthesize the results so that we can draw interesting conclusions from the SLR.

Key findings

Publication trend

We begin by analysing the publication trend in scholarly articles on CIIs and DCs (see Figure 2). First, the first two studies published (Camuffo and Volpato, 1995; Parry et al., 1998) differ greatly from most of the publications and constitute the starting point for our research topic. They have striking similarities, sharing an orientation to human resources (HR) practices inherent in the Lean methodology, consideration of these practices as a vehicle for developing DCs, and case studies of automobile companies.

Second, starting in 2009, we find clear consolidation and a growing trend, publication of studies that include CIIs and DCs. Four studies were published during 2009-2011, five during 2012-2014, and seven during 2015-2017. The years 2009 and 2016 were the most prolific, with three and four publications, respectively.

Gowen and Tallon (2005) anticipated the trend begun in 2009. They were the first to study the Six Sigma methodology from a DCs perspective, proposing that Six Sigma program design factors and e-business applications could contribute to sustainable competitive advantage through development of DCs. During 2009-2011, some publications (Ambrosini et al., 2009; Anand et al., 2009; Trkman, 2010) analyse the relationship between orientation to CI and development of DCs. From 2012 to 2014, one study continues to analyse the relationship between CI and DC (Kohlbacher, 2013), while others based on the reasoning of the DCs perspective analyse the benefits of implementing initiatives such as Lean and Six Sigma (Gowen et al., 2012), LSS (Manville et al., 2012) and TQM (McAdam et al., 2014; Nadarajah et al., 2014). As to TQM, López-Mielgo et al. (2009) had previously confirmed that innovation is positively related to TQM practices, considering both as DCs. During 2015-2017, studies employing a DCs perspective analysed topics such as kaizen, proposed by the Lean methodology (Glover

et al., 2015); how Lean can improve performance in hospitals (Dobrzykowski et al., 2016); and the relationship of value chain costing to CI (Ussahawanitchakit, 2017). Others examine learning as a DC and its relationship to TQM practices (Camisón and Puig, 2016) and Lean orientation (Hansen and Møller, 2016). Finally, still others study how business excellence models should include DCs to develop CI (Zapata-Cantu et al., 2016) and how CI itself can be considered as a DC (Galeazzo et al., 2017), following the line of previous publications.

- Insert Figure 2-

Country distribution

This section first examines the authors' country of professional affiliation, understood as the university affiliation of each author of the articles analysed. Figure 3 shows that universities in the US and the UK lead this classification, with 14 and 12 authorships affiliated with institutions in these countries, respectively. Each of these countries' outputs constitutes around 25% of the total authorships analysed. Of the US authors, Gowen (Gowen and Tallon, 2005; Gowen et al., 2012) and McFadden (Dobrzykowski et al., 2016; Gowen et al., 2012) appear in two publications each. Next in authorship are universities in Italy and Spain, with five each, constituting approximately 10% of the total. These countries are followed by Mexico, Denmark and Malaysia, with three, two and two authorships associated with their universities, respectively. Finally, there is a group of countries whose universities show affiliations with only one author: Australia, Austria, New Zealand, Slovenia, Switzerland and Thailand.

- Insert Figure 3-

Second, in considering the country of origin of the firms studied in the articles on this topic (see Figure 4), we find that six of the articles focused on US firms, the leading area of study. This result agrees with previous studies that identify the USA as the leading country in publications about CIIs (Albiliwi et al., 2015; Trakulsunti et al., 2018). Second were firms located in the UK (three articles), followed by Austria, Italy and Spain (two each). Finally, we find just one study each of firms from Denmark, Finland, Germany, Japan, Korea, Mexico, Singapore, Slovenia, Sweden and Thailand. One study identified the region analysed as the continent of Europe, preventing detailed identification of the countries analysed. Although most of the articles analyse firms from a single country, Zapata-Cantu et al. (2016) analyse firms from Europe, Singapore and Mexico simultaneously, and Galeazzo et al. (2017) firms from Austria, Finland, Germany, Italy, Japan, Korea, Sweden and the US.

- Insert Figure 4-

From the two figures, we see that the countries whose universities have the most authors studying CIIs and DCs (the US, the UK, Italy and Spain) are also the countries of the firms analysed, showing a relationship between the authors' country of professional affiliation and the country of origin of the firms' analysed. In the case of the US—in the leading position in both categories—the studies analyse Lean, Six Sigma, TQM and CI, the full spectrum of CIIs except LSS. LSS has been analysed in the UK (Manville et al., 2012), as have Lean (Parry et al., 1998) and TQM (McAdam et al., 2014). Italy's research has been oriented toward Lean (Camuffo and Volpato, 1995) and CI (Galeazzo et al., 2017), while both analyses in Spain (López-Mielgo et al., 2009; Camisón and Puig, 2016) were of TQM, following Spain's strong tradition of QM implementation.

