ORIGINAL PAPER

Agile-as-a-tool and agile-as-a-culture: a comprehensive review of agile approaches adopting contingency and configuration theories

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Abstract

Today's world requires new approaches to innovation that leverage continuous testing and pivoting. Speed and the ability to respond to exogenous shocks are becoming increasingly important in both theory and practice. Following the introduction of the Agile Manifesto in 2001, a wide range of industries have adopted agile approaches, which differ from other ways of managing innovation projects by promoting flexibility and the rapid development of new solutions. Despite the proliferation of agile approaches across industries, the literature lacks a systematic understanding of their underlying elements. Therefore, we conduct a systematic literature review using a text mining technique to longitudinally explore the evolutionary dynamics of the field. Analyzing the results through the dichotomous lens of contingency and configuration theories, we show that the agile literature can be systematized into two perspectives: agile-as-a-tool in the contingency perspective, and agile-as-a-culture in the configuration perspective. Our review reveals underexplored intersections in the field of innovation and provides interesting insights into these two perspectives. We also propose a research agenda to shed light on these emerging perspectives in the agile innovation and management literature.

Keywords Agile · Agile approaches · Configuration · Contingency · Innovation · Flexibility

JEL Classification M10 · O30 · O31

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1 Introduction

The term *agile* is not only a buzzword in many academic fields (Grass et al. 2020) but is also considered a relevant approach for managing innovation (Cooper and Sommer 2016a, 2018; Sharma et al. 2022). Indeed, in a world where competition is increasing (Micheli et al. 2019; Trabucchi et al. 2019; Bellis et al. 2022) and managing uncertainty is crucial (MacCormack et al. 2001; Conforto et al. 2014, 2016; Conz et al. 2020), approaches based on the ability of firms to implement dynamism (Teece et al. 2016; Ghosh et al. 2021) and agility (Bianchi et al. 2022) are needed. Therefore, it is important for both practitioners and scholars to better understand what agile means and how it can be used to drive innovation, digital transformation, and management activities in general.

Several approaches and methods that leverage agility have emerged in the practitioner world in recent years. These agile approaches emphasize the role of iteration and learning mechanisms to cope with the complexity of a world that cannot be easily predicted (Tuomi 2012; Magistretti et al. 2023). For example, General Electric proposed the FastWorks framework as an agile approach (Euchner 2017), Amazon introduced the press release method to develop innovations with customers, adopting iteration and agility as the fuel of innovation (Pisano 2015), and Spotify showed that agility is not just a process, but also relevant at the level of the firm's culture (Bäcklander 2019). These are just a few examples of the proliferation of agile approaches and principles in organizations. Indeed, the Harvard Business Review database shows the relevance of agile approaches in the practitioner domain with over 1.500 articles, books, and case studies on how agile is permeating the business and management world. In addition, Harvard Business Review published a book in 2020 that distills the insights from this plethora of publications to give managers some guidance on how to embrace agile (Rigby et al. 2020). Therefore, the interest in this topic is undeniable and evident in both the practitioner and academic worlds.

The first seminal work was the Agile Manifesto by Beck et al. published in 2001, which summarized the agile approach in 12 principles and is considered a milestone (Paluch et al. 2020). Among others, it emphasizes the role of people over processes, work over documentation, collaboration over contracts, and flexibility over planning (Cooper and Sommer 2016a, b). Over the years, other paradigms based on similar principles have emerged in different domains, such as design (Mansoori et al. 2019), business model innovation (Ghezzi 2019; Jovanovic et al. 2021; Sanasi et al. 2022), and digital transformation (Guinan et al. 2019; Chirumalla 2021; Ghosh et al. 2021).

As the literature is vast and scattered, a comprehensive review would allow understanding the fundamental elements of agile approaches and highlight the under-researched areas. However, to the best of our knowledge, no systematic literature review covers the agile field from a temporal and evolutionary perspective, bridging the gap between an interpretation of the approach in practice and innovation management theories. This is important because such a review could inform practitioners about the evolution of the approach and help them to better exploit the potential of the agile approach. For researchers, it can highlight what we know and do not know about agile approaches and help expand the field with

future research. Hence, we aim to answer the following research question: *What are the different interpretations and the underlying dimensions of agile over time?*

To this end, we conduct a review of the agile literature over time. For the definition of agile approaches, we follow Beck et al. (2001), later discussed in Paluch et al. (2020), based on: (i) iteration, (ii) high unpredictability, (iii) time-box constraints, and (iv) continuous interaction with customers. To analyse the agile literature, we employ a text mining technique for systematic literature reviews following Biesenthal and Wilden (2014) and Randhawa et al. (2016). In line with the research guidelines for setting inclusion and exclusion criteria (Tranfield et al. 2003; Sauer and Seuring 2023), we collected a database of articles related to the agile field. To delve deeper into the database and discuss the findings, we consider contingency and configuration theories (Doty et al. 1993; Delery and Doty 1996). In particular, these organizational theories help us discuss and understand the underlying components and elements of the agile literature. In addition, these theories show that different multidimensional constellations of conceptually distinct factors can give rise to different frameworks (Meyer et al. 1993). First, researchers who view agile approaches from a contingency perspective (Miller 1981; Calantone et al. 2003; Gama et al. 2021) emphasize the generalizability of the approaches and their prominence in academic communities. Second, a more holistic mode of inquiry has naturally exposed the configurational dimension of agile adoption (Miles et al. 1978; Pullen et al. 2012).

In reviewing the articles, agile-as-a-culture emerged as a perspective influenced by organizational dimensions and a configurational lens (Miles et al. 1978; Pullen et al. 2012; Bäcklander 2019; Hoonsopon and Puriwat 2019; Huikkola et al. 2021; Vrontis et al. 2023). Instead, agile-as-a-tool synthesizes the literature on processes and activities to implement agility in innovation through the lens of contingency theory (Miller 1981; Calantone et al. 2003; Cooper and Sommer 2016a, b; Pellizzoni et al. 2019; Gama et al. 2021). Moreover, this theoretical lens has helped to unveil understudied areas. For example, our literature review shows that articles dealing with agile-as-a-culture take a holistic view of the organizational dimensions of agility, but what happens to the components of agile-as-a-culture in a reductionist perspective remains under-researched. In particular, reductionism is a research approach that tends to look at the individual dimensions and constituents of an organization (Meyer et al. 1993).

Similarly, the review shows that it is unclear what type of configuration might be generated when agile is viewed in a configuration perspective and part of the agile-as-a-tool cluster. Thus, our review benefits practitioners and scholars by showing that agile is not only a tool to support innovation under uncertainty or changing the organizational culture, but also in in-between situations. This tool-culture dichotomy appears to be a common way of recognizing different perspectives in the agile literature, which may influence the adoption of the agile innovation principles. As other scholars report, diverse and sometimes conflicting views are common in academic research (Suddaby 2010; Micheli et al. 2019; Magistretti et al. 2021). Nevertheless, different definitions of the same construct may hinder the understanding and adoption of the agile methodology itself. Therefore,

a clear definition resulting from the systematization of the literature can mitigate this issue and promote the growth of knowledge (Kraus et al. 2022).

2 Theoretical lenses to study agile approaches

Innovation approaches are characterized by different combinations of design and contextual factors that influence the way the approach is configured in the organization (Mintzberg 1979, 1983). Indeed, it is crucial for the efficiency of processes and approaches that different configurations support equifinality (Doty et al. 1993). Equifinality is the theoretical assumption that different forms can be equally effective (Drazin and Van de Ven 1985). The debate about different types of configurations has grown over the years, and the role of configuration theory in management is beyond doubt (Korotka and Bos-Nehles 2016; Zhang et al. 2017; Myers 2018; Thornton et al. 2019). Nevertheless, configuration theory is always compared to contingency theory. Indeed, the former is concerned with a more holistic understanding of a phenomenon, the latter with a more reductionist analysis (Meyer et al. 1993). This aspect, together with the fact that another underlying assumption is that contingency theory looks for aggregations of components (Meyer et al. 1993), is interesting as a theoretical lens for the investigation of agile where this dichotomy has been noted but not discussed in depth.

