

REVIEW

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# Disentangling organizational agility from flexibility, adaptability, and versatility: a systematic review

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## Abstract

Organizational agility is the ability of an organization to swiftly and efficiently respond to changes in the organization's environment. However, the literature demonstrates the interchangeability of agility, flexibility, adaptability, and versatility. Therefore, confusion and conceptual overlap persist. As a result, this study aimed to provide further conceptual clarity about organizational agility by synthesizing organizational agility, flexibility, adaptability, and versatility. A systematic review of 40 articles published in business and management-related journals between 1991 and 2022 in ABI/INFORMS, Since Direct, Emerald databases are employed. Findings from thematic analysis and content analysis using Leximancer text mining analysis show that versatility, adaptability, and flexibility are closely connected with their focus on coping with change in the business environment. However, agility is distinct due to its emphasis on organizational ability, capability, and changeability, as well as how it conceptualizes these attributes. This review contributes to developing organizational agility theory and practice by disentangling organizational agility from related concepts. Specifically, it contributes to scientific communication by referring to the same phenomena as organizational agility. Finally, the study concludes by highlighting future research directions.

**Keywords** Organizational agility, Flexibility, Adaptability, Versatility, Organizational change

## Introduction

Continuous change is increasingly the new norm rather than the exception in contemporary organizations. Today's business environment is dynamic and subject to significant changes in every aspect [1]. For a business

to thrive in the market and gain a competitive edge, it must quickly adapt to change and improve efficiency [2, 3]. Thus, certain organizational capabilities can enable a company to respond appropriately to quickly changing environmental conditions and to exploit these changes as business opportunities [4]. In this respect, prominent studies identify organizational agility (OA) as a specific dynamic capability to sense unexpected changes and respond swiftly and efficiently to them [5–7].

Accordingly, organizational agility is the strategy for responding to these changes and revolution factors [6]. Agility provides the organization with quick response and compatibility with the environment and allows applying novel approaches as needed to improve its efficiency [1, 8]. Similarly, Hatzijordanou et al. [9] emphasized a high agility level as a rewarding capability when aimed at the quick exploitation of new business opportunities.

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However, different definitions for the same phenomenon and interchangeable use of terms such as flexibility, adaptability, and versatility with organizational agility are the challenges in research on organizational agility, and these may prevent the understanding of organizational agility and its further progress [3, 4]. Previous literature shows an overlapping conceptualization and interchangeable use of agility, flexibility, versatility, and adaptability [10–12]. Some scholars concluded that these concepts are difficult to measure, predict, and effectively teach since they are ill-defined and elusive [13]. Researchers call this phenomenon concept proliferation, which means the emergence of differently named constructs with overlapping attributes or the use of different names for the same concept [14]. Jingle and jangle fallacies are another name for this condition. The jangle fallacy describes labeling two different terms to refer to the same thing, and the jingle fallacy describes using a single term to refer to different things [15].

Blending similar concepts leads to confusion and prevents a complete understanding of organizational agility (OA) [16]. A fundamental cause of this blending of similar concepts is a lack of construct clarity and differentiation from similar or related constructs [14]. As a result, these jingle-jangle fallacies hinder scientific communication and knowledge convergence among researchers when we use the same terms for different phenomena and study the same phenomena but refer to them differently [17].

In this respect, some scholars emphasize the differences and similarities between agility and related terms [11, 13, 18]. The academic debate about the role of OA and its relation with flexibility, adaptability, and versatility can be dated back to 1991 when Evan argued that the use of the word flexibility is ubiquitous. The sense frequently evoked by flexibility is a capability for novel situations, represented in agility and versatility [11]. Nevertheless, Walter [4] emphasizes that OA builds on previous concepts in management theory, and similarities exist, but there are important distinctions that should be considered.

As a result, previous researchers have reviewed OA and similar terms from different perspectives, such as psychology [13], strategic management [11], supply chain management [18, 19], information technology [20], and marketing [21]. These reviews provide valuable insights into the use of OA and similar terms. However, the studies are fragmented, and identifying the connection between these concepts calls for integrating the important details of existing studies in an evidence-based review. Moreover, to the best of our knowledge, there is no comprehensive systematic review of studies that summarize how agility is distinguished from similar terms

such as flexibility, adaptability, and versatility in business and management contexts using text mining analyses. Furthermore, as conceptualization establishes the language used when describing and thinking about terms, an in-depth understanding of these concepts is crucial for achieving them [22]. Therefore, the current study will address the following research questions: How does previous literature differentiate OA from flexibility, adaptability, and versatility? What characteristics differentiate OA from flexibility, adaptability, and versatility as a strategy to cope with the change in the business environment?

The current review advances OA literature through a systematic analysis of definitions, connectedness, and differences associated with OA, flexibility, adaptability, and versatility. Consequently, this advances OA research by improving scientific communication amongst researchers by allowing them to refer to the same phenomena as OA, which enhances the development of efficient methods for measuring, predicting, and instructing OA.

The structure of this study begins with a brief overview of the historical connections between OA, flexibility, adaptability, versatility, and the ability to adapt to changes in the business environment, followed by an identification of the gaps in more recent literature. In the following sections, the research method and the findings of the thematic and content analysis using text mining are presented. Finally, the discussion, conclusion, and avenues for future research are outlined.

## Background literature

### Organizational agility

The term agility goes back to the Old French term (*agilité*) in the fourth century meaning “nimbleness, and quickness” [23]. Agility was first used in a business setting in 1982 when it was defined as “the ability to react quickly to rapidly changing circumstances” [4, 24]. The term agile was also mentioned by [25] study, that organizational leaders were responsible for driving continuous change to meet the changing needs, and emphasized the need for organizations to adjust fast, which is a crucial notion in OA [26]. However, other researchers believe that OA has its roots in the manufacturing context and originated with the 1991 Lehigh Report of the Iacocca Institute. The report concluded that a new production system based on OA must be invented to fulfill the needs caused by new competitiveness factors in United State of America (USA) manufacturing industry [1, 4]. In the mid-1990s, the largest American corporations, particularly in the Information Technology (IT) and telecommunications sectors, adopted the notion of agility concerning this report [27].

Over the last three decades, researchers have looked into agility in a variety of contexts, including

manufacturing, strategic management, operations and marketing, and information systems and supply chain management. As a result, scholars and practitioners have debated what constitutes OA and indicated a lack of theoretical clarity [28]. Furthermore, scholars view agility from various angles, resulting in discrepancies in the concept's definition [4, 29]. On the other hand, the conceptualization of OA was also argued as a paradigm and capability of an organization [4].

In this respect, prominent studies identify agility as a capability that an organization builds with its resources to identify changes and the ability to respond to the environment, coupled with the know-how, experience, and knowledge of the organization and its decision-makers [5, 6, 30, 31]. Several researchers also defined OA as the ability to adapt or react to change [5, 32, 33]. Furthermore, OA is an organizational readiness to change, the capability to alter organizational resources and predict future opportunities [29]. Similarly, OA is defined as the ability to recognize unexpected changes in the environment and appropriately respond swiftly and efficiently by utilizing and reconfiguring internal resources, thus gaining a competitive advantage [6]. All taken together, it can be concluded that literature identified OA as the ability to recognize, foresee, react, and create change.

### Flexibility

The term flexible goes back to the Old French term (*flexible*) in the fifth century meaning capable of being bent and mentally or spiritually pliant. In Latin *flexibilis* means “bent, pliant, flexible, yielding, figuratively tractable and inconstant” [23]. Flexibility is a multi-dimensional concept with different connotations, paradigms, foundations, and dimensions [34]. The origin of flexibility as a concept dates back to the pioneering work of Stigler and Hart during the 1930s in economics and then became the topic of discussion in different research areas, including economics, decision analysis, military strategy, organizational design, and information technology [35, 36]. For decades, management literature has addressed the idea of organizational flexibility. However, studies indicated that flexibility in an organization highlights ambiguity and suggests a closer examination of its definitions [34].

Different studies described flexibility as the ability to adapt, the ability to accomplish something other than initially intended, the degree to which an organization has a variety of managerial capacities, and the speed to increase the control capacity of management and improve the controllability of the organization [11, 37]. Flexibility is a company's capability to deal with or respond to environmental fluctuations or uncertainties and consequently acquire the opportunities to obtain a maintainable competitive advantage [38]. In general, it

can be concluded that flexibility is the ability of an organization to deal with internal and external environments.

### Adaptability

The concept of adaptation with its meaning (*adapt*) goes back to the Latin term (*aptus*) in the early fourteenth century, meaning “suited, fitted” or to *adaptare* meaning “to join” and in French, (*adapter*) it goes back to its English roots in (1610) to mean (fit something into some purpose) [23]. Adaptation takes its conceptual glory from the theory of evolution and remains the center of focus in biology. However, adaptation became a central concept in several major social disciplines, such as psychology, anthropology, and geography, as well as in many fields of biology. In each discipline, the environment is strongly linked to the concept of adaptation [39].

In organizational theory and strategic management, [40] layered the concepts of strategic decision-making and functional efficiency on the concept of adaptation. The important frameworks known as Behavioral Theory of the Firm [41] and Differentiation and Integration in Complex Organizations [42] defined adaptation and fit as concepts representing the interface between organizations and environments, in which organizations assess feedback from the environment and strive to rectify misalignments. The frameworks claim that a good fit between internal structures and external sub-environments aided organizations in achieving better results [43].