Finally, we highlight the absence of studies in Africa, both by authors affiliated with universities and about firms analysed. Only one author is affiliated with an Australian university (Manville et al., 2012), and no studies treat Australian firms. Studies have been performed by university authors from Asia and of firms in Asia (Japan, Korea, Singapore and Thailand). The absence of countries such as India and China, with largest populations on the planet, is also noteworthy. Indeed, at the present, India, for instance, has the most number of publications on LSS. Still, the US and Europe that may have longer tradition about strategic management literature, dominate in both categories.

Methodologies

By type of methodology employed in the articles analysed (see Figure 5), 48% of the articles were empirical studies, analysing samples of firms ranging from 66 manufacturing and service Six Sigma organizations (Gowen and Tallon, 2005) to 2909 firms from different industries with TQM implementation (López-Mielgo et al., 2009). Second, we find five case studies of firms in the UK; two in Italy, Slovenia and Denmark; and two cross-case analyses, both in the US. Finally, a conceptual paper, a viewpoint paper, and a theoretical development paper were also published.

- Insert Figure 5-

CIIs

The articles chosen analyse different CIIs. Figure 6 presents the distribution of the publications based on initiative studied. Nine of the 19 articles adopt a broad orientation, analysing the application of CI in general in the firms. While these studies do not focus on a specific initiative, their conclusions may be reliably extrapolated to them. Moreover, seven articles analysed the behaviour of DCs when a Lean methodology is applied, four

when TQM is implemented, three when Six Sigma methodology is executed, and one for LSS. The total number of initiatives studied, 24, is greater than the total number of articles analysed, 19 because some articles cover more than one methodology, as in the case of Anand et al. (2009) and Gowen et al. (2012).

- Insert Figure 6-

Figure 7 presents the time distribution of publication dates according to CI initiative studied. The oldest studies analyse the Lean and DCs methodologies (Camuffo and Volpato, 1995; Parry et al., 1998), followed by Six Sigma and DCs (Gowen and Tallon, 2005). According to the arguments presented in Section 3.1, the greatest concentration of publications on the five types of initiatives analysed has emerged since 2008.

- Insert Figure 7-

The relationship between CIIs and DCs

This section presents the articles' various approaches to explain the relationship between CIIs and DCs. Although classification is complex in some cases, we differentiate between CI specifically as a DC, CI as an enabler of DC and CI as the result of DC¹.

CI as a DC

Two studies are striking in their presentation of CI as a DC. First, Ambrosini et al. (2009) differentiate three types of DCs—incremental, renewing and regenerative—whose application depends on the manager's perception of the dynamism of the environment.

¹ In any case, it seems that the problem is more of terminology than of content. CI can be understood as both a process composed of various phases and a result of a set of practices. If we consider it as a process of continuous change in processes, products and services, we can understand CI as an enabler of DCs. If CI is the change resulting from organizational practices and actions, it can be understood directly as a DC.

Incremental DCs correspond to essentially stable environments, in which there will always be a need for CI, since CI enables the firm to guarantee that the resource stock maintains its value in this relatively stable environment. CI thus involves adaptive changes in the resource base without actually modifying the mechanisms for producing these changes. Second, *renewing DCs* belong to dynamic environments that require firms to “refresh and renew the nature of the resource stock, rather than incrementally adapt it” (Ambrosini et al., 2009, p.14). Finally, *regenerative DCs* respond to the need to change DCs themselves, that is, to the way in which the firm modifies its resource base. This concept departs from the everyday application of the CIIs studied.

Second, Anand et al. (2009) affirm that CI may be considered as a DC when it includes a comprehensive organizational context, enabling coordination and sustainability of organizational learning efforts to achieve an improvement process systematically. Further, CIIs involve many practices and methodologies that are established gradually in the organization. For this reason, Anand et al. (2009) affirm that CI fits the concept of DC proposed by Helfat et al. (2007), who define it as a patterned activity, not a one-time change in the organization’s resources.