In contrast, configuration theory looks at the strong cohesion of the construct, showing how this theoretical lens can support delving into the agile literature (Miller 2018; Yan et al. 2019). Finally, the debate around the two theories also shows that contingency looks for effectiveness determined by the situational context, while configuration theory aims to achieve equifinality regardless of the types of configuration highlighted by the research (Doty et al. 1993). Thus, we aim to better understand the agile approaches by searching within the academic debate for constructs that share the tendency of agile to be considered more effective as a contingency or configuration approach.

From examining existing knowledge about agile and linking it to contingency and configuration theories, some preliminary insights emerge. First, the Agile Manifesto (Beck et al. 2001) clarifies that people involved in agile projects have more accountability, which is determined by the situational context in which they are immersed. This is evident when considering the accountability that a developer has in the definition-of-done in a scrum project (Spagnoletti et al. 2021). Second, agile approaches show that flexibility can increase innovation and help to better respond to changes in a specific context (MacCormack et al. 2001). Flexibility is intended as an organization's ability to adapt to the environment and change the design of the solution according to evolving information (Verganti 1999). These first two examples show a typical contingency perspective characterized by reductionism, contextual influence, and quasi-stationary equilibrium (i.e., the tendency to study phenomena as if in equilibrium or moving towards it). On the other hand, what has emerged from the agile literature is that to embrace agile principles, organizations should work holistically at the firm level rather than at the process level. Indeed, if flexibility is not a feature at the organizational level, its benefits and impact are lower (Buganza and Verganti

2006). As such, when culture is examined, a configuration approach to agile seems to emerge. This dyadic view of agile also seems to be supported in a recent special issue of the Journal of Business Research, where the guest editors emphasized this view of agile as a contingency or holistic (configuration) perspective. The editorial by Paluch et al. (2020) shows that the first three articles focused on contingent investigations of agile (Dziallas 2020; Ghezzi and Cavallo 2020; Bianchi et al. 2020), while the remaining three took a more holistic and thus a configuration perspective (Annosi et al. 2020; Fecher et al. 2020; Mills et al. 2020).

The need to better understand the interrelationships between these two perspectives led us to delve deeper into the literature. As the initial findings show that the agile approaches can be read according to contingency and configuration theories (Miles et al. 1978), this review aims to enrich our knowledge of the agile approaches in the literature using these theories in a longitudinal perspective to unveil the essence of the agile approaches and inform future research.

3 Methodology

3.1 Review criteria

In this section, we describe the approach used to review the agile literature. To conduct the review, we adopted and adapted the systematic review principles of the identification phase proposed by Tranfield et al. (2003) and subsequently implemented by different scholars (e.g., Savino et al. 2017; Ghezzi et al. 2018; Calabrò et al. 2019; Lim et al. 2022). Our data collection process is based on the assumption that there are predefined stages to follow to collect and cluster different scientific contributions (Kraus et al. 2020).

This structured approach ensures transparency and replicability (Snyder 2019; Kraus et al. 2024), and informs future researchers in the field of agile approaches. The process consists of five steps and is reported next.

First, we delved into the agile literature to find the boundaries of the research scope. This first divergent moment was crucial to understand the overarching area in which the systematic literature review should be positioned. Given the goal of disentangling a broad topic, we chose the Scopus database because it allowed us to include more articles and be less stringent in the initial search (Keupp et al. 2012; Pangarso et al. 2022; Gama and Magistretti 2023).

Second, we identified a set of more than ten keywords that we could potentially use to search the repository and to find interesting contributions. These keywords were refined in iterative cycles among the authors to agree on the framing of the search. We used the final set of keywords (Table 1) to search within Scopus. In particular, the keywords belonging to category A are central to the field of agile approaches, while category B helps to better describe the field. As mentioned, the field is strongly characterized by agility, flexibility, and lean approaches, but the individual words may be misleading due to their general meaning. Thus, we searched within categories A and B with an *OR* relationship between the constructs, while to better define the limits of the search, we compiled the two categories with an *AND* logic (e.g., agile innovation/lean

Table 1 Keywords used to perform the search

Category A	Category B
Agil*	Innovation
Flex*	Development
Lean	Project Management

development). The decision to limit the two categories to a small, albeit fairly broad, set of keywords was related to the objective of this literature review. A more focused set of keywords would have limited the collected articles to a smaller area, thus excluding the diversity of agile approaches from the analysis.

Third, we restricted the search to articles written in English and downloadable in full-text, excluding working papers, editorials, research notes and commentaries, interviews, dissertation abstracts, books, book chapters, and conference proceedings (Keupp et al. 2012). There is consensus among scholars that these types of articles have higher value than those in non-academic peer-reviewed journals (Ordanini et al. 2008; Podsakoff et al. 2005). Moreover, given the focus on contingency and configuration theories as defined in the business literature, we limited the subject area to business, management, and accounting.

Fourth, given that the agile approach is a growing stream and its boom is associated with the introduction of the agile principles in the Agile Manifesto in 2001, we decided to systematically review the literature starting from 2002 when the business, management, and accounting literature began to look at it to understand how these principles might be associated with other innovation approaches. The literature shows the increase in agile approaches to manage innovation in a more agile, flexible, and lean way, where the goal is to execute solutions quickly to increase learning and accept failure. Because these principles were adopted by only a few organizations before 2001, reviewing these articles would have led to misleading conclusions. We conducted our search up to July 2020, namely 20 years of research published after the introduction of the Agile Manifesto.

Fifth, considering that the two categories and the start of the search in 2002 did not limit the area of investigation in terms of the management field, we also introduced a set of keywords adopting an *AND NOT* logic. This is because we realized that although category B focuses on the innovation and new product/service development perspectives, the search added many articles from other management areas not relevant for our review. Therefore, we excluded articles that dealt with the environment, operations, production, sustainability, electricity, energy, urban, and supply chains.

This five-step process is the formal procedure that brought the initial dataset of 153,118 articles to 3527, as shown in Table 2.

3.2 Data analysis

We first analyzed these 3,527 articles using text mining. This technique can provide conceptual insights through an unstructured ontological discovery based on words for an unbiased and content-driven review of the literature (e.g., Biesenthal

Table 2 Steps followed to reach the final article dataset

Initial article dataset	Language	Document type	Subject area	Years	Perspective
Screening with the Keywords defined in Table 1	Limited to English	Limited to Articles (Published and in Press)	Limited to Business Management and Accounting	Starting from 2002	Exclusion: Environment Operations Production Supply Chain
156.765	156.500	79.095	8.310	6.642	3.527

and Wilden 2014; Randhawa et al. 2016). We used the textual data mining software Leximancer 4.0, in line with studies in the field of product and innovation management (e.g., Randhawa et al. 2016).

Leximancer uses a Bayesian learning algorithm that performs a bootstrap analysis, considering an extended list of related terms that signify a concept from the text data. This type of analysis has been shown to be consistent with expert judgment (Campbell et al. 2011; Rooney 2005). The algorithm highlights the most frequent concepts and defines their relationships. It starts with the identification of seed words (through the thematic analysis of documents), which are then linked by cooccurrence and frequency in their context based on semantic analysis (Mathies and Burford 2011).

Previous systematic literature reviews have used text mining analysis to reveal differences between different subsamples of the overall dataset. For example, Randhawa et al. (2016) use multiple time frames to show the evolution of the field. In our case, the text mining analysis supports the longitudinal study of research developed from 2002 to 2020. Figures 3, 4, 5, 6, 7, and 8 show the results of this analysis, where dots represent concepts (collections of words with related meanings) and circles represent themes, which are aggregations of related concepts. The brightness of the circle indicates the importance of the themes, while the distance between concepts indicates how related they are. We use these analyses to untangle the vast body of knowledge that has been developed over the years.

4 Results

This section presents the first descriptive analysis of the dataset, followed by detailed views of the elements that emerged from the text mining over the time horizon considered.