Organizational adaptation is the ability of an organization to change and survive in the face of external changes that were not predicted in any precise way when the organization was designed [44]. Besides, organizational adaptability is the ability to learn and perform according to changing environmental contingencies [20]. In general, it can be concluded that literature identified adaptability as the ability to survive and change according to environmental change.

### Versatility

The root of the word versatility meant “to turn around” or “to pivot” [44]. Versatility is the ability to do different things and pivot from one approach to another depending on the needs of a situation [45, 46]. On the other hand, versatility is the provision of analytical support to decision-makers that explicitly considers the variation in effectiveness and other payoffs of alternatives with potential future events and explicitly examines the tradeoffs between costs, effectiveness, and flexibility to respond or adapt to these future events [46, 47]. Versatility is being able to respond to a range of positive and negative uncertainty [48].

Some authors elicit versatility as an element of flexibility [11, 49]. Accordingly, flexibility has two distinct and independent components in terms of the use of different representations and the acceptance of both operational and structural viewpoints, namely versatility and adaptation [11]. According to Golden and Powell [50] versatility is one of the four metrics to measure flexibility. On the other hand, versatility is the ability to turn freely between opposing styles like an assertive “forceful” versus a more considerate “enabling” approach or between a focus on long-range strategic needs versus near-term operational concerns [51, 52].

In general, versatility is the organizational ability to respond to the environment with a wide range of activities that can be complemented by other concepts such as agility and flexibility.

### Previous systematic literature reviews

Previous literature reviews regarding OA and related terms are summarized below.

In their 2009 review of the literature, Bernardes and Hanna [53] examined how flexibility, agility, and responsiveness were frequently used in the operations management literature. Their paper proposed a hierarchical interrelationship between the terms: flexibility is mostly associated with the inherent property of systems that allows them to change within pre-established parameters, and agility is used to describe rapid system reconfiguration in the face of unforeseeable changes. The authors analyzed the content regarding the most common associations between the terms in the literature. While the reader gets an idea of the meanings of these terms, the understanding of OA as a construct distinct from versatility and adaptability remains unclear. In contrast, the goal of this Systematic Literature Review (SLR) is to distinguish the concept of agility from flexibility, adaptability, and versatility.

Abdelilah et al. [54] reviewed papers written between 1920 and 2017 focused on flexibility and agility in manufacturing and the supply chain context. The authors justified that agility is the natural evolution of flexibility and confirmed that the idea of flexibility is part of agility. Based on this, the authors indicated that until the 1990s, the term “flexibility” was used to refer to agility, but because of market changes, competitiveness, and the need for speed, the term “agility” was coined, and flexibility became an agility capability, among other capabilities such as responsiveness or speed. In this connection, their study emphasized flexibility and agility in manufacturing and supply chain literature. However, this literature review focuses on the interactions between agility and related terms such as flexibility, versatility, and adaptability in business and management-related literature.

Stefanelli et al. [19] systematically reviewed 74 studies (71 articles and 3 publications in books) from the literature focused on supply chain management. The authors critically analyzed relevant literature regarding how adaptability, flexibility, agility, lean, and leagility (the combination of the lean and agile paradigms needed for responding to a volatile demand) differ in the supply chain context. The result of the review was a summary of each term in supply chain management and an analysis of the external forces that might influence the extent of “lean,” “leagile,” “agile,” “flexible,” and “adaptable” thinking in organizations and the expected effects on the supply chain. From this, they concluded that all terms aim at improving business performance. However, the authors did not explain the relationship between each term and how they differ. Further, the study focused exclusively on the supply chain context. By contrast, the purpose of this SLR is to distinguish OA from related concepts in management and business contexts.

Walter [4] reviewed 75 research articles focusing on the conceptualization of OA on an organizational level and summarized the categories of OA: agility drivers, agility enablers, agility dimensions, and agility categories. In particular, the author justified that the SLR aimed to improve the conceptual understanding of OA. The result of the review proposed an operational definition of the OA and agility categories, their respective functions, and their interrelationships. However, the review did not provide an evidence-based review on agility and related terms other than indicting agility and absorptive capacity in background literature.

The OA literature is still disconnected and needs to disentangle OA from related terms to measure, predict, and teach effectively. None of the existing literature reviews summarize how agility is distinct from flexibility, adaptability, and versatility. Therefore, this SLR addresses the stated gap in the OA literature. To further advance research in this area, the following questions are identified:

- 1) How does previous literature differentiate OA from flexibility, adaptability, and versatility?
- 2) What characteristics differentiate OA from flexibility, adaptability, and versatility as a strategy to cope with the changing business environment?

## Methodology

### Data gathering

A review protocol that includes database selection, search strategy, eligibility criteria, and data abstraction and management is developed based on Tranfield's guidelines [55] to indicate the description and rationale



of methods and how different types of studies will be located and selected.

Based on frequently recommended databases in business and management [56], ABI/INFORM, Since Direct and Emerald were the databases selected for this study. Besides, a thorough analysis of the search terms utilized in prior pertinent reviews served as the basis for the search term selection [4, 11, 19, 54]. Keywords such as organization agility, flexibility, adaptability, and versatility are among the search terms identified. Additionally, the study employed synonyms for keywords from various dictionaries, including the Library of Congress subject heading and thesaurus synonym dictionary. Table 1 indicates the systematic review's keywords and synonyms. Then, the search pattern in the search strategy is determined by using boolean operators AND to combine keywords and OR to combine synonym terms with the concepts. As a result, studies that include the words: (agility OR Nimbleness) AND (flexibility OR adjustability OR changeability) AND (adaptability OR suitability OR fitness) AND (versatility OR dexterity OR ambidexterity) were identified from each database.

The inclusion and exclusion criteria for studies also include publication years between 1991 and 2022 because the inception of OA is mostly believed to date back to the Lehigh Report of the Iacocca Institute in 1991 [1, 4]. Besides, publications in the English language, qualitative and quantitative studies, and peer-reviewed publications were the criteria for including studies in this systematic review.

### Data analysis

A critical assessment of the sampled studies was conducted using a Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) step-by-step screening guideline. First, in the paper identification step, papers were identified from selected databases, and duplicates were removed. Second, the screening step includes activities such as topic and abstract evaluation of the studies based on their relevance to the review questions and inclusion and exclusion criteria. This step focused on excluding articles that had no relevance to the reviewed topic. Then, the full texts of the qualifying papers were assessed based on selection criteria and

relevance for the study. In this step, articles are excluded for two reasons: (a) they were inadequate or only mentioned one concept in the study, and (b) they were not within the scope of the study. In total, this step yields 29 papers.

Finally, because formal search techniques of entering index terms or keywords in electronic databases may overlook important studies [57], a backward and forward snowballing procedure was employed, which is used by the reviews [57, 58] to search the reference lists of the selected studies for additional relevant works. After this screening process, another five articles were included in our final sample. Following this screening, manual searches of articles were also conducted to include pertinent works on the subject of the study. As a result, six additional studies were added. Then, this process results in the inclusion of 40 publications. Figure 1 shows the flow of the review process.

Thematic analysis and narrative synthesis were used based on the review questions to summarize and clarify the parallels and discrepancies [59, 60] between OA, flexibility, adaptability, and versatility in the literature. Given the nature of the study, articles are coded based on variables such as the journal, method (theoretical/conceptual, quantitative, qualitative), level of analysis (institutional/country, organizational/firm, individual, multi-level), and theory used by selected articles for descriptive data analysis, and definitions, elements, and dimensions code for thematic analysis to precisely ascertain the difference and similarity of the concepts agility, flexibility, adaptability, and versatility. Besides, for the content analysis and text mining analysis, the Leximancer software package was used. Leximancer uses an empirically validated Bayesian learning algorithm to examine the most frequently used concepts within the text and the relationships between these concepts [61]. Specifically, Leximancer allows us to transform lexical co-occurrence information from natural language into semantic patterns (concept maps) by conducting both thematic (analysis of the pattern of meanings) and relational (analysis of the relationship between concepts) analyses of the text data using a machine learning technique [62]. In this respect, Leximancer has been used in different studies to disentangle and examine the co-occurrence of concepts [62, 63]. Moreover, we also used the MapChart program to present the number of studies used in the systematic review by the country of origin on the world map.