With the exception of these two studies, the articles selected do not investigate the identification between CI and DC in much depth, although some propose arguments for such study. López-Mielgo et al. (2009), for example, affirm that TQM can be understood as a DC because it is based on learning, improvement and change, which allow the firm to achieve competitive advantages. Trkman (2010) analyses business process management, which involves a series of CI efforts to ensure sustained benefits and thus help to achieve sustained competitive advantages, such as analysis and optimization of the business—all associated with the concept of DC. Building on Anand et al. (2009), Kohlbacher (2013) proposes that CIIs help to enhance the organization’s ability to make

quick, cohesive process changes to improve performance, which then become DCs. Through study of a SME case, McAdam et al. (2014) establish associations between TQM practices—managerial capability in driving innovation or team capability in using recent TQM methods—and the classification of DCs developed by Ambrosini et al. (2009). Nadarajah et al. (2014), in turn, propose that business process management, associated with TQM, is a resource that can become a DC. For this to occur, the firm must have a good business process orientation and process improvement initiatives that rectify defects and enable adaptation to achieve competitive advantage. Glover et al. (2015) analyse CI from the kaizen perspective. In showing that both management and workforce are fundamental to implementing improvements in the organization, they develop their DC from CI. Starting from Zollo and Winter (2002), Hansen and Møller (2016) identify two main components of DCs: a stable pattern and collective activity. These authors argue that this definition fits the concept of CI perfectly, since the problem-solving activity can be understood as a collective activity, while the context of problem-solving activities corresponds simultaneously to a learned and stable pattern. Galeazzo et al. (2017) argue that CIIs represent DCs that enable systematic modification of resources responsible for improving processes and products, thus facilitating competitive advantage (Peng et al., 2008; Anand et al., 2009; Su et al., 2016). To do so, CI develops methods such as DMAIC and PDCA, which are based on small-scale improvements. Finally, Ussahawanitchakit (2017) identifies value chain costing² as a DC and includes CI within value chain costing. This practice fosters employee involvement, use of cross-functional teams to develop improvements and development of new versions of products and services to improve adaptation, satisfaction and performance.

² Value chain costing integrates concepts of accounting, management and marketing aspects in recognizing, managing and utilizing relevant business activities through cost structure, profitability and customer satisfaction in an organization (Ussahawanitchakit, 2017).

CI as enabler of DCs

Second, other studies propose a positive relationship between CI and DCs. Parry et al. (1998) stress the importance of teamwork associated with CI, arguing that this practice inherently involves a series of key competencies connected to DCs, which permit “redrawing” the form of the organization to exploit its potential. These competencies include interaction of team members, internal control, mutual adjustment, flexibility and responsiveness. Gowen and Tallon (2005) argue that Six Sigma’s goals of process improvement include alignment with opportunities in the environment and threats, as well as development of capabilities to adapt resources, facilitating the dynamic alignment that the organization must perform relative to its environment proposed by DCs. Manville et al. (2012), in contrast, present the LSS methodology as a response to current dynamic environments. Specifically, they stress that LSS should stimulate development of a bottom-up strategy, enabling employees to manage the necessary tools and techniques, as well as to master the improvements required. These measures facilitate development of emerging strategies that respond better to dynamic environments, promoting DCs. Gowen et al. (2012) argue positive relationships of the implementation of Lean, Six Sigma and continuous quality improvement to DCs. For example, Six Sigma strengthens organizational processes, supporting successful creation of DCs, while Lean facilitates the reconfiguration of DCs through changes in culture and processes. Camisón and Puig (2016) differentiate QM practices (QMP) clearly from DCs: “QMP can lead to the development of (dynamic) capabilities such as organisational learning; however, these practices are enablers of capabilities and not a capability in itself” (Camisón and Puig, 2016, p.2877). Their results show that QM practices are really useful for developing DCs, since these practices facilitate development of learning, accumulation of technological capabilities and the process of innovation. Focusing on the healthcare context,

Dobrzykowski et al. (2016) state that a comprehensive Lean orientation enables development of flexible processes and routines, which can in turn create DCs and results in improved performance. Lean responds to aspects related to adaptation of customers' taste, eliminating unnecessary activities, and sharing knowledge about organizational processes to facilitate the organization's adaptation through DCs. Finally, Zapata-Cantu et al. (2016) identify three characteristics of business excellence models that facilitate development of DCs: (1) open models with a clear focus on innovation and CI, (2) guidelines for encouraging organizations constantly to challenge the status quo by creating new knowledge, and (3) management models in which the key factors are knowledge generation and talent development.