4.1 Descriptive analysis

Before presenting the detailed results of the systematic literature review, we provide some descriptive information about the dataset. Figure 1 shows the most represented journals (more than 20 articles in the sample) and the two main strands: innovation and project management. Indeed, project management journals (e.g., International Journal of Project Management or International Journal of Managing Projects in Business) and innovation journals (e.g., Technological Forecasting and Social Change and Journal of Product Innovation Management) have the highest number of papers in the dataset.

The contributions are well distributed over time (Fig. 2), with three local peaks: 2008, 2014, and 2019 (to date). This suggests that agile approaches were a hot topic at the beginning of the century (mainly referring to flexibility), and that these topics have received even more attention from scholars in recent years.
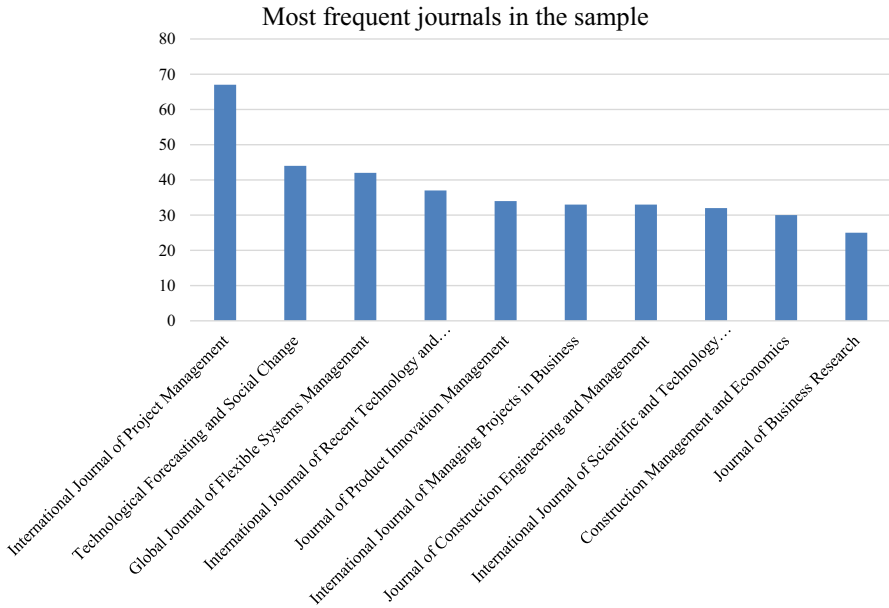
Most frequent journals in the sample

Fig. 1 Most frequent journals in the sample

Since the numbers are high throughout the period, we provide a detailed analysis in 3-year windows (2002–2004, 2005–2007, 2008–2010, 2011–2013, 2014–2016, and 2017–2020) to highlight the trends and shifts over time.

4.2 2002–2004

At the beginning of the century, research in the field of agile approaches was mainly driven by two themes: *development* and *flexibility* (Fig. 3). Development includes as concepts and keywords *models*, *R&D*, *process*, and *product*, which strongly recall

Papers published over time
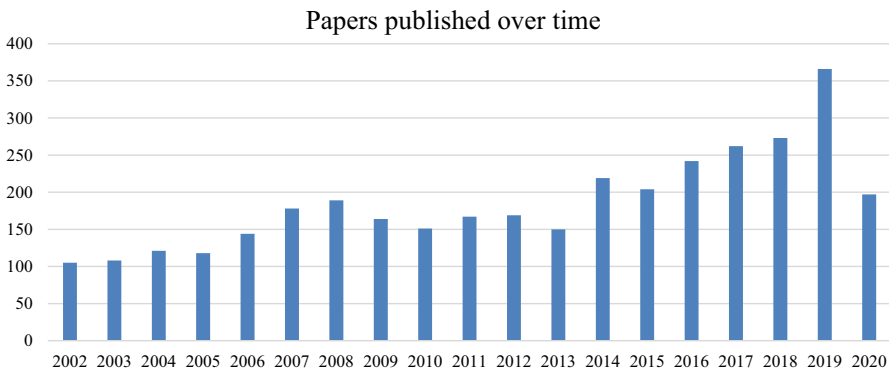
Fig. 2 Papers published over time

the traditional elements of the new product development process. The emergence of development as a concept with a strong focus on processes, interactions, and models reinforces the traditional view of agile as a process-oriented approach.

At the time of the Agile Manifesto (Beck et al. 2001), a novel paradigm in new product development was emerging that challenged stage-gate as the dominant design (Cooper 1990). This led to the second concept in the literature, *flexibility*. Flexibility includes words such as *knowledge* and *innovation* as precursors to these models. Technology seems to act as the primary enabler of such changes, along with a strategic market need (within the firm concept). Most cited papers in these years refer to market needs that push towards modular products and processes to increase the fit between new product development and customer demands (Worren et al. 2002). Overall, customers and market dynamics are seen as more uncertain, hence the growing need for methods and practices to deal with them (Sommer and Loch 2004).

These needs seem to be supported by digital technologies, which at the time appeared to hold great promise for creating new organizational forms, for example, enabling virtual teams, and changing development processes (Powell et al. 2004). However, the rapid response demanded by the market also posed significant
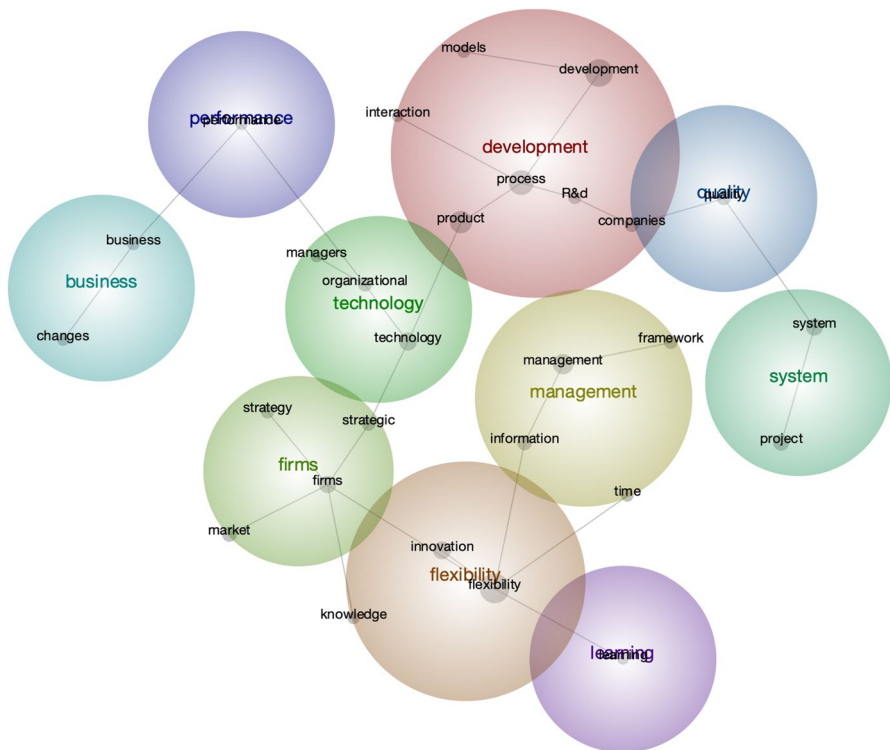
Fig. 3 Text mining analysis 2002–2004

challenges to the way people worked and behaved in organizations (Joshi and Sharma 2004; Galbraith 2002). On the one hand, the *development process* is a central theme, and on the other hand, researchers point out that agile approaches tend to emphasize the critical role of relationships between individuals and creating dense networks that embed a strong sense of belonging (Schoemaker 2003), namely the human side of agile.

4.3 2005–2007

The central theme in this period (Fig. 4) remains *development*, with ancillary themes such as *flexibility*, *product*, and *models* echoing the previous years.