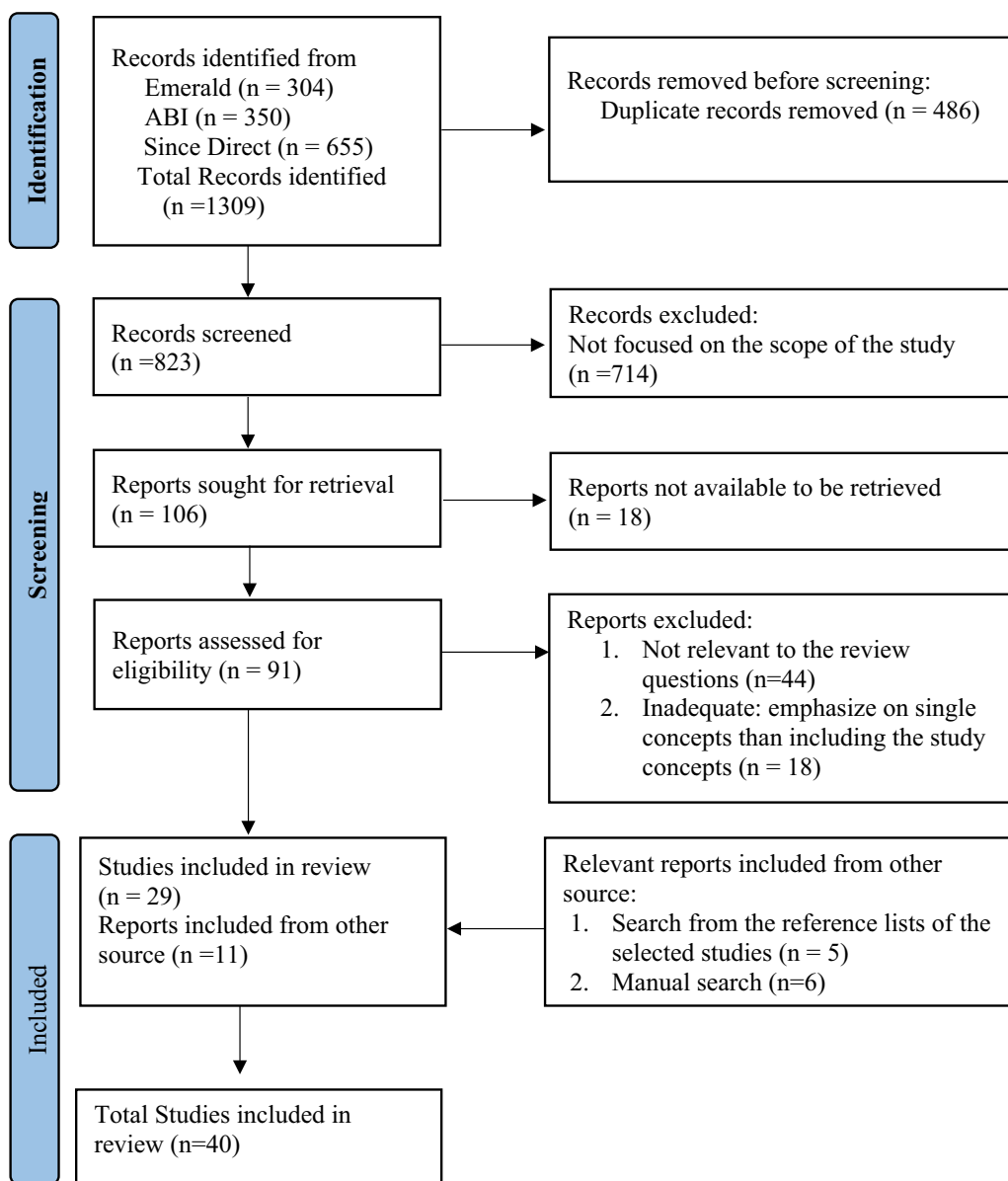
## Results

### Descriptive analysis

The distribution of the selected literature from 1991 to 2022 displays 40 papers. The selected articles have been published in a variety of contexts in 33 various business

**Table 1** Keywords and synonyms

Keywords	Synonyms
Agility	Nimbleness
Flexibility	Adjustability/Changeable
Adaptability	Fit/Suitability
Versatility	Dexterity/Ambidexterity

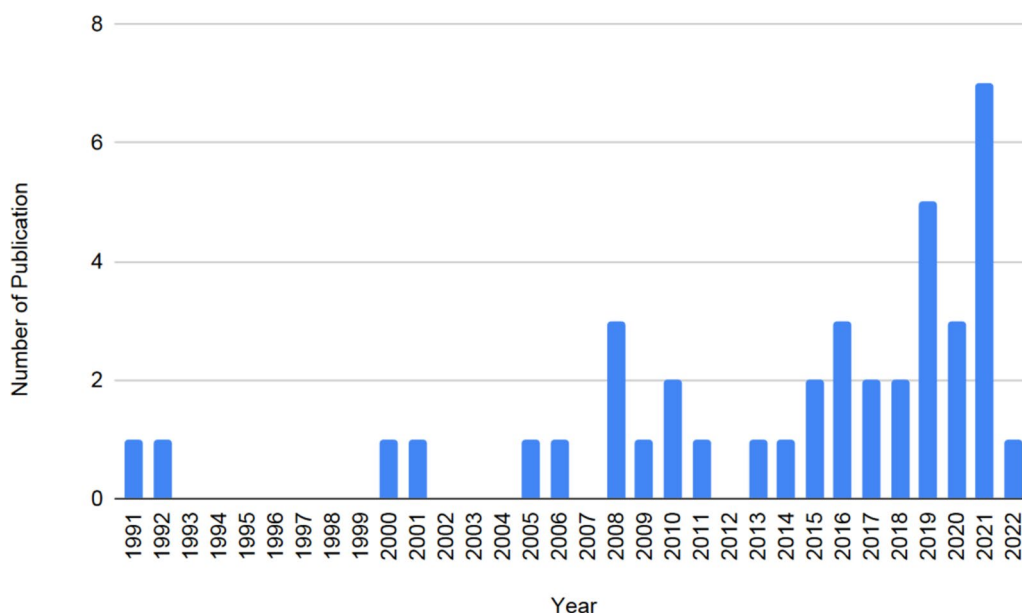


**Fig. 1** PRISMA systematic review process. Note adopted from MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *BMJ* 2021; 372:n71. <https://doi.org/10.1136/bmj.n71>

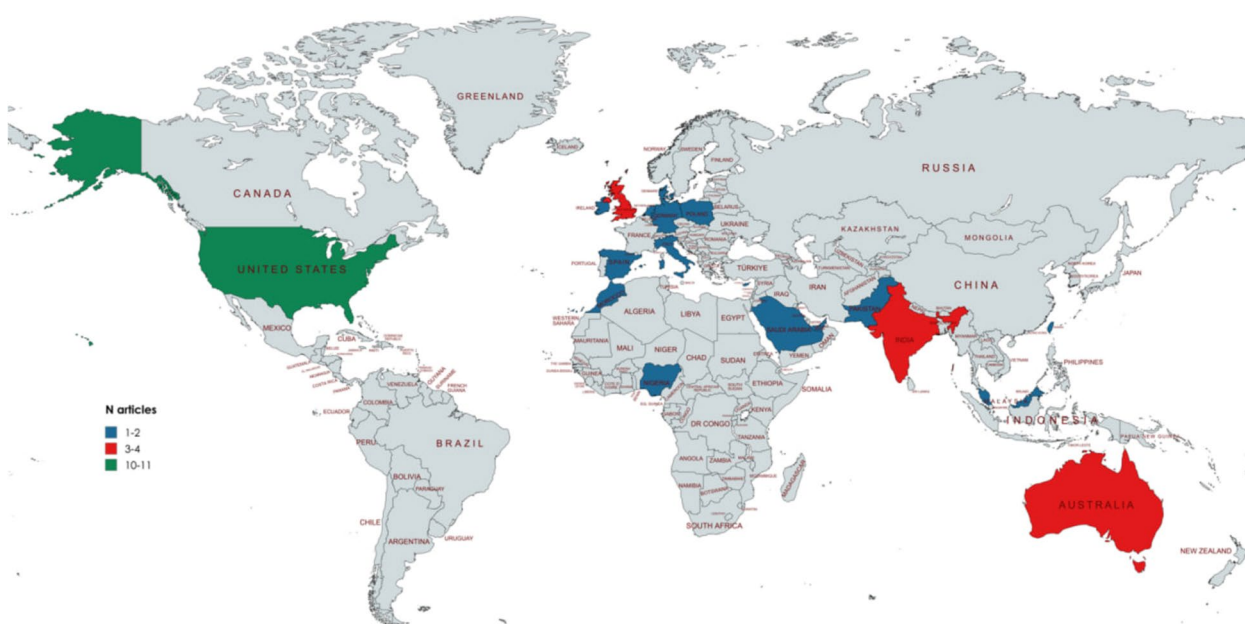
and management-related journals. Figure 2 shows the distribution of publications in the years 1991–2022. Such heterogeneity demonstrates the extreme diversity of disciplines and research areas now addressing agility-related issues. Overall, the wide range of publications needs focused research to make sense of the knowledge already available. Moreover, research on organizational agility and related terms has been conducted in nineteen countries. The USA has produced the most published articles (n=11; 27.5%), followed by Australia and the UK (n=4; 10%). Regarding continental distribution, Europe

accounted for the greatest number of articles (n=15; 37.5%), followed by North America (n=11; 27.5%), Asia (n=8; 20%), Australia (n=4; 10%), and Africa (n=2; 5%). Figure 3 presents the number of articles distributed by country on the world map.

Regarding the methodology, the findings show that purely conceptual and empirical studies are equally frequent (39% for both), while systematic reviews are less frequent (22%). For the empirical studies, the majority use quantitative methods (81%), while only 13% use qualitative methods, followed by a small number using



**Fig. 2** Distribution of publication in the year range 1991–2022



**Fig. 3** Number of articles distributed by country

mixed methods. Among the articles included in the review, a greater emphasis is given to the organizational level of analysis related to agility and related terms. This highlights the need to conceptualize agility and related concepts at the organizational level [4, 57]. Besides, the theoretical underpinnings indicate that the Dynamic Capability View is the most used theoretical framework

to explain OA as a higher-order capability to sense and respond to environmental changes. In addition, Real Option Theory appears as the next framework used to explain decision makers’ ability to be more proactive in responding to uncertainty and investing in the options that suit the company to perform strategic actions and, thus, achieve competitive advantage at the right time [64].

### Thematic analysis

The thematic analysis focuses on the definitions and elements/dimensions of OA, flexibility, adaptability, and versatility used in the sample literature.

