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A Comprehensive Review on the Intersection of Artificial Intelligence and Organizational Agility

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ABSTRACT
In the fast-changing technology environment, the most critical question that faces any organization is not "whether" to go for corporate agility but to "what degree" and "how best" to develop that flexibility. In addition, the organizational agility concepts become significant from the time of COVID-19 since new ways are required by organizations for the improving employee engagement, building organizational performance and capabilities for assisting their competitiveness and delivering on their business strategy. Economic, legislative, and political pressures and market competition served a pivotal role in the need for the increased strategic and organizational agility. Artificial Intelligence (AI) enhances organizational agility through digital capabilities in this study. As organizations integrate AI tools, they can enhance internal processes, simplify operations, facilitate efficient decision-making, as well as be more responsive to market dynamics and customer needs externally. The organization's transformation is determined by AI tools to leverage the firm's digital capabilities, thereby the firm could become more agile in terms of internal processes and the external environment challenges. An exploration of how Artificial Intelligence (AI) technologies are transforming businesses to succeed in rapidly changing environments is presented in this paper. In this study, we highlight the enabling role of AI in fostering operational, strategic, and portfolio agility in conjunction with critical agility frameworks, which includes the machine learning, Internet of Things (IoT) and neural networks. Furthermore, the paper demonstrates AI's transformative potential in organizations by discussing its impact on decision-making, innovation, and resource allocation. In order to build resilient, competitive, and adaptive enterprises, artificial intelligence-driven solutions must be incorporated.

Keywords: *Organizational Agility, Artificial Intelligence (AI), Digital Capabilities, IOT, Neural Networks, Machine learning*

1. INTRODUCTION

Now-a-days, one of the major driving forces which need for the agility of business is artificial intelligence and also it has a significant capability, which takes into consideration for the level of business agility of the firm (Sullivan & Wamba, S2024). On the course of time, we could witness the significant development of Artificial Intelligence. Even though AI had been relatively expensive in the beginning time of computing, the architecture shaped by primary objective was the efficiency, whereas relative performance was delivered (Bughin et al., 2017). Chiefly, roles and relationships had been defined for the optimizing the use of scarce and expensive technology resource (Hagel & Brown, 2001). Due to the scale economies, AI becomes commoditized and standardized during these years which lead to lower prices (Moro-Visconti, 2024). Relating to AI, the organizational agility essence cannot be overemphasized (Mukherjee, 2023). Artificial Intelligence channels are wide-ranging and include machine learning, robotics, internet of things, neural networks etc., (Kaur et al., 2020). These channels have a wide range of applications which cut across the organizational intranet and extranet, sophisticated work software, e-commerce and online banking, technological advancements on work process, security etc., (Zwass, 2003). These channels have propensity to cause a change within organizations and the changes reflect in a continuum of organizational responses or what is referred to as organizational agility (Braunscheidel & Suresh, 2009).

Artificial Intelligence (AI) is a transformative force in organizations today due to the rapid advancement of technology (Wamba-Taguimdje et al., 2020). The concept of artificial intelligence was first introduced in the mid-20th century and has evolved into a multi-faceted field that includes IoT, neural networks, and machine learning (Kuznetsov et al., 2024). Initially intended to mimic human intelligence, these technologies have demonstrated capabilities far beyond automation when

embedded in organizational processes (Enholm et al., 2022). With AI, organizations can now make real-time decisions, perform predictive analytics, and adopt adaptive systems, reshaping their operations as a result (Badmus et al., 2024). Moreover, the ability of responding effectively and quickly has been a key component of business success to external changes (Jalonen & Lönnqvist, 2011). Volatility and uncertainty are typical characteristics of the digital era, in which agility is not just a necessity, but a must (Salmela et al., 2022). In the intersection of artificial intelligence and organizational agility, businesses can maximize innovation, enhance efficiency, and maintain competitive advantages through