Researchers continued the discussion that started between 2002 and 2004 by considering technology as a key factor in driving and enabling the creation of a new development process. Uncertainty around innovation projects continued to increase and new project management approaches were required (Atkinson et al. 2006). From a process perspective, the dimensions of improvisation (simultaneous planning and executing) and unlearning (changing routines) to face newly emerging needs that could not be met with what was previously learned (Akgün et al. 2007) began to gain importance. In addition, the role of customers and their greater involvement in development started to emerge (Sawhney et al. 2005). Scholars began paying attention to flexibility in a broader perspective. First, the concept of flexibility started to be highly considered even outside of software development (Buganza and Verganti 2006), mainly due to the growing importance of customer-centricity and the introduction of topics such personalization (Buhalis and O'Connor 2005). New evidence suggested that flexibility needed to move from the front end to the entire lifecycle (Buganza and Verganti 2006). In this scenario, specific capabilities such as speed and responsiveness were considered fundamental (Lin et al. 2006).

The idea of a different external environment emerged in the *change* theme, with words like *environment*, *strategic*, and *business*, also linked to broader words like *management*, *organizations*, and *firms*. In short, change should be supported by considering the people involved in the processes. Agility here became the ability to bring people together to face uncertainty through collaborative relationships (Lin et al. 2006). Technology was still seen as an enabler of different forms of organization, not necessarily based on hierarchy (Zammuto et al. 2007). The impact could even extend beyond customers and teams to stakeholders, meaning everyone must be ready, and flexibility must be structurally prepared (Olsson 2006).

4.4 2008–2010

Also in this third time frame (Fig. 5), the two central themes are *development* and *flexibility*, still focusing on related topics such as *software*, *process*, *product*, and so forth.

The impact of agile approaches was still in the spotlight, for example, showing that more direct and continuous customer contact leads to flexible behavior at the firm level (Combe et al. 2012). In other words, agile approaches imply strategic
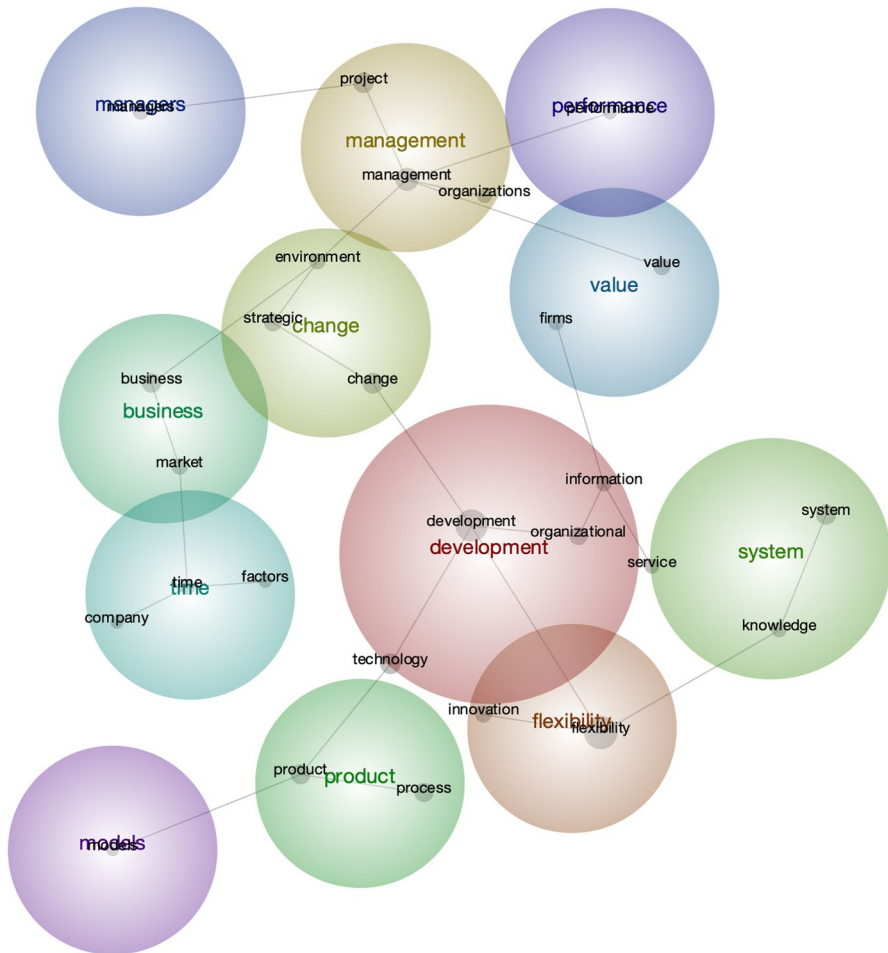
Fig. 4 Text mining analysis 2005–2007

flexibility—in terms of resources and coordination—as a critical driver (Yuan et al. 2010).

The IT dimension remained central, with papers that continued to view agility as a process characteristic associated with specific IT skills (e.g., Tallon 2008). Researchers continued to study the profound effects of agile approaches from a process perspective, for example, the impact on various performance measures, the relationship between product performance and number of customer change requests (Maruping et al. 2009). Open innovation and agile met, with researchers showing the value that looking outside of the firm could bring to the process, helping it to be more agile and thus increasing the innovativeness of the output (Harryson et al. 2008; Marion and Friar 2012).
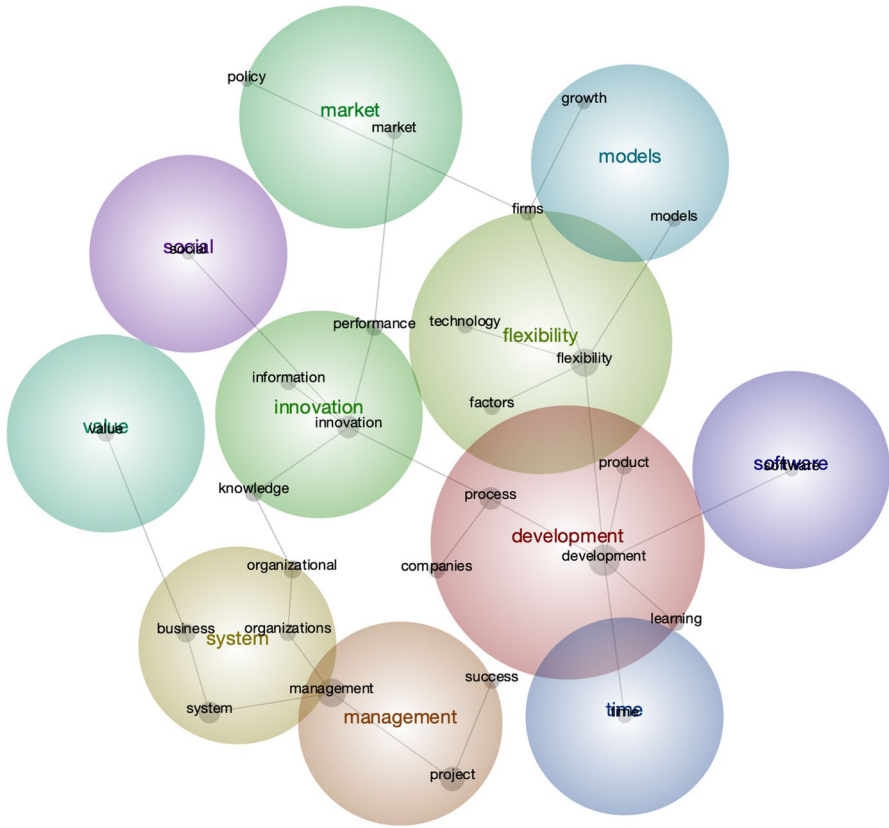
Fig. 5 Text mining analysis 2008–2010

Other scholars explored the link between process dimensions (efficiency and effectiveness of the development process) and organizational dimensions, such as team autonomy (Lee and Xia 2010). In fact, as in the previous cases, a second set of themes emerged, starting from *innovation*, and the organizational dimension through the *system* theme with concepts such as *organizational*, *organization*, or *social*.

At the global level, studies showed that an organizational culture that promotes flexibility leads to high product innovation performance (Valencia et al. 2010). At the individual level, leadership studies entered the field, for example, showing the role of transformational leadership in creating the right climate for change in agile environments (Sarros et al. 2008). All these approaches require people to embrace flexibility in order to be ready to adapt to rapidly changing environments while performing a wide range of activities and expanding their management skills (Mishra et al. 2009).