The analysis of the articles indicated that the papers used different definitions in different contexts. This implies that there is no clear and agreed-upon definition of OA and related terms. However, the concepts of agility, flexibility, adaptability, and versatility indicate the ability of the organization to react to changing business environments. Table 2 indicates different definitions of agility, flexibility, adaptability, and versatility.

On the other hand, the analysis of the articles indicates different elements of agility, flexibility, adaptability, and versatility are used in different papers. Table 3 shows the use of several elements for agility. On the one hand, some authors use flexibility as the element of agility [18, 54], while others use the opposite [46, 50]. In addition, some authors indicated range as an element of flexibility, while others used it as an element of versatility [37, 50]. Moreover, authors use flexibility as an element of adaptability [18], while others use the opposite [50]. This suggests that different authors use different terms and elements that compose agility, flexibility, adaptability, and versatility, which vary from perspective to perspective and context.

In general, studies indicated the concept of OA is rooted in flexibility and adaptability, and underlined agility shares the main elements of these concepts [58, 64, 78, 79]. However, the analysis of this review suggests the similarity and distinct nature of this concept require further examination, which is addressed in the content analysis part of this study.

### Content analysis: Leximancer result

Text mining is used to systematically decipher key concepts and themes that existing literature has focused on. The output of Leximancer consists of themes formed by closely related concepts and displays the extracted information visually. The information is displayed using a conceptual map that provides a birds-eye view of the material, representing the main concepts contained within the text and information about how they are related [82]. The map displays themes as colored circles; the most important theme is shown in red or orange, while cool colors (blue and green) indicate the next or less important themes in the body of literature; gray nodes represent the main concepts that appear in the text; and connected lines show the relationships and connections between concepts [82].

### Leximancer result: literature on organizational agility

As shown in Fig. 4, the finding indicates the relationship between organizational and agility themes. The organizational theme incorporates a large number of core concepts in business and management research. The key concepts with high numbers of hits (i.e., word counts) in the organizational theme include organizational change, organizational process, process analysis, systems, and resilience capability [66, 67, 69]. On the other hand, the agility theme includes concepts such as firm performance, dynamic capabilities, supply chain, strategy, flexibility, manufacturing, and market. Further, the findings indicate that agility is linked to the concepts of flexibility, supply chain, performance, and manufacturing and receives the most attention from scholars [37, 75, 80] as it covers organizational-level issues and forms the basis for literature and studies in business and management. A closer examination of the articles included in this theme further suggests that business ability is the concept that is connected with agility, and this concept is also related to business capability, model, and technology [83, 84].

Besides, dynamic capabilities [67], business ability [57, 83], technology [70], business model [84], product value development [66], and management [69] are the concepts that link the organizational theme with the agility theme. These findings are in line with Sumayya et al.'s [85], argument that an organization's agility is the ability to predict change and modify its policies and practices to embrace it in a timely, effective, and sustained manner while simultaneously maintaining excellent performance. In light of these findings, this study defines OA as follows.

*OA is the firm dynamic business capability to respond to market trends with flexible organizational practices such as system management, technology, and business models.*

### The Leximancer analysis: literature on agility and flexibility

In order to examine the research on flexibility and agility, a text mining analysis using Leximancer on the selected articles with the keywords "agility" and "flexibility" is conducted. Figure 5 shows the results of the Leximancer analysis and shows a broader relationship that occurred between agility and flexibility.

The findings suggest that flexibility and agility are closely connected and distinct concepts that have received attention from scholars. Studies included in the agility theme address the fact that agility is distinct from flexibility by its focus on firm capability, changeability, firm abilities, resilience capacity, firm performance, and the influence of the supply chain on



**Table 2** Definitions of Terms

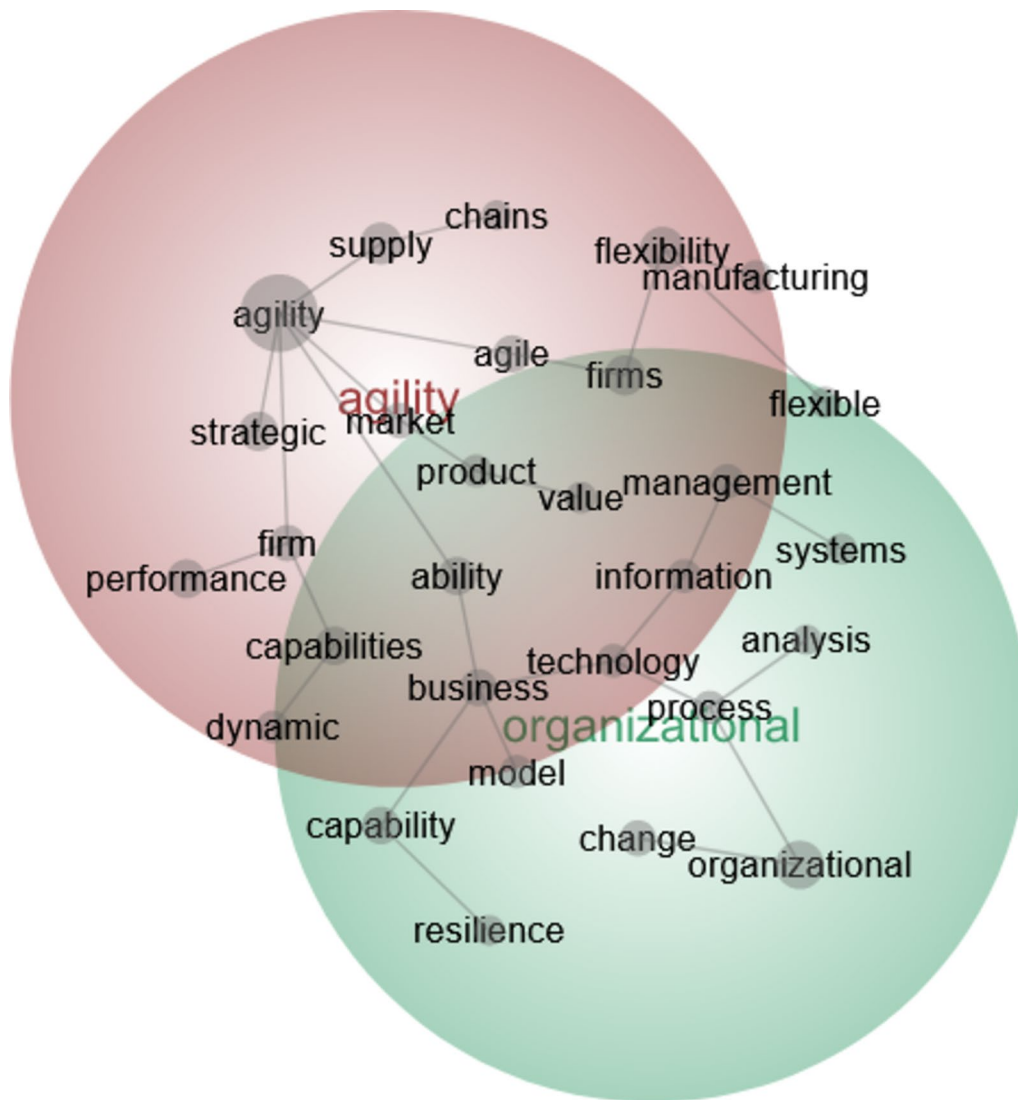
Terms	Definition	Authors
<b>Agility</b>	The ability to reconfigure operations processes, and business relationships efficiently while at the same time flourishing in an environment of continuous change	Feizabadi et al.[65]
	Responsiveness to change without losing flexibility	Dunford et al.[37]
	A strategic ability that assists organizations rapidly to sense and respond to internal and external uncertainties	Fayezi et al.[66]
	The ability to sense short-term, temporary changes in the supply chain and market environment and to rapidly and flexibly respond to those changes with the existing supply chain	Eckstein et al. [18]
	The capability to provide a quick organizational response when dealing with turbulences, maintaining existing organizational structures and strategies	Conz and Magnani [67]
	The ability of an organization to respond quickly to rapidly changing markets driven by customer-based valuing of products and services	Mohammed et al.[68]
	Ability of the system to rapidly reconfigure with a new parameter	Bernardes and Hanna [53]
	The ability to adapt to external changes in the external environment	Phillips and Wright [69]
	The capability to survive and prosper by reacting quickly and effectively to a continuously and unpredictably changing, customer-driven and competitive environment	Vázquez-Bustelo and Avella [16]
	The ability to exercise or sometimes reconfigure available options rapidly and appropriately when uncertainty or opportunities have materialized	Lee et al.[70]
	A capacity to respond with speed to environmental changes and opportunities	Ravichandran [63]
	The ability to prosper in a competitive environment and respond quickly to the rapidly changing markets	Gölgeci et al.[71]
	Persistent, systematic variations in an organization's outputs, structures or processes that are identified, planned, and executed as a deliberate strategy	Baskarada and Koronios [72]
	Moving nimbly with a sense of urgency	Bahrami and Evans [35]
	<b>Flexibility</b>	The capability to respond quickly to environmental change
The ability to perform tasks in more than one way		Karman [73]
The capacity to increase variety without losing responsiveness		Dunford et al.[37]
The range and extent of the malleability of the firm's structure, resources, and activities		Golgeci et al. [71]
The capability of implementing rapid decision-making processes, quick internal communication and fast learning		Conz and Magnani [67]
An operational ability that assists organizations to change efficiently internally and/or across their key partners in response to internal and external uncertainties		Fayezi et al.[66]
The ability to respond to a variety of customer requirements which exist within parameters		Phillips and Wright [69]
Ability of a system to change status within an existing configuration (of pre-established parameters)		Bernardes and Hanna [53]
The ease with which the organization's structures and processes can be changed		Kumar and Stylianou [48]
The capacity to change status within a pre-established range with mobility		Lee et al.[70]
<b>Adaptability</b>	The capacity to adapt across four dimensions; temporal, range, intention and focus	Golden and Powell [50]
	Ability of the manufacturing system to cope with the changes effectively	Siddiqui et al.[74]
	Allowing an internal change in the organization, procedures and structures to better adapt to challenges	Karman [73]
	Adjusting the supply chain to meet structural shifts in markets	Feizabadi et al. [65]
	The ability of the firm to sense long-term fundamental changes and to respond to such changes by flexibly adjusting the configuration of the supply chain	Eckstein et al. [18]
	The capability to adjust the firm's response and to adapt internal processes to changing external conditions	Conz and Magnani [67]
	A singular and permanent adjustment to a newly transformed environment	Evans [11]
	Inherent ability to adjust or modify	Butler and Surace [10]
	The sense of adapting the organization to unpredictable environments, through several features that represent a suitable set of drivers	Stefanelli et al.[19]
	A dynamic capability to freely communicate and recombine to the situation at hand	Loughlin and Priyadarshini [75]
The ability of the firm to make supply chain design changes that are far more radical and long term	Aslam et al.[76]	
The capability of the organization to self-learn and self-organize based on previous experience	Patten et al.[20]	