CI as a result of DCs

Finally, although residually in an older study, Camuffo and Volpato (1995) present the implementation of Lean practices as the result of developing DCs. Their study focuses on Fiat's capability to develop a firm-specific model derived from the learning processes it has experienced over the years. Cumulative and non-reversible, these processes result in the implementation of work organization and human resource management policies stemming in part from Lean.

The role of organizational learning

Finally, although it does not constitute a relationship of any kind between CI and DC, we would stress the importance that the literature analysed attributes to organizational learning. For Anand et al. (2009), for example, organizational learning is important as the main source of DCs (Helfat et al., 2007). Learning stimulates development of improvement actions due to improved knowledge and understanding (Fiol and Lyles, 1985), enabling organizational adaptation (Anand et al., 2009). Gowen

et al. (2012) argue that CIIs can facilitate achievement of DCs, since the latter are based on learning mechanisms such as experience accumulation, knowledge articulation and knowledge codification. Manville et al. (2012) stress that LSS fosters learning through challenging improvement projects and employee participation. This statement agrees with the proposals by Camisón and Puig (2016) on QM practices, or by Dobrzykowski et al. (2016) on Lean. All of these learning mechanisms underlie the foundation for development of DCs. Finally, Galeazzo et al. (2017) operationalize the organizational learning infrastructure and investigate its effects on CI, concluding that organizational learning is an infrastructure necessary for the development of DCs.

Critical success factors (CSF)

The main goal of the articles analysed is not to identify the CSF that can affect the relationship between CIIs and DCs. Deeper investigation of their content allows us, however, to identify issues indicated by the authors that could have significant repercussions for this relationship. Table 1 includes a list of the CSF proposed and their corresponding studies. The table shows some consensus in stressing the importance, first, of leadership and top management commitment, and, second, of an organizational culture that encourages learning, innovation and teamwork. Some studies, such as Galeazzo et al. (2017) and McAdam et al. (2014), focus specifically on certain variables, such as strategy and innovation, respectively, that condition the CSF proposed.

If we investigate CSFs in greater depth, we find the starting point to be the need for leaders to perceive the importance of fostering DCs for the organization's success, since fostering DCs affects the real development of DCs (McAdam et al., 2014). Subsequently, following Anand et al., (2009), to foster DCs that will develop the flexibility needed to respond to changes in the environment, top managers should

facilitate the participation of middle and lower management in formulating objectives, as such facilitation will translate strategic orientation into operational goals. Top managers should thus transmit this orientation and implement it through their actions (Zapata-Cantu et al., 2016). Galeazzo et al. (2017) call this process “strategic alignment”, which, together with a “goals management system”, can help to ensure that all employees work in the same direction towards organizational goals. Leadership is thus needed to facilitate the integration of employees into the new processes proposed (Dobrzykowski et al., 2016; Kohlbacher, 2013).

Second, fostering DCs development requires implementing an organizational culture that promotes change and innovation (Camisón and Puig, 2013). Such a culture requires promoting both teamwork, by granting employees autonomy and decision-making power, and customer orientation (Camisón and Puig, 2013; Kohlbacher, 2013; McAdam et al., 2014). A culture of continuous change must be nurtured that goes beyond merely correcting errors as they appear. This culture must seek ways to improve existing processes by encouraging employees to propose changes and preparing them to face these changes continuously (Anand et al., 2009). On the other hand, strategic change towards development of DCs can take several years to implement, during which interventions such as large-scale events, specific language, symbols or metaphors can facilitate understanding of the new strategic orientation and its objectives (Hansen and Møller, 2016).

Third, process management is also an important CSF for DCs development, as it establishes how to plan and execute projects (Camisón and Puig, 2016). Processes must be designed, managed and improved to satisfy and increase value for customers and stakeholders (Zapata-Cantu et al., 2016). Organizations must develop a double, ambidextrous orientation for process management. First, they must implement existing

processes in a standardized way, while creating new operational capabilities. Second, some projects must focus on improving existing capabilities and others on designing new processes (Anand et al., 2009). Technical components such as “best practices sharing” (which identifies key customers and their preferences, measures performance, launches process improvement projects and expands some applications) and reconfiguration of resources through process improvement projects may also contribute to the firm’s adaptation to external environmental changes (Gowen and Tallon, 2005).

Fourth, organizational changes are necessary (Trkman, 2010). Parallel participation structures that include cross-functional teams allow organizations to make rapid changes when needed, as DCs require (Anand et al., 2009). Further, process owners who supervise CI in processes and are thus responsible for dynamic improvements of these processes are also positive (Trkman, 2010).