In this perspective, teams are also relevant: the role of others is critical because agile approaches rely heavily on a sharp learning attitude, often facilitated by lateral relationships (van der Meer-Kooistra and Scapens 2008).

4.5 2011–2013

The themes and concepts that emerged in the 3 years from 2011 to 2013 (Fig. 6) are similar to the previous ones. On the one hand, a part of the concept map is still focused on *development* and *flexibility* and on the application of agile approaches to the development process to make it more flexible. Agile approaches were still being studied in terms of the impact of customer involvement, the role of cross-functional teams and iterative approaches, also in service development (Zomerdijk and Voss 2011). Many studies dealt with the IT field and software development, aiming to push the boundaries a little further (Zaitsev et al. 2020). New elements entered, for example, the possibility to develop in distributed teams and the need for high alignment within teams (Ramesh et al. 2012).
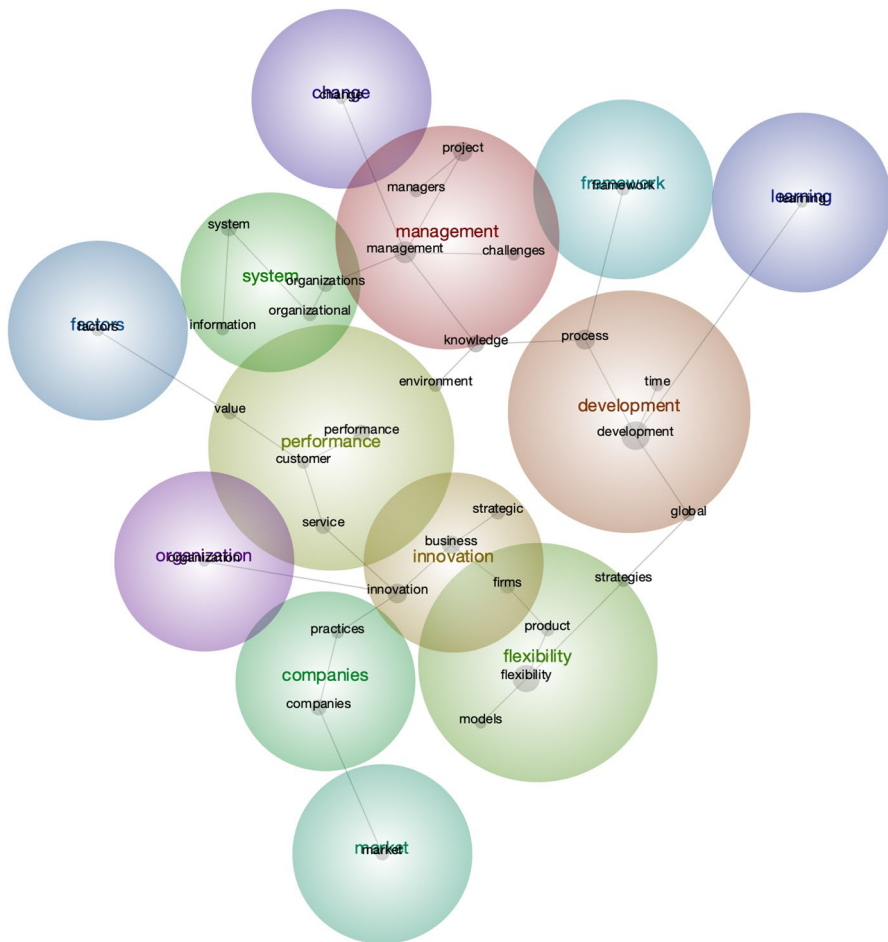
Fig. 6 Text mining analysis 2011–2013

Other studies emphasized the role of people and organizations in this transformation. Indeed, in the IT field, soft dynamics (organizational culture) and the empowerment of the project team are key success factors (Sheffield and Lemétayer 2013), in line with the other part of the concept map. For the first time, the *organization* topic emerged as a stand-alone theme. In contrast, the *management* theme started to focus on cultural dimensions, linking *managers*, *change*, and the *system* themes with *organizations* and *organizational*. Many studies in these years focused on the organizational implications of agile approaches. Among others, specific roles emerged, such as champions and gatekeepers, enhancing the applicability of flexible and agile approaches to new product development outside the software industry (Kandemir and Acur 2012). At the same time, the role of organizational change was considered a prerequisite: strategic flexibility can be enabled by the structural simplification of the organization (Bock et al. 2012). Finally, the concept of organizational agility, market capitalization agility, and operational adjustment agility emerged, mainly from a process perspective, still very much focused on the IT world (Lu and Ramamurthy 2011).

4.6 2014–2016

The structure of the themes (Fig. 7) from 2014 to 2016 remained fairly stable compared to the previous 3 years, but the content of the papers shows a significant shift.

Around the *development* theme, two ad hoc *project* and *process* themes emerged. On the one hand, the previous stream of agile methods in software development continued, focusing on more complex issues, such as portfolio management (Stettina and Hörz 2015). New studies highlighted the relevance of agile approaches in traditional industries, for example, testing the impact of agile on project performance in terms of project efficiency and stakeholder satisfaction, regardless of the application domain (Serrador and Pinto 2015).

On the other hand, a new significant and relevant stream ensued from the words of Robert Cooper, the creator of the stage-gate model (Cooper 1990). In particular, Cooper questioned the future of stage-gate in his seminal paper that brought agile principles to the traditional stage-gate process (Cooper 2014). In the following years, papers emerged that formalized the hybrid stage-gate (i.e., a combination of the agile principles and the traditional stage-gate approach) (Copper and Sommer 2016a, b), exploring specific applications, such as in the manufacturing field (Cooper and Sommer 2016a, b; Zhang and Sharifi 2007). Similar studies were developed by authors focusing on typical innovation projects and highlighting the need to properly manage the two souls (Conforto and Amaral 2016). The contributions in this area are not only related to the formalization or quasi-formalization of phases, but also to the output of the process itself. Counterintuitively, some researchers showed that radical projects are often the result of more formal ideation methods compared to incremental ones, where flexibility is higher (Holahan et al. 2014).

The second part of the themes centered around *flexibility* and *innovation*, again pushing toward an organizational dimension, enabling innovation at the *firm* level and dealing with *employees*.
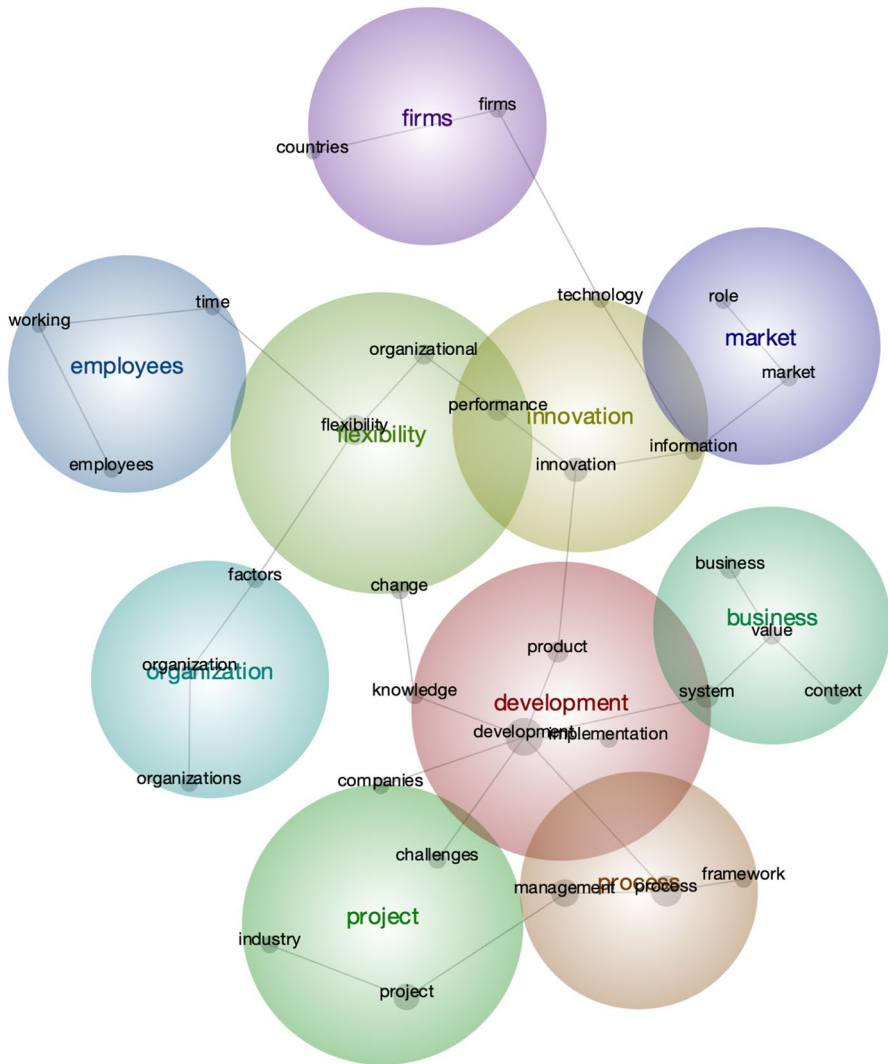
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Fig. 7 Text mining analysis 2014–2016