**Table 2** (continued)

Terms	Definition	Authors
<b>Versatility</b>	The ability to maintain efficiency as a part of changes in mission and tasks	Karman [73]
	A capability to respond to a wide range of scenarios ahead of time, or by affecting a rapid modification once a change has occurred	Evans [11]
	Being able to respond to a range of positive and negative uncertainties	Kumar and Stylianou [48]
	Balancing the operational efficiency of the supply chain with market needs	Leończuk [77]
	Able to do different things and apply different capabilities depending on the needs of a particular situation	Bahrami [46]
	The extent to which the organization has the range of activities that the organization has contingently planned for, and can respond to environmental change	Golden and Powell [50]
	Functioning with dexterity in different settings	Bahrami and Evans [35]

**Table 3** Elements/Dimensions of Terms

Elements	Authors
<b>Agility</b>	
Alertness	Golgeci et al.[71]
Competency	Abdelilah et al.[54]
Cooperation	Fayezi et al.[66], Mohammed et al.[68]
Cost	Abdelilah et al. [54]
Dependability	Abdelilah et al. [54]
Flexibility	Eckstein et al.[18]; Worley & Lawler [36]; Abdelilah et al.[54]; Feizabadi et al.[65]; Fayezi et al.[66]; Mohammed et al.[68]; Lee et al.[70]; Golgeci et al.[71]; Siddiqui et al.[64]; Shams et al.[79]; Ravichandran [80]
Proactiveness	Fayezi et al.[66]
Quality	Abdelilah et al.[54]
Quickness	Abdelilah et al.[54]; Feizabadi et al. [65]; Fayezi et al. [66]; Gölgeci et al.[71]
Reconfigurability	Bernardes and Hanna [53]
Responsive	Abdelilah et al. [54]; Fayezi et al.[66]; Mohammed et al. [68]; Gölgeci et al.[71]
<b>Adaptability</b>	
Flexibility	Eckstein et al. [18]
Innovation	Eckstein et al. [18]
Modification	Golden and Powell [50]
<b>Flexibility</b>	
Adaptability	Golden and Powell [50]
Agility	Bahrami [46]; Kumar & Stylianou [48]; Golden & Powell [50]; Phillips & Wright [69]; Siddiqui et al.[74]; Shukla & Sushil [81]
Efficiency	Golden and Powell [50]
Focus	Dunford et al. [37]; Bahrami [46]; Kumar & Stylianou [48]; Golden & Powell [50]; Abdelilah et al. [54]; Mohammed et al.[68]
Intention	Dunford et al. [37]; Bahrami [46]; Kumar and Stylianou [48]; Golden and Powell [50]; Mohammed et al. [68]
Range	Stefanelli et al.[19]; Dunford et al. [37]; Bahrami [46]; Fayezi et al. [66]; Mohammed et al.[68]
Responsiveness	Golden and Powell [50]
Robustness	Golden and Powell [50]
Temporal	Stefanelli et al.[19]; Dunford et al. [37]; Bahrami [46]; Golden & Powell [50]; Fayezi et al. [66]; Mohammed et al. [68]
Versatility	Bahrami [46]; Kumar & Stylianou [48]; Golden & Powell [50];Siddiqui et al.[74]
<b>Versatility</b>	
Diversity	Bahrami [46]
Range	Golden and Powell [50]



**Fig. 4** Leximancer result on organizational agility

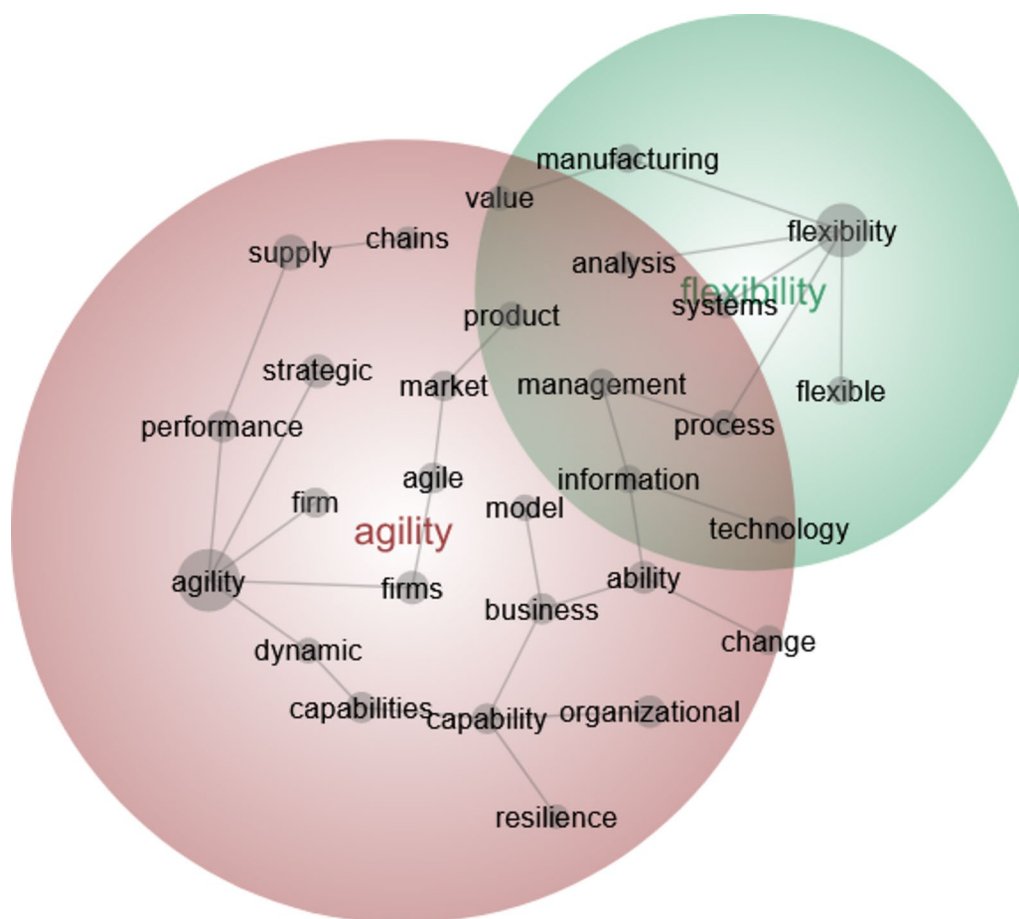
OA [70, 75]. These findings align with the notion that organizational agility is typically viewed as the organization's capacity, capability, or both [86].

On the other hand, the flexibility theme focuses on system flexibility, process flexibility, analysis, and manufacturing flexibility [37, 70, 71]. A closer examination of the articles included in this theme further suggests that business model, changeability, management process, and information technology are the concepts that connect the flexibility theme and the agility theme [57, 65, 73]. Based on these findings, this study defines flexibility as follows.

*Flexibility is the firm ability to change its system, process, and management.*

#### **The Leximancer analysis: literature on agility and versatility**

A text mining analysis utilizing Leximancer on the selected articles with the keywords "agility" and "versatility" is carried out to look at the research on agility and versatility. Figure 6 shows the result of the Leximancer analysis of two themes, agility and versatility. Concepts like capability, resilience, flexibility, and change response are at the center of the agility theme. As a result, this result closely resembles the content of the agility theme in Figs. 4 and 5. Besides, a closer examination of the articles included in this theme further suggests that agility is connected and shares some similarities with the versatility concept [50, 73].