Fifth, HR practices such as selection, training, recognition, rewards and promotion are fundamental for a successful organizational functioning (Anand et al., 2009; Gowen and Tallon, 2005; Zapata-Cantu et al., 2016). These practices must be aligned with the requirements needed to respond properly to environmental changes (Zapata-Cantu et al., 2016). Since organizations must have people dedicated to championing the transformation process (Hansen and Møller, 2016), specialized roles for employees are useful for DCs development and organizational learning (Anand et al., 2009).

Finally, information systems can contribute significantly to involving organizational members in processes (Zapata-Cantu et al., 2016) and to recording the knowledge resulting from previous experiences, as both actions are useful for future process improvements (Anand et al., 2009).

Key research gaps and directions for further research

The studies included in our investigation propose many lines for future research. In this section, we identify only the lines directly related to ideas linked to future study of the relationship between CIIIs and DCs. The main requirement is for future analyses to incorporate longitudinal studies that can advance and draw conclusions about this problem. The studies by Anand et al. (2009), Camisón and Puig (2016), Galeazzo et al. (2017) and Zapata-Cantu et al. (2016) emphasize this recommendation.

Second, and more specifically, Hansen and Møller (2016) affirm the need to deepen knowledge of how to develop improvement systems to foster DCs over time. Along these lines, Galeazzo et al. (2017) propose identifying which routines in addition to organizational learning underlie the capability of CI, and Manville et al. (2012) recommend analysing the impact of organizational culture and structure on strategy development.

Some studies suggest including external variables. For example, Camisón and Puig (2016) follow proposals by Schilke (2014) recommending inclusion of environmental dynamism and uncertainty³ as moderator variables in the study of DCs and competitive advantage, or by Dobrzykowski et al. (2016) to adopt a market-based analysis to achieve greater consumer satisfaction.

Ambrosini et al. (2009), in turn, stress the need to develop empirical measures to contrast the theoretical proposals in their study, while McAdam et al. (2014) focus on fostering innovation in SMEs, calling for more case studies to determine how to facilitate development of knowledge-based DCs. Finally, analysing the case of business excellence

³ Environmental dynamism can be defined as the number of changes in the external environment, whereas uncertainty can be defined as the level of unpredictability of these environmental changes. New technologies or telecommunications are industries characterized by high levels of environmental dynamism and uncertainty where companies such as Apple or Intel are examples of companies that face these environmental (e.g. Gutierrez-Gutierrez et al., 2018; Teece, 2012).

models, Zapata-Cantu et al. (2016) propose studying whether DCs are implicit in the implementation of these models, since they pursue innovation and CI.

Discussion and propositions

The research question of this study was: “*How can CIIs boost development of DCs within organizations?*” To answer this question, this section uses the 19 studies described previously and analyses the literature on the DCs perspective in greater depth to develop different theoretical propositions for contrast in the future. Figure 8 summarizes these propositions and the analysed variables, showing how CIIs can foster the development of DCs in organisations.

-Insert Figure 8-

Research has demonstrated the importance that managerial leadership in CIIs has in the development of DCs (Anand et al., 2009; Galeazzo et al., 2017; Zapata-Cantu et al., 2016). We must, however, develop a deeper sense of the work of the leader required to achieve development of DCs. For Teece (2012), managers’ work in today’s environments cannot be only improvement of existing organizational routines or creation of new ones. His/her function must go farther and transform the firm and its ecosystem through strategies that go beyond what has been done previously. Teece (2012) differentiates DCs development clearly from managerial actions that focus on standardization and optimization. It is necessary to discover new opportunities and how to achieve them rather than maintaining or refining existing processes. According to these arguments, building on the idea that leaders have perceived the importance of developing DCs (McAdam et al., 2014), “strategic alignment” must be marked by this transformative

character that continuously seeks new opportunities. This must be the orientation followed in shared formulation of objectives with middle and lower managers (Anand et al., 2009) and in transmission of these objectives to employees (Dobrzykowski et al., 2016; Galeazzo et al., 2017; Kohlbacher, 2013). All of the foregoing takes concrete form in an organizational culture that promotes change and innovation (Anand et al., 2009; Camisón and Puig, 2013), which can be promoted from CIIs (Kohlbacher, 2013; López-Mielgo et al., 2009). Based on the foregoing, we propose:

Proposition 1: The implementation of CIIs by transformative leaders will strengthen development of DCs, as such activities will lead to detection of opportunities, stimulation of actions, and discovery of new ways of doing things in the organization.