The concept of flexibility emerged as an individual characteristic in the context of major innovations (Kok and Ligthart 2014). At the same time, many concepts referred to the individual or the process level, scaled to the organizational level. Agility became more about team performance than just a software development methodology (Conforto et al. 2014, 2016). Ambidexterity scaled at the organizational level, showing positive effects in terms of strategic flexibility and new product development perspectives, highlighted the role of dynamic resource management (Wei et al. 2014). Hybrid approaches also reached the organizational dimension, referring to a semi-formal organization that combines traditional

structures with informal connections to facilitate flexibility and agile work (Bian-cani et al. 2014).

4.7 2017–2020

In the last 4 years (Fig. 8), the situation evolved, but the duality remained. The lower part of the figure still shows words related to the *development* theme, always linked to the *software* world and the *project* dimension. In other words, the original stream that followed the Agile Manifesto in 2001 continued with studies on the specifics of agile development projects. For example, new insights emerged about the types of performance improvements. Considering process performance, several researchers explored the role of agile principles in making the process more efficient or effective.

Fig. 8 Text mining analysis 2017–2020

For example, in software development, agile practices improved either effectiveness or efficiency, but not both at the same time (Recker et al. 2017).

The emerging stream of the previous 3 years continued with a focus on hybrid approaches. Cooper (2019) studied the determinants of new product development success, while Bianchi et al. (2020) explored the combination of agile and stage-gate, highlighting the advantages and disadvantages of both approaches in the software industry (Bianchi et al. 2020).

At the same time, the full range of words related to the themes of *flexibility* and *innovation* expanded and became more prominent, in combination with many words related to *process* and *management*, recalling the organizational dimension.

In these years, agility moved to the strategic level as the ability of a firm to continuously renew itself and maintain flexibility without compromising efficiency (Clauss et al. 2019), namely anticipating competition to seize emerging opportunities and levering learning processes in continuous innovation (To et al. 2019). When agile reached the strategic dimension, it meant having the ability to reconfigure the entire business model (Battistella et al. 2017). The business model perspective was also adopted in the startup world, with lean approaches strongly related to the agile principles (Ghezzi and Cavallo 2020).

This move toward the organizational dimension, from a project to a strategic orientation, also impacted the individual perspective. Agile approaches require people to embrace specific characteristics that are often compared to an entrepreneurial mindset. This idea has been reinforced by recent studies that consider flexibility a key characteristic of entrepreneurs (Staniewski and Awruk 2019; Xing et al. 2019), often associated with a high use of feedback, critical reflection, and goal setting to help people embrace agile principles while discovering what matters to them (Doeze Jager-van Vliet et al. 2019).

The parallelism between the two worlds—the project and the strategic level—was reinforced by the fact that people working with agile approaches are often held accountable for their decisions, which has a significant impact on the decision-making process that needs to be influenced by creativity and informal planning (Nemkova 2017).

Specific roles usually strengthen these mechanisms between people, for example, specific coaches (e.g., agile coaches) who increase context sensitivity, support others, establish simple principles, observe group dynamics, surface conflicts, and facilitate constructive dialogue (Bäcklander 2019). The same study also highlights the opportunity for new organizational structures to support these approaches.

Finally, individuals working with these approaches require specific skills. Among others, frame flexibility, defined as the cognitive ability to expand the categorical boundaries of innovation to understand what resonates within the organization, is considered a key individual characteristic (Raffaelli et al. 2019).

5 Discussion

By systematically reviewing articles related to the evolution of agile approaches, this study contributes to the innovation management literature As noted, agile approaches often include two main themes, *development* and *flexibility*, which are

at the heart of two broader souls that emerge from the literature: agile-as-a-tool to change the new product development process, and agile-as-a-culture to embrace flexibility. We next discuss these two souls based on the literature review and the theoretical lenses adopted.

5.1 Agile-as-a-tool

Agile-as-a-Tool is related to traditional development processes, such as Cooper's (1990) stage-gate model, and project management techniques (Turner 2016), which aim to anticipate as much as possible what might happen during the process in order to make it efficient and effective. However, the growing importance of uncertainty in projects has become a relevant issue, as demonstrated by software development and the resulting digital revolution. Complexity is too high to be fully anticipated, and flexibility and agility are therefore necessary drivers to cope in such an uncertain world (MacCormack et al. 2001; Brand et al. 2021). Given the aforementioned theoretical contingency and configuration approaches to management, a one-to-one fit seems to emerge from the findings.

In particular, the *development* perspective (Cooper and Sommer 2016a), with its ideal type of fit, namely the agile approach, fits a specific context and clearly refers to a contingency approach (Miles et al. 1978). The reductionist perspective (Meyer et al. 1993), where the focus of agile is reduced to a mere process, allows one of the two souls of agile to emerge: agile-as-a-tool. Agile-as-a-tool means that agility can be implemented in specific processes or to accomplish specific tasks, focusing the inquiry on specific components of processes (Cooper and Sommer 2016b). This leads organizations to try to adapt their traditional structure to the new challenges (e.g., iteration, complexity) that the current world proposes by unidirectionally rethinking the processes (Hobbs and Petit 2017).

Delving into the development dimension of the chronological evolution of the agile field, two different waves of research emerged. The first is related to the role that agile development processes have had in software development. The Agile Manifesto (Beck et al. 2001), with a clear focus on improving the development processes, increased the attention of researchers to the specific value delivered by different components in a contingency perspective (e.g., Akgün et al. 2007; Lin et al. 2006; Tallon 2008; Maruping et al. 2009; Harryson et al. 2008; Marion and Friar 2012). After years in which scholars focused mainly on the drivers of flexible and agile approaches to change the development process, this first wave of studies started to delve into the inner characteristics of agile as a tool to change the innovation approaches. Some examples in this direction are Buganza and Verganti (2006), who suggested taking a lifecycle perspective, or moving outside the software development industry (e.g., Kandemir and Acur 2012; Meier and Kock 2021), while questioning the role of individuals within these new processes (e.g., Ramesh et al. 2012; Sheffield and Lemétayer 2013). These are typical elements of a contingency dimension of analysis, with a focus on contextual factors that aim for reductionist simplicity, stability, and regulation (Mintzberg 1979).

Later in these years, a second wave of studies emerged related to the development process based on agile principles. Indeed, the shift from software to new research areas drew the attention of scholars toward a broader set of areas (Combe et al. 2012; Battistella et al. 2017; Yuan et al. 2010). This allowed introducing the topic of hybrid stage-gate methodologies showing that specific agile development processes require specific components and the formalization and specialization of different design factors (Cooper 2014; Cooper and Sommer 2016a, b). Challenging his foundational work, Cooper (1990) sought to revise the stage-gate model in light of new market and business needs.