**Fig. 5** Leximancer result on agility and flexibility

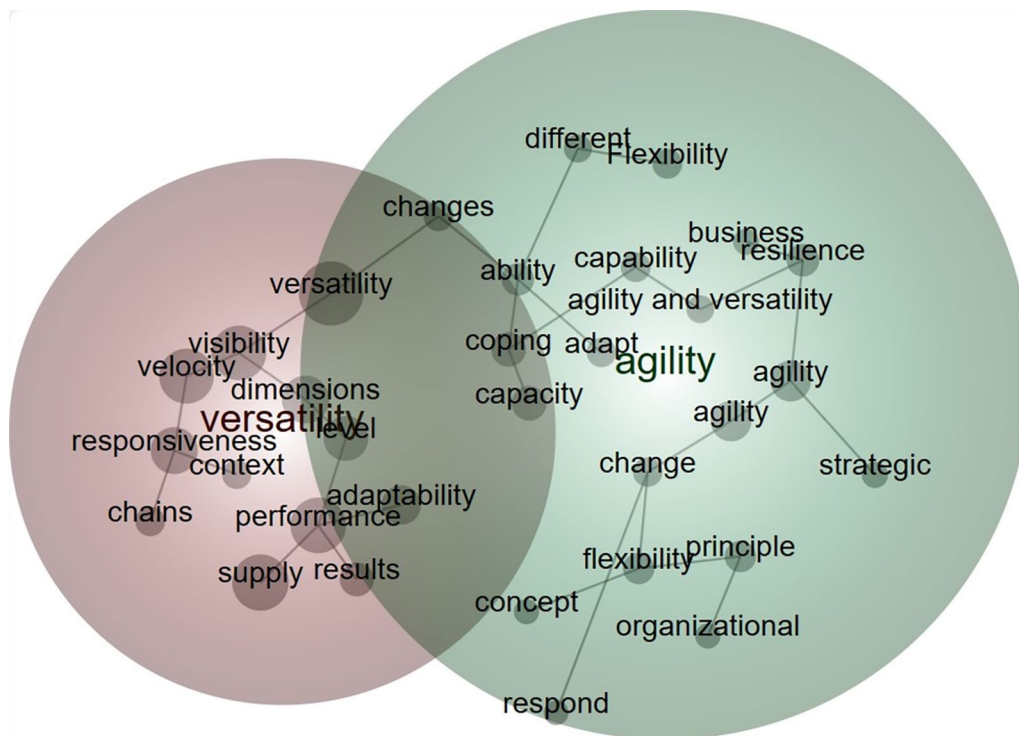
The versatility theme includes concepts such as visibility, velocity, and responsiveness. Visibility is the ability to quickly identify changes, opportunities, and threats [77], while velocity is the ability to carry out various processes and measures aimed at quickly achieving the desired goals [77]. Responsiveness is the capacity to sense, anticipate, initiate, and respond to change [66].

Remarkably, the relationship between versatility and agility themes shares similar concepts such as organizational changes, coping ability, adaptability, and organizational performance. This result is consistent with the finding that visibility and responsiveness concepts are also similarly claimed to be important enablers of agility [66]. In light of these findings, this study defines versatility as follows.

*Versatility is firm responsiveness, velocity, and visibility to change, meaning the ability to promptly recognize changes and implement various procedures and actions in response.*

#### ***The Leximancer analysis: literature on agility and adaptability***

To examine the relationship between agility and adaptability, a text mining analysis using Leximancer on the selected articles with the keywords “agility” and “adapt” “adaptability” and “adaptation” is conducted. Figure 7 shows the results of the Leximancer analysis and about agility and adapt theme. Thus, the agility theme is distinct from the adapt theme by focusing on concepts such as capabilities, strategy, management system, and manufacturing [65, 72]. On the other hand, the adapt theme focuses on firm adaptation, resilience, and adaptability [67]. A subsequent reading of the articles included in these themes showed significant attention is given to the changes in the business environment (market changes), organizational ability to change, and organizational performance as common concepts shared by the adapt and agility themes [75]. On the other hand, an in-depth review of relevant articles included in this theme also suggests adaptability mainly focused on the capacity to adapt to its business



**Fig. 6** Leximancer result on agility and versatility

environment [67, 77]. Based on these findings, this study defines adaptability as follows.

*Adaptability is the firm's ability to fit changing markets and business environments.*

## Discussions

This systematic literature review offers a comprehensive outlook on agility, flexibility, adaptability, and versatility in the business and management context. The discussion below addresses the review questions: How does previous literature differentiate OA from flexibility, adaptability, and versatility? and what characteristics differentiate OA from flexibility, adaptability, and versatility as an organization's coping strategy to the change in the business environment.

Studies in business and management provide us with a better understanding of OA. Previous literature differentiates OA from flexibility, adaptability, and versatility in business and management literature by focusing on the definitions, elements, or components that comprise the concepts and by identifying relationships between the terms. The study's findings, however, showed that distinguishing terms based on definitions and constituent parts did not result in conceptual clarity since many researchers employ similar terminology and pinpoint comparable

constituent parts for each term. The present study aligns with the claims that the confusion and impediment to a comprehensive comprehension of OA result from the combination of similar concepts [4, 14]. The primary cause of this blending is the absence of construct clarity and the inability to distinguish between similar or related constructs [4, 14].

In this case, the analysis and synthesis of this study have identified and elaborated paths whose characteristics differentiate and relate OA to the concepts of flexibility, adaptability, and versatility. The review's findings indicate that agility and the notions of flexibility, adaptability, and versatility are closely related, with change in a business setting serving as their common theme. This finding is in line with previous studies that state that OA builds on previous concepts in management theory, and similarities exist. Nevertheless, there are crucial differences that should be considered [16]. Some researchers also indicated that agility is a unique construct that is based on flexibility, adaptability (the ability to adjust to a changing environment) [87–89], and versatility (the ability to anticipate and react to a wide range of situations) [65].

Subsequently, agility is a distinct concept that places greater emphasis on an organization's entire capability to adjust to its changing environment than it does on any specific feature. The findings of the study place a strong





emphasis on flexibility, with particular attention paid to system flexibility, process flexibility, and analysis flexibility; in contrast, agility stresses organizational capabilities, changeability, and resilience. On the other hand, agility emphasizes competence, resilience, flexibility, and a strategic reaction to change, while versatility focuses on responsiveness, visibility, and velocity to organizational change. Agility is more concerned with capability, management systems, and business strategy than adaptability is with adaptation and resilience. In general, the way that agility emphasizes organizational ability, capability, and changeability as well as how it conceptualizes these qualities distinguishes it from flexibility, adaptability, and versatility.

### Conclusion and implications

The review has demonstrated that prior research has made significant progress toward distinguishing OA from flexibility, adaptability, and versatility. Researchers predominantly conceptualize OA as an organization's capacity and capability to survive in front of change, and this characteristic helps to set OA apart from flexibility, adaptability, and versatility. The findings draw attention to OA, flexibility, adaptability, and versatility similarly by their emphasis on responding to organizational change. Therefore, OA is a construct that can be achieved by integrating different organizational abilities such as flexibility, adaptability, and versatility rather than using these terms as an alternative to OA.

Understanding the differences and interconnectedness of OA, flexibility, adaptability, and versatility enhances common understanding and implementation of OA. Consequently, this advances OA research by giving a foundation for distinguishing OA from related concepts, improving scientific communication amongst researchers by allowing them to refer to the same phenomena as OA, and advancing the development of efficient methods for measuring, predicting, and instructing OA.

Additionally, this review provides some management implications. Agility is the quality that companies need to thrive in today's fast-paced environment [1, 64]. A clear distinction between OA, flexibility, adaptability, and versatility, in terms of their focus and interconnectedness, can guide managers to understand what OA is and how it is connected with other organizational abilities. Moreover, it enhances managers' ability to assess and support the improvement of agility levels.

### Future research directions

Studies on the nature and conceptualization of OA are required to further shed light on better understanding and practical implementation of OA. The findings of this study provide some pointers for further research on

this topic. It does suggest that flexibility, adaptability, and versatility are related to OA by their focus on coping with change, but some significant differences exist. Therefore, to advance research on OA, future studies may look at how flexibility, adaptability, and versatility relate to OA as a foundation for new and intriguing research directions. Research may also explore the concept that a combination of organizational abilities is necessary for an organization to adapt to changing environmental conditions. Moreover, the finding indicates that OA is distinct in its focus on organizational capability. Therefore, researchers might examine the capability and capacity conceptualization of OA and its shortcomings.

This systematic review had notable limitations. The selection of publications in the current systematic literature review is limited to journal articles published by three of the most well-known electronic databases. The search methods of inserting index terms or keywords in electronic databases may neglect significant studies, which is why the study also incorporated additional papers [57, 75]. These search methods, however, may restrict results on OA, flexibility, adaptability, and versatility. Therefore, future scholars can extend the research by including other electronic databases and relevant studies to produce a more compelling argument on OA and related terms. Moreover, this study is limited to content analysis using Leximancer text mining analysis. Therefore, to guide and strengthen the implication of the software outputs, the research team read the contextual text and supplemented the objective examination of the literature with qualitative interpretative analysis.

### Abbreviations

IT	Information Technology
OA	Organizational Agility
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
SLR	Systematic Literature Review
UK	United Kingdom
USA	United State of America

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### Author contributions

Mrs. ED carried out this study as a first author, Dr. MG, JG, and SM supported the research as a supervisors. All authors have read and approved the manuscript.

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The data that support the findings of this study are available and would be provided upon request.

## Declarations

### Ethics approval and consent to participate

Not applicable.

### Consent for publication

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### Competing interests

The authors declare that they have no competing interests.