Proposition 2: The implementation of CIIs with an organizational culture of change and innovation will strengthen development of DCs, as such activities will lead to detection of opportunities, stimulation of actions, and discovery of new ways of doing things in the organization.

Recent studies note the importance of HR for development of DCs (Barrales-Molina et al., 2015; Colbert, 2004; Kok and Lighthart, 2014). Barrales-Molina et al. (2015) observe that HR practices, such as employee qualification and retention, moderate the relationship between NPD (understood as a DC) and meta-flexibility (understood as the resulting adaptive capability). These authors suggest that qualified and involved employees are more prepared and willing to apply their abilities to implement the change needed by DCs for environmental adaptation. These ideas agree with the proposals mentioned for employee training, recognition, rewards and promotion (Anand et al., 2009; Glover et al., 2015; Gowen and Tallon, 2005; Zapata-Cantu et al., 2016), that can play a significant role for the development of improvement projects. CIIs may incorporate

a profound programme of training, involvement, rewards, recognition and empowerment of employees, which, when implemented properly, can benefit the organization and potential development of DCs (Camisón and Puig, 2013; Kohlbacher, 2013; McAdam et al., 2014). It is important to add, however, that such HR practices must foster the capability for adaptation and change (Ussahawanitchakit, 2017; Zapata-Cantu et al., 2016). Specialized-role individuals are also needed to champion the transformation process (Anand et al., 2009; Hansen and Møller, 2016), that is, people who can lead parallel participation structures such as cross-functional teams to enable the organization to make rapid changes when needed (Anand et al., 2009). We therefore establish that:

Proposition 3: The implementation of CIIs that strengthen practices for employee growth and development will strengthen development of DCs through employees' greater willingness to change and adapt.

Proposition 4: The implementation of CIIs that create specialized positions to lead groups and parallel work structures will strengthen development of DCs through employees' greater willingness to change and adapt.

Some studies connect these HR practices directly to the learning that results from them as a fundamental factor explaining development of DCs. Human capital has been related to the development of DCs due to employee know-how (Hsu and Wang, 2010; Nieves and Haller, 2014), and the learning developed in organizations can be used to respond to constantly changing contexts (Crick et al., 2013; Matsuo and Nakahara, 2013). For example, Gutierrez-Gutierrez et al. (2018) relate QM practices such as training and teamwork positively to knowledge integration and organizational learning (antecedents of DCs) and to New Product Development (a DC). Gutierrez-Gutierrez et al. (2012) demonstrate that teamwork and statistical process control in Six Sigma firms facilitate

absorptive capacity, which in turn is related to organizational learning. Matsuo and Nakahara (2013) observe that the PDCA cycle facilitates organizational learning by stimulating problem solving, and the acquisition and sharing of new knowledge and skills. These practices are examples of how CIIs may strengthen learning and thus DCs (Hansen and Møller, 2016). For these reasons, we propose that:

Proposition 5: The implementation of CIIs that strengthen learning mechanisms and knowledge management will strengthen development of DCs through use of this knowledge to facilitate actions of organizational adaptation to changes in the environment.

In relation to these learning mechanisms, more specifically, Argote and Ren (2012) present transactive memory system (TMS) as the micro-foundation of DCs, since TMS facilitates achievement of the three goals of DCs proposed by Kogut and Zander (1992): efficiency, scope and flexibility. TMS is a system shared by groups of individuals and organizations to codify, store and recover information or knowledge (Lewis and Herndon, 2011). CIIs can thus serve as an alternative to development of TMS through development of their projects for improvement and process management. Along these lines, Cabeza-Pulles et al. (2013) identify how having TQM practices benefits the relationship between TMS and knowledge transfer. According to these findings, we propose the following proposition:

Proposition 6: The implementation of CIIs that develop a TMS that enhances learning and knowledge management can strengthen development of DCs by achieving DCs' goals of efficiency, scope and flexibility.

Kok and Ligthart (2014) also identify the positive effect of functional workforce flexibility, which enables employees to perform a greater variety of tasks. This result

agrees with the conclusion of Barrales-Molina et al. (2015), which identifies a negative effect of task frequency, since automatic and repetitive tasks can block the development of DCs, potentially generating inertia in organizations (Teece, 2012; Zollo and Winter, 2002). Excessive orientation to task standardization within the CI could thus be counterproductive from the perspective of DCs. CI is needed to foster flexibility and adaptability, as Dobrzykowski et al. (2016) proposed for the Lean methodology. According to the foregoing, we propose:

Proposition 7: The implementation of CIIs that strengthen standardization of tasks performed by employees will jeopardize development of DCs through the emergence of organizational inertias resistant to change.