Interestingly, he suggested the possibility of merging the traditional development tool, stage-gate, with the new agile tools. This gave rise to the second wave of the agile-as-a-tool literature stream, with various papers presenting new processes to help a wider range of companies benefit from the agile approaches (Cooper 2014; Cooper and Sommer 2016a, b).

As in the case of the first wave, within a few years, researchers began to delve deeply into these new agile approaches, for example, defining where stage-gate fits better than agile and how they can be balanced (Bianchi et al. 2020), recognizing hybrid roles (Ko and Kirsch 2017; Dziallas 2020), and showing hybrid outcomes in project performance (Kosztyán and Szalkai 2018; Ghezzi and Cavallo 2020).

5.2 Agile-as-a-culture

The second theme that emerged from the text mining as a recurrent theme across all the time frames considered is *flexibility* (MacCormack et al. 2001). Flexibility can be accommodated by organizations in different ways, and the theoretical lens discussed above seems to suggest that this second theme better fits the configuration perspective (Meyer et al. 1993). Indeed, research on flexibility, by being more holistic in its inquiry, based on empirical observation and non-linear in the interactions between different constructs (Doty et al. 1993), led to the emergence of the second soul of agile: Agile-as-a-Culture. Agile-as-a-culture represents the complete fulfilment of the Agile Manifesto: the organization serves the end goal, putting the results above any superstructure. This soul is rooted in the modern competitive scenario where organizational configurations differ to create and have a global impact in a faster way (Euchner 2017).

From this perspective, agile approaches have had a long evolution over the 19 years of research observed in this study. This second set of studies refers to agile as something much broader than the first set (agile-as-a-tool). The locus where agile is applied is not a specific process, such as development, but becomes an overall mindset that extends to all activities and behaviors within the organization. Also in this second case, we can highlight two main waves over the years: the first is a more strategic view of agility (e.g., Olsson 2006; Valencia et al. 2010; Bock et al. 2012); the second a more behavioral view (e.g., Kok and Ligthart 2014; Conforto et al. 2016; Bäcklander 2019; Mollet and Kaudela-Baum 2022).

The former relates to the view of flexibility as an enabler of better strategic management. Thus, agile approaches that aim to manage the direction, the strategic

dimension of the business, mainly take into account an overall structural perspective. This means that contributions thus far mainly focused on the role and governance of external relationships (Lin et al. 2006; Annosi et al. 2020), the ability to continuously change without losing efficiency (Clauss et al. 2019), ad hoc governance frameworks (Sergeeva 2019), and the impact of agile on the whole organization (Bäcklander 2019). In this stream, many papers suggest how the entire organization should change to embrace a complete shift to agility, moving from virtual teams (e.g., Powell et al. 2004) to a flat or semi-formal organization (e.g., Zammuto et al. 2007; Biancani et al. 2014), with one common denominator: agility must be structural (Olsson 2006).

The latter is more attached to the view of individuals in the team playing a different role, configuring the overall agile approach as a more holistic way of thinking for the entire organization (Magistretti et al. 2019; Bäcklander 2019), defining the concept of organizational agility (Lu and Ramamurthy 2011; Mills et al. 2020). In this perspective, scholars emphasized the need for the right climate throughout the organization, facilitated by an ad hoc leadership approach that drives change (Sarros et al. 2008). People need to change and adopt agile behaviors to be able to work in such organizations (Mishra et al. 2009), and develop a critical and a continuous learning attitude (van der Meer-Kooistra and Scapens 2008; Fecher et al. 2020).

Given the holistic view adopted and the complexity of the analysis, the dynamism of agile-as-a-cultural and the complexity of the phenomenon, this second soul seems to fit the configuration perspective (Miles et al. 1978).

5.3 An emerging model

Our review of the literature presents a dual dichotomy: first, highlighting two contrasting views of agile approaches that we explore through contingency and configuration theories (Meyer et al. 1993); second, two souls emerge from the studies considered that seem to perceive agile in two very different ways: agile-as-a-tool and agile-as-a-culture.

At first glance, there appears to be a perfect fit between these two dichotomies (Fig. 9). In particular, the contingent view of agile seems to be strongly associated with the agile-as-a-tool stream, with a wide range of publications dealing with structured approaches to making the development process more agile and evolving coherently with market needs or uncertainty trends. As such, agile becomes a tool to respond to an external environment that is changing at a rapid pace compared to the world where the stage-gate model was the dominant design for the development process. Within these structured processes, the literature defines practices, roles, and even industries (starting with the IT world) where this type of agility fits better.

The second perspective—agile-as-a-culture—seems to embrace a configuration perspective. This second stream deals with the strategic orientation of firms, aiming to evolve over time to fit the business context better thanks to the ability to quickly align and change. This strategic flexibility orientation takes on a human dimension. People need to adopt a mindset that helps them work in such an environment, regardless of the process. Agility becomes a culture, an attitude that people must
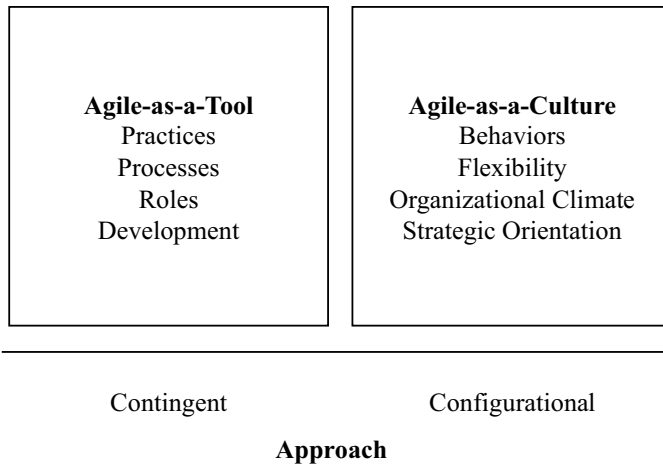
Fig. 9 Agile-as-a-tool and Agile-as-a-culture

embrace to think, work, and behave in a way that is consistent with constant flexibility that enables the organization to respond to any change.

6 Research agenda and conclusion

Our review of how scholars have studied agile approaches over the past years highlights two perspectives that complement the evidence suggesting that agile can be read through both contingency and configuration theories. In addition, there is evidence of new views showing that the concept of agile has become broader and more comprehensive over time.

On the one hand, there is evidence of a configuration perspective in the agile-as-a-tool literature; on the other hand, there is evidence of a contingency perspective in the agile-as-a-culture stream. In particular, the second wave of the agile-as-a-tool literature stream, initiated by Cooper's (2014) seminal work on hybrid stage-gate, appears to move away from a contingency view of the process. Agile no longer seemed to fit all the needs of contingent projects, as it did for software development (Beck et al. 2001; Dönmez et al. 2016), but became a living process to manage projects according to their particularities. The level of agility may vary depending on the type of project and the level of uncertainty surrounding it (Cooper 2014, 2016, 2017). Other studies support this view by integrating agile and traditional approaches (e.g., Bianchi et al. 2020). Therefore, agile approaches are still a tool, but not in a contingent way. Organizations need to think in an agile way to adapt to more agile or traditional processes according to specific needs, with people who can work in any context.

The agile-as-a-culture literature stream instead seems to push toward the contingency view by identifying specific behaviors that fit agile processes. Examples are the emergence of specific roles, such as champions and gatekeepers, to bring

a certain mindset to a contingent project (Kandemir and Acur 2012), or the role of agile coaches to help people in specific situations (Bäcklander 2019). Early evidence of organizations implementing a configurational and cultural shift starting from contingent changes are emerging (e.g., Magistretti et al. 2019), showing the opportunity to create ad hoc agile-centers that may help diffuse the culture. Figure 10 presents an evolution of the original framework that enhances our understanding of agile studies. This illustrates that agile-as-a-tool and agile-as-a-culture are not confined to specific corners of the two-by-two matrix, but are evolving and expanding beyond the dichotomous contingency and configuration perspectives. While predominantly associated with one view, they are exhibiting a dynamic shift, starting from one corner and progressing to adjacent areas, as indicated by the arrows.