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## References

- Nafei WA (2016) Organizational agility: the key to organizational success. *Int J Bus Manag* 11(5):296
- Kumarasingh HPNI, Dilan HKT (2021) Organizational change and change management. In: *Contemporary innovation in management*: 49–69, Global Learners Academy of Development Korattur, Tamilnadu, India
- Renzl B, Mahringer CA, Rost M, Scheible L (2021) Organizational agility: current challenges and future opportunities. *J Competenc Strateg Manag* 11:1–10
- Walter AT (2020) Organizational agility: ill-defined and somewhat confusing? A systematic literature review and conceptualization. *Manag Rev Q* 71:343–391. <https://doi.org/10.1007/s11301-020-00186-6>
- Teece D, Peteraf M, Leih S (2016) Dynamic capabilities and organizational agility: risk, uncertainty, and strategy in the innovation economy. *Calif Manag Rev* 58:13–35. <https://doi.org/10.1525/cmr.2016.58.4.13>
- Zitkiene R, Deksnys M (2018) Organizational agility conceptual model. *Monte J Econ* 14(2):115–129. <https://doi.org/10.14254/1800-5845/2018.14-2.7>
- Clayton SJ (2021) An agile approach to change management. *Harv Bus Rev*. <https://hbr.org/2021/01/an-agile-approach-to-change-management>
- Lewis MW, Smith WK (2014) Paradoxical leadership to enable strategic agility. *Calif Manag Rev* 56(3):58–77. <https://doi.org/10.1525/cmr.2014.56.3.58>
- Hatzijordanou N, Bohn N, Terzidis O (2019) A systematic literature review on competitor analysis: status quo and start-up specifics. *Manag Rev Q* 69(4):415–458. <https://doi.org/10.1007/s11301-019-00158-5>
- Butler B, Surace K (2015) Call for organisational agility in the emergent sector of the service industry. *J Bus Manag* 10:4–14
- Evans S (1991) Strategic flexibility for high technology manoeuvres: a conceptual framework. *J Manag Stud* 28(1):69–89. <https://doi.org/10.1111/j.1467-6486.1991.tb00271.x>
- Sherehijy B, Karwowski W, Layer JK (2007) A review of enterprise agility: concepts, frameworks, and attributes. *Int J Indust Ergo* 37(5):445–460. <https://doi.org/10.1016/j.ergon.2007.01.007>
- Pulakos ED, Arad S, Donovan MA, Plamondon KE (2000) Adaptability in the workplace: development of a taxonomy of adaptive performance. *J Appl Psych* 85(4):612–624. <https://doi.org/10.1037/0021-9010.85.4.612>
- Podsakoff PM, MacKenzie SB, Podsakoff NP (2016) Recommendations for creating better concept definitions in the organizational, behavioral, and social sciences. *Organ Res Methods* 19(2):159–203. <https://doi.org/10.1177/1094428115624965>
- Casper WJ, Wayne JH, Dehaug S, Greenhaus J (2018) The jingle-jangle of work—nonwork balance: a comprehensive and meta-analytic review of its meaning and measurement. *Appl Psychol* 103(2):182–214
- Vázquez-Bustelo D, Avella L (2006) Agile manufacturing: industrial case studies in Spain. *Technovation* 26(10):1147–1161. <https://doi.org/10.1016/j.technovation.2005.11.006>
- Gonzalez O, MacKinnon DP, Muniz FB (2021) Extrinsic convergent validity evidence to prevent jingle and jangle fallacies. *Multivar Behav Res* 56(1):3–19. <https://doi.org/10.1080/00273171.2019.1707061>
- Eckstein D, Goellner M, Blome C, Henke M (2015) The performance impact of supply chain agility and supply chain adaptability: the moderating effect of product complexity. *Int J Produ Res* 53(10):3028–3046. <https://doi.org/10.1080/00207543.2014.970707>
- Stefanelli F, Giulianielli D, De Sanctis I (2019) A comparison between the main drivers and effects of dynamic supply chain concepts. *J Supp Chain Manag Syst* 8(2): 1–23. <https://doi.org/10.13140/RG.2.2.20041.90721>
- Patten K, Whitworth B, Fjermestad J, Mahinda E (2005) Leading it flexibility: Anticipation, agility and adaptability. *AMCIS 2005 Proceedings*, 361. <http://aisel.laisnet.org/amcis2005/361>
- Grewal R, Tansuhaj P (2001) For managing economic crisis: the role of market orientation and strategic flexibility. *J Mark* 65(1):67–80. <https://doi.org/10.1509/jmkg.65.2.67.18259>
- Gong Y, Janssen M (2012) From policy implementation to business process management: principles for creating flexibility and agility. *Gov Info Q* 29:S61–S71. <https://doi.org/10.1016/j.giq.2011.08.004>
- Harper D (2001) Online Etymology Dictionary. [www.etymonline.com](http://www.etymonline.com)
- Brown JL, Agnew NMK (1982) Corporate agility *Bus Hori* 25(2):29–33. [https://doi.org/10.1016/0007-6813\(82\)90101-X](https://doi.org/10.1016/0007-6813(82)90101-X)
- Belasco JA (1990) *Teaching the elephant to dance: Empowering change in your organization*. New York, NY: Crown
- Gagel G (2020) The effects of leadership behaviors on organization agility: a quantitative study of 126 U.S.-Based Business Units. *Manag Organ Stud* 7(1): 1–18. <https://doi.org/10.5430/mos.v7n1p1>
- Horney N (2013) *Agility research history and summary*. pp. 1–54. Strategic Agility Institute
- Kharabe AT (2012) *Organizational agility and complex enterprise system innovations: A mixed methods study of the effects of enterprise systems on organizational agility*. Dissertation, Case Western Reserve University
- Najrani M (2016) *The effect of change capability, learning capability and shared leadership on organizational agility*. Dissertation, Pepperdine University
- Akkaya B, Akif T (2020) The link between organizational agility and leadership: a research in science parks. *Acad Strateg Manag J* 19(1):1–17
- Narasimhan R, Swink M, Kim SW (2006) Disentangling leanness and agility: an empirical investigation. *J Operat Manag* 24(5):440–457. <https://doi.org/10.1016/j.jom.2005.11.011>
- Setili A (2014) *The agility advantage: how to identify and act on opportunities in a fast-changing world*. JosseyBass
- Lin CT, Chiu H, Chu PY (2006) Agility index in the supply chain. *Int J Prod Econ* 100(2):285–299. <https://doi.org/10.1016/j.ijpe.2004.11.013>
- Sharma MK, Sushil JPK (2010) Revisiting flexibility in organizations: exploring its impact on performance. *Glob J Flex Syst Manag* 11(3):51–68. <https://doi.org/10.1007/bf03396587>
- Bahrami H, Evans S (2011) Super-flexibility for real-time adaptation: perspectives from silicon valley. *Calif Manag Rev* 53(3):21–39. <https://doi.org/10.1111/j.1835-9310.1982.tb01239.x>
- Worley CG, Lawler EE (2010) Agility and organization design: a diagnostic framework. *Organ Dyn* 39(2):194–204. <https://doi.org/10.1016/j.orgdyn.2010.01.006>
- Dunford R, Cuganesan S, Grant D, Palmer I, Beaumont R, Steele C (2013) “Flexibility” as the rationale for organizational change: a discourse perspective. *J Organ Change Manag* 26(1):83–97. <https://doi.org/10.1108/09534811311307923>
- Yousuf A, Lorestani VZ, Oláh J, Felföldi J (2021) Does uncertainty moderate the relationship between strategic flexibility and companies’ performance? Evidence from small and medium pharmaceutical companies in Iran. *Sustainability*. <https://doi.org/10.3390/su13169157>
- Simonet G (2010) The concept of adaptation : Interdisciplinary scope and involvement in climate change. *Surveys and Perspectives Integrating Environment and Society* 3(1): 1–9. <https://journals.openedition.org/sapie ns/997>
- Chandler AD (1962) *Strategy and structure: Chapters in the history of the American enterprise*. Cambridge, MA: MIT Press
- Cyert RM, March JG (1963) *A behavioral theory of the firm*. Englewood Cliffs, NJ: Prentice-Hall
- Lawrence PR, Lorsch JW (1967) Differentiation and integration in complex organizations. *Admin Sci Q* 12: 1–47
- Sarta A, Durand R (2020) Organizational Adaptation. *J Manag* 47(1):1–33. <https://doi.org/10.1177/0149206320929088>
- Hatun A, Pettigrew AM (2006) Determinants of organizational flexibility: a study in an emerging economy. *British J Manag* 17(2):115–137. <https://doi.org/10.1111/j.1467-8551.2005.00469.x>