The complementarities among DCs and supply chain management have also been analysed (Beske, 2012), with findings on issues such as “knowledge assessment” (access to knowledge patterns) and “Supply Chain partner development”. The development of these complementarities leads to “strategic alliances”, one of the most-recognized DCs (Barrales-Molina et al., 2013; Schilke, 2014; Zollo and Singh, 2004). Hsu and Wang (2010) identify a positive relationship between the relational capital that encompasses suppliers, customers and other external agents, and DCs, since it is simpler for these agents to reconfigure resources and routines jointly to face turbulent environments. The supplier management and customer involvement proposed in CIIs, or the co-design of products, services and other similar practices can facilitate development of this joint structure of SCM and DCs. Gowen and Tallon (2005) identify different Six Sigma practices that can benefit SCM significantly. We thus propose:

Proposition 8: The implementation of CIIs that strengthen relationships with suppliers and customers strengthens development of DCs through greater access to knowledge and development of strategic alliances.

Hsu and Wang (2010) confirm empirically that structural capital, measured through the information technology expense ratio, is positively related to DCs, since this type of capital refers to the knowledge encrusted in the organization through its processes, routines and practices (Jansen et al., 2009). Mechanisms for storage, use and sharing of knowledge thus become very important. As Anand et al. (2009) propose, accessing and using organizational knowledge—understood generally as knowledge of concepts, facts or events—enables application of numerous options in different contexts, which benefits DCs. Something similar occurs with knowledge of processes and procedures, which act as a base for creating learning processes that facilitate the introduction of changes (Nieves and Haller, 2014). CIIs can incorporate diverse information technology tools and practices that enable achievement of the goals mentioned above. Gowen and Tallon (2005) observe that Six Sigma firms with high-technology intensity show a stronger and more significant relationship among Six Sigma practices and competitive advantage. According to the foregoing, we propose:

Proposition 9: The implementation of CIIs that use information systems for information storage, strengthen the development of DCs because these systems enable a structured information exchange that can increase the knowledge base to be applied to different contexts.

Finally, using longitudinal key informant data from 279 firms, Schilke (2014) observes that DCs are more easily associated with competitive advantage in environments with moderate dynamism than in environments of high or low dynamism. According to

this finding, dynamism of the environment is a factor moderating development of DCs. As mentioned above, first, some proposed lines of future research include external variables such as environmental dynamism and uncertainty (Camisón and Puig, 2016). Second, Ambrosini et al. (2009) argue that there are three kinds of DCs, which depend on dynamism of the environment and cannot correspond in all cases to CIIs. In a stable environment, in which the firm need only adapt its resources combination, CIIs understood as DCs can play an important role. This case may correspond to the small-scale improvements proposed by Galeazzo et al. (2017). In more dynamic environments, however, the function of CIIs like DCs is less clear, since they require extensive renewal of resource stock. According to the foregoing, we propose:

Proposition 10: The relationship between implementation of CIIs and development of DCs will depend on dynamism of the environment, with adaptive CIIs (to maintain resource stock value) corresponding to more stable environments, and innovative CIIs (to renew the resource stock) to more dynamic environments.

This SLR and the ten resulting propositions constitute the starting point for future empirical research that seeks to answer the questions proposed. To achieve this goal, we would first attempt to develop an interview protocol with Six Sigma Black Belts, MBBs, Six Sigma project champions and deployment champions, CI champions, CI practitioners, Lean practitioners, Dynamic Capability academics and key researchers from different countries to get a closer, more detailed view of the business reality of the problem posed. We would then identify the variables to be included in subsequent empirical studies. We will choose and/or design measurement scales for these variables and develop a survey questionnaire for multiple online data collection. Beforehand, we would perform a pilot test of the survey instrument. The survey questionnaire should be a longitudinal study from different countries so that we can carry out some cross

comparative studies and understanding some of the critical and rudimentary differences in the findings. After gathering the data, we would analyse them in a way that would contrast the hypotheses that relate CIIs to DCs development. The authors are aiming to develop a final framework linking CI and DC for implementing CIIs in such a way that competitive advantage can be created and maintained.