6.1 Agile-as-a-tool: future research adopting a configuration approach

The framework suggests there is room to explore agile-as-a-tool in a configuration perspective. In other words, a holistic approach to better understand how agile processes can fit into the overall configuration. It may be relevant to examine how the different components interact in an overarching way that brings together the tools, processes, and people, moving away from purely the tool view.

In particular, at the time, both innovation managers and scholars accepted an explicit model as the dominant design for project development based Cooper's (1990) stage-gate. Evidence from this review suggests that in today's increasingly
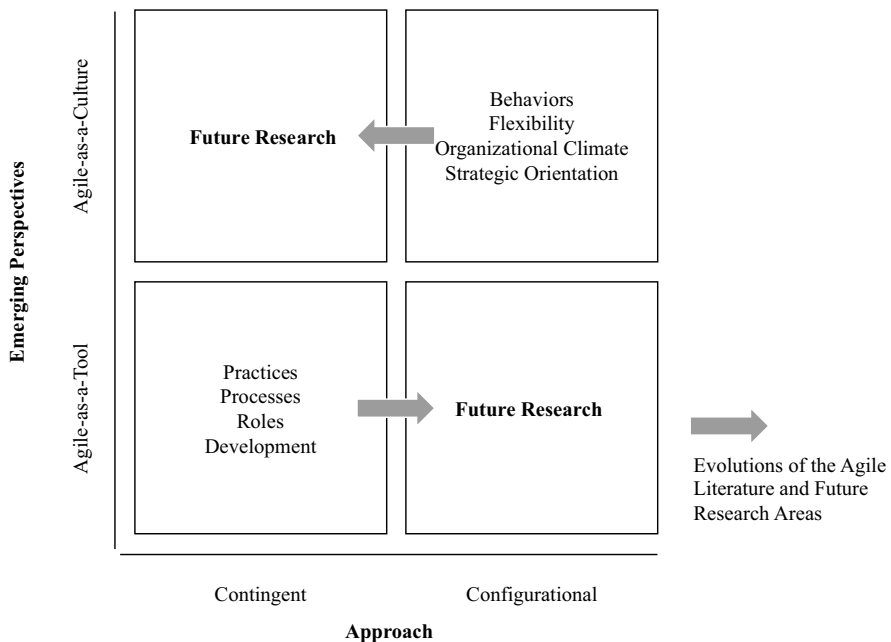
Fig. 10 An evolving framework for future research

turbulent markets and uncertain development, it may be difficult to see a new reference model emerging. Nevertheless, Cooper (2014, 2016) proposed a more flexible process that can be adapted to different situations, but this line of research could be greatly expanded, for example, by asking:

How do firms operate knowing that different processes are needed for different projects?
How can the organizational configuration be adapted to accommodate a different type of development process?
How can organizations be prepared to configurationally manage different types of agility?

6.2 Agile-as-a-culture: future research adopting a contingency approach

There is also room to explore a contingency view of the cultural dimension. In other words, researchers could focus on a more punctual and contingent view of the behaviors and mindsets of agile approaches. In particular, it may be relevant to understand how an agile organizational culture can be transformed into specific and contingent behaviors and roles. Once organizations leverage the configuration perspective of agile approaches and manage to have the right culture embracing the agile mindset, can this mindset be operationalized in different contingency dimensions? Specifically:

How can people rely on the agile mindset to change behaviors to accommodate a contingency perspective?
Which capabilities would help employees embrace an agile culture while being effective in contingent projects?

6.3 An integrated view of agile-as-a-tool and agile-as-a-culture: future research areas

Finally, as shown, there is room for further exploration in different directions, taking a configuration perspective of agile-as-a-tool and a contingency perspective of agile-as-a-culture. However, something more emerged from this review.

On one side, two different dichotomies: the tool vs cultural perspective and the contingent vs configuration perspective. On the other side, several tensions that correspond to the different perspectives. The agile approaches, originally designed to manage the uncertainty of complex environments, now respond to effectiveness and efficiency. Studying complex approaches requires focusing on specific dimensions, hence these dichotomies. However, 20 years of research shows that these dichotomies tend to overlap and extend into each other. The next few years of agile research should take a step back and embrace and explore agile approaches from a balanced perspective. In particular: *How can organizations manage the transition from traditional models to agile approaches?*

Shifting the unit of analysis, for example, moving from projects or organization to business units and practices, may help scholars to simultaneously adopt the

contingency and configuration perspectives. Similarly, getting closer to employees—embracing the human perspective that is becoming more prominent in the innovation field (Bogers et al. 2018)—may help in considering how people work (in the process dimension) and how they behave (in the cultural dimension).

Finally, the framework proposed in Figs. 9 and 10 has some limitations due to the nature of the review. In particular, our review is limited to agile approaches in the innovation and management literature. In addition, we only consider agile approaches that incorporate Cooper's (2019) view of agile stage-gate and not agile in general (e.g., agile development, lean manufacturing).

6.4 Conclusions

This study explores the agile approaches through a bibliometric systematic literature review. The contributions and implications of these papers are threefold.

First, from an academic perspective, our review provides a systematic and longitudinal view of how scholars have explored agile approaches in terms of contingency and configuration theories, highlighting gaps to be explored in future research. In addition, the analysis of the dataset led to two different perspectives in the study of agile approaches: agile as a way to improve contingent process performance to achieve the output of the development process in a more efficient way, which we label agile-as-a-tool; and agile as an organizational configuration that goes beyond the single process or output towards the strategic and direction dimension, entering all organizational aspects and defining the agile-as-a-culture approach. Our review shows how these two perspectives of agile approaches considered in the past have been confined to contingency (the former) and configuration (the latter) theories. The review unveils the temporal evolution of the field, and studies published over the last decade highlight that the agile-as-a-tool and agile-as-a-culture perspectives are evolving and emerging as two approaches that can inform practitioners and scholars on both theories. The review also highlights this initial permeation of the first perspective (as a tool) with the configuration view in hybrid approaches, and the second (as a culture) with the contingency view at the individual level. Therefore, future research could attempt to bridge these gaps.

Second, by adopting a longitudinal perspective and mapping the evolution of research in the agile field, the review enriches our understanding of two relevant aspects. First, it demonstrates a new way of reviewing the literature by adopting a temporal perspective to understand how the field has evolved. Second, our study shows that in the agile field, the contingency perspective as a reductionist mode of inquiry and the configuration perspective as a holistic mode of inquiry are converging. This could inform scholars that these two theories, similar to the agile-as-a-tool and agile-as-a-culture concept, are not two sides of the same coin, but a continuum where more research could enrich our understanding.

Third, the review also draws three managerial contributions. First, the article systematizes two different agile perspectives, agile-as-a-culture and agile-as-a-tool, showing managers how these two souls are both equally relevant to achieving agility in an organization. Second, this review sheds light on a complex environment where

multiple approaches that rely on similar antecedents can be introduced with the purpose of achieving different goals. By presenting the two souls of agile approaches and juxtaposing them to contingency and configuration theories respectively, this study can provide managers and entrepreneurs who want to adopt agile approaches with a clearer view of what type of agility they need for the challenges ahead. Third, our review offers a temporal perspective on agile approaches, informing managers on how agile was perceived in the earlier stages of its development and grew over time. This way, the review can support managers in finding a stance that resonates with them and gaining insights on how to introduce agile in their organization. The review can thereby serve as an informative guide for practitioners, paving the way for an organization's evolutionary progression towards agility.

Nevertheless, like all systematic literature reviews, our study has some limitations related to the sampling process and the theories examined. The adoption of a temporal evolutionary perspective, although interesting to map a field as vast as agile, may have hindered the robustness of our findings. In addition, the multi-theoretical lens adopted, while an interesting way to close the gap between the practitioner and scholarly interpretation of agile, does not purport to be the only possible interpretation. Therefore, we hope that this will encourage scholars to delve deeper into agile to discover more connections with management and organization theories.

Data Availability Statement There is no associated data.

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