45. Kaplan RE (1996) Forceful leadership and enabling leadership: you can do both. Greensboro, NC, Center for Creative Leadership.
46. Bahrami H (1992) The emerging flexible organization: perspectives from silicon valley. *Calif Manag Rev* 34(4):33–52. <https://doi.org/10.2307/41166702>
47. Kaiser RB (2020) Leading in an unprecedented global crisis: the heightened importance of versatility. *Consult Psychol J* 72(3):135–154. <https://doi.org/10.1037/cpb0000186>
48. Kumar RL, Stylianou AC (2014) A process model for analyzing and managing flexibility in information systems. *Eur J Inf Syst* 23(2):151–184. <https://doi.org/10.1057/ejis.2012.53>
49. Schroeder TL, Schaeffer CM, Reisch CP, Donovan JE (2002) Preservice teachers' understanding of functions: a performance assessment based on non-routine problems analyzed in terms of versatility and adaptability. Paper presented at the annual meeting of the American educational research association. New Orleans, LA
50. Golden W, Powell P (2000) Towards a definition of flexibility: in search of the holy grail? *Omega* 28(4):373–384. [https://doi.org/10.1016/S0305-0483\(99\)00057-2](https://doi.org/10.1016/S0305-0483(99)00057-2)
51. Kaiser RB, Lindberg JT, Craig SB (2007) Assessing the flexibility of managers: a comparison of methods. *Int J Select Assessm* 15(1):40–55. <https://doi.org/10.1111/j.1468-2389.2007.00366.x>
52. Lindberg JT, Kaiser RB (2004) Assessing the behavioral flexibility of managers : presented at the 19th annual meeting of the society for industrial and organizational psychology, Chicago
53. Bernardes ES, Hanna MD (2009) A theoretical review of flexibility, agility and responsiveness in the operations management literature: toward a conceptual definition of customer responsiveness. *Int J Operat Produ Manag* 29(1):30–53. <https://doi.org/10.1108/01443570910925352>
54. Abdellilah B, Korchi AEI, Balambo MA (2018) Flexibility and agility: evolution and relationship and agility. *J Manuf Technol Manag* 29(7):1138–1162. <https://doi.org/10.1108/JMTM-03-2018-0090>
55. Tranfield D, Denyer D, Smart P (2003) Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British J Manag* 14:207–222
56. Liu G (2020) Systematic reviews in business and management : are business librarians ready? *Academic BRASS* 16(1): 1–8. Retrieved from [https://digitalcommons.wcupa.edu/lib\\_facpub/23](https://digitalcommons.wcupa.edu/lib_facpub/23)
57. Christofi M, Pereira V, Vrontis D, Tarba S, Thrassou A (2021) Agility and flexibility in international business research: a comprehensive review and future research directions. *J Worl Bus* 56(3):101194. <https://doi.org/10.1016/j.jwb.2021.101194>
58. Luo Y, Zhang H (2016) Emerging market MNEs: qualitative review and theoretical directions. *J Int Manag* 22(4):333–350. <https://doi.org/10.1016/j.intman.2016.05.001>
59. Jnanathapaswi SG (2021) Thematic analysis & coding : an overview of the qualitative paradigm. In: An introduction to social science research. <https://doi.org/10.6084/m9.figshare.17159249>
60. Thomas J, Harden A (2008) Methods for the thematic synthesis of qualitative research in systematic reviews. *BMC Med Res Methodol* 8:1–10. <https://doi.org/10.1186/1471-2288-8-45>
61. Harwood IA, Gapp RP, Stewart HJ (2015) Cross-check for completeness: exploring a novel use of leximancer in a grounded theory study. *Qual Rep* 20(7): 1029–1045. <https://doi.org/10.46743/2160-3715/2015.2191>
62. Chen S, Lin N (2021) Culture, productivity and competitiveness: disentangling the concepts. *Cross Cultu Strateg Manag* 28(1):52–75. <https://doi.org/10.1108/CCSM-02-2020-0030>
63. Randhawa K, Wilden R, Hohberger J (2016) A bibliometric review of open innovation: setting a research agenda. *J Produ Innov Manag* 33(6):750–772. <https://doi.org/10.1111/jpim.12312>
64. Zhang M, Wang Y, Olya H (2022) Shaping social media analytics in the pursuit of organisational agility: a real options theory perspective. *Tour Manag* 88:104415. <https://doi.org/10.1016/j.tourman.2021.104415>
65. Feizabadi J, Maloni M, Gligor D (2019) Benchmarking the triple-A supply chain: orchestrating agility, adaptability, and alignment. *Benchmarking* 26(1):271–295. <https://doi.org/10.1108/BIJ-03-2018-0059>
66. Fayezi S, Zutshi A, O'Loughlin A (2017) Understanding and development of supply chain agility and flexibility: a structured literature review. *Int J Manag Rev* 19(4):379–407. <https://doi.org/10.1111/ijmr.12096>
67. Conz E, Magnani G (2020) A dynamic perspective on the resilience of firms: A systematic literature review and a framework for future research. *Euro Manag J* 38(3). <https://doi.org/10.1016/j.emj.2019.12.004>
68. Mohammed IR, Shankar R, Banwet DK (2008) Creating flex-lean-agile value chain by outsourcing: an ISM-based interventional roadmap. *Bus Proce Manag J* 14(3):338–389. <https://doi.org/10.1108/14637150810876670>
69. Phillips PA, Wright C (2009) E-business's impact on organizational flexibility. *J Bus Res* 62(11):1071–1080. <https://doi.org/10.1016/j.jbusres.2008.09.014>
70. Lee NCA, Wang ETG, Grover V (2020) IOS drivers of manufacturer-supplier flexibility and manufacturer agility. *J Strateg Inf Syst* 29(1):101594. <https://doi.org/10.1016/j.jsis.2020.101594>
71. Gölgeci I, Arslan A, Dikova D, Gligor DM (2020) Resilient agility in volatile economies: institutional and organizational antecedents. *J Organ Change Manag* 33(1):100–113. <https://doi.org/10.1108/JOCM-02-2019-003>
72. Baškarada S, Koronios A (2018) The 5S organizational agility framework: a dynamic capabilities perspective. *Int J Organ Anal* 26(2):331–342. <https://doi.org/10.1108/IJOA-05-2017-1163>
73. Karman A (2020) Flexibility, coping capacity and resilience of organizations: between synergy and support. *J Organ Change Manag* 33(5):883–907. <https://doi.org/10.1108/JOCM-10-2019-0305>
74. Siddiqui F, Haleem A, Wadhwa S (2009) Role of supply chain management in context of total quality management in flexible systems: a state-of-the-art literature review. *Glob J Flex Syst Manag* 10(3):1–14. <https://doi.org/10.1007/BF03396562>
75. Mc Loughlin E, Priyadarshini A (2021) Adaptability in the workplace: investigating the adaptive performance job requirements for a project manager. *Proj Leadersh Soc* 2:1–8. <https://doi.org/10.1016/j.plas.2021.10001>
76. Aslam H, Blome C, Roscoe S, Azhar TM (2018) Dynamic supply chain capabilities: how market sensing, supply chain agility and adaptability affect supply chain ambidexterity. *Int J Operat Produ Manag* 38(12):2266–2285. <https://doi.org/10.1108/IJOPM-09-2017-0555>
77. Leończuk D (2021) Factors affecting the level of supply chain performance and its dimensions in the context of supply chain adaptability. *Logforum* 17(2): 253–269. <https://doi.org/10.17270/JLOG.2021.584>
78. Shams R, Vrontis D, Belyaeva Z, Ferraris A, Czinkota MR (2021) Strategic agility in international business: a conceptual framework for "agile" multinationals. *J Int Manag* 27(1):100737. <https://doi.org/10.1016/j.intman.2020.100737>
79. Manders JHM, Caniëls MCJ, Ghijsen PWT (2017) Supply chain flexibility: a systematic literature review & identification of directions for future research. *Int J Logist Manag* 28(4):964–1026. <https://doi.org/10.1108/IJLM-07-2016-0176>
80. Ravichandran T (2018) Exploring the relationships between IT competence, innovation capacity and organizational agility. *J Strateg Inf Syst* 27(1):22–42. <https://doi.org/10.1016/j.jsis.2017.07.002>
81. Shukla SK, Sushil (2020) Evaluating the practices of flexibility maturity for the software product and service organizations. *Int J Inf Manag* 50:71–89. <https://doi.org/10.1016/j.ijinfomgt.2019.05.005>
82. Leximancer (2021) Leximancer User Guide, Release 5.0. Leximancer Pty Ltd. <https://static1.squarespace.com/static/5e26633cfcf7d67bbd350a7f/t/61a84738789d220c1a865559/1638418279565/Leximancer-User-Guide-5.pdf>. Accessed 10 Jan 2023
83. Babatunde OA (2021) Adaptive capability, social media agility, ambidextrous marketing capability, and business survival: a mediation analysis. *Mark Brand Res* 8:31–47. <https://doi.org/10.33844/mbr.2021.60328>
84. Hussein N, Shakhour T, Obeidat BY, Management EP, Alshurideh M (2021) Agile-minded organizational excellence: empirical investigation. *Acad Strateg Manag J* 20(6):1–25
85. Sumayya U, Amen U, Hameed I (2023) Adapting to uncertainty: navigating the pandemic with green and traditional HR practices. *Future Bus J*. <https://doi.org/10.1186/s43093-023-00260-x>
86. Singh J, Lyytinen K, Sharma G, Schnackenberg A, Hill J (2013) Oreganizational agility: what it is, waht it is not, and why it matters. In: *Academy of Management Proceedings*. 11813 (2013). <https://doi.org/10.5465/ambpp.2013.11813abstrac>
87. Harraf A, Wanasika I, Tate K, Taldof K (2015) Organizational Agility. *J Appl Bus Res* 31(2): 675–686. <https://doi.org/10.19030/jabr.v31i2.9160>

88. Pramono CA (2021) Analysis of the influence of entrepreneurship capability, agility, business transformation, opportunity on start-up behavior. In: E-commerce companies in Indonesia during the Covid 19 pandemic. *Wseas Trans Bus Econ* 18: 1103–1112. <https://doi.org/10.37394/23207.2021.18.104>
89. Saha N, Gregar A, Saha P (2017) Organizational agility and HRM strategy: do they really enhance firms' competitiveness? *Int J Organ Leadersh* 6:323–334

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