Conclusion

This SLR of CI and DCs has analysed the 19 scholarly articles resulting from five databases of maximum academic relevance. The SLR seeks to answer the research question, “*How can CIIs boost development of DCs within organizations?*”

The results of the SLR showed a publication trend that has been growing since it began and which promises a successful immediate future for study of the topic proposed. The US holds the leading position for university affiliation among the article authors analysed and country of origin of the firms studied. We also see a majority of empirical (49%) and case studies (26%), which enabled us to contrast some of the initial approaches in the literature empirically. Further, 37% of the studies focus on CI in general, which can be extrapolated to more concrete methodologies. After this more general orientation, the relationship of Lean methodology has received the most study in relation to DCs (29%), followed by TQM (17%) and Six Sigma (13%).

Examination of the literature about role of CI for the development of DCs lacks consensus. In order to understand the relationship further, this study classified the literature into studies that propose CI as a DC itself, studies that come to CI as an enabler of DCs and studies that see CI as a result of DCs. Among the most significant CSFs of the CIIs for DC development identified in the literature are *leadership*, *organizational*

culture for change and innovation, process management, organizational changes, HR practices and information technologies.

Finally, among the key research gaps in the current literature is the need for longitudinal empirical studies that enable contrast of existing theoretical approaches. DCs should facilitate continuous adaptation of changes in the environment over time (Teece et al., 1997; Teece, 2007), such that use of longitudinal analyses becomes crucial to contrasting whether continuous adaptation is really maintained over time. On the other hand, we find the need to develop more in-depth study of CI from the DCs perspective, taking into account the fundamental components or ingredients of DCs such as strategy development, organizational learning and routines (Eisenhardt and Martin, 2000). Finally, due to the external character of the DCs perspective (Teece et al., 1997; Teece, 2007), suggestions for future study also include moderating variables linked to the environment and its dynamism and turbulence.

In line with these proposals, and to advance our research question, we reviewed the DCs literature to see how CIIs can foster development of DCs, including ten propositions to contrast in future research according to the research protocol indicated. A main limitation of this study may be the small sample size of the SLR. Although the trend in the number of publications on this topic is growing, the overall count is small. In any case, there is no consensus on the minimum number of studies needed to perform an SLR (Albiliwi et al., 2015; Trakulsunti et al., 2018). In fact, prior studies have developed satisfactory SLRs with similar sample sizes (Andersen et al., 2014; Materla et al., 2017; Moralos et al., 2016). The restrictions applied in the search may also have excluded studies related to the topic but that did not fulfil the criteria.

Figure 1. Research protocol

Figure 2. Year of publication

Figure 3. Country of origin of authors' University

Figure 4. Country of analysis

Figure 5. Type of paper

Figure 6. CI initiatives

Figure 7. Year of publication and CI initiative analyzed

Figure 8. Proposed model for the relationship between CIIs and the development of DCs

Table 1. CSF for the relationship between CI initiatives and DCs

Anand et al. (2009)	Camisón and Puig (2016)	Dobrzykowski et al. (2016)	Galeazzo et al. (2017)	Glover et al. (2015)	Gowen and Tallon (2005)	Hansen and Moeller (2016)	Kohlbacher (2013)	McAdam et al. (2014)	Trkman (2010)	Zapata-Cantu et al. (2016)
Purpose (organizational direction and CI goals, and balanced innovation and improvement)	Process Management	Top-level management support: encourage employees, ensure new process participation, remark the importance of quality.	Strategic alignment	Managerial processes	Six Sigma design technical dimension	Top management focus, employee support, and dedicated people to champion	Management commitment	Leadership	Organizational changes	Leadership (improvement and innovation development, absorptive capacity)
Process (constant-change culture, parallel participation structures, and standardized improvement method)	Organizational culture		Teamwork for problem solving	Workforce	Six Sigma design Human Resources dimensions	Interventions to highlight the company strategy and purpose (language, symbols, metaphors...)	Corporate culture	Historical propensity to innovation	Appointment of process owners,	Planning (environmental sensing, organizational seizing, strategic innovation)
People (training and career paths, information technology support)	Teamwork		Goals management systems		Six Sigma practices for e-business	Large-scale events		Lifecycle resources for innovation	Implementation of proposed changes (quick-win strategy)	Process (combinative capabilities, flexibility and speed of response, process improvement capacity)

						Continuous leadership development		Culture for innovation	Use of a continuous improvement system	Customer (new products development, customer satisfaction assessment)
										People (innovation and intrapreneurship capacity)
										Information (anticipation and responsiveness to market needs)
										CSR (organizational transformation process to response social needs and environmental challenges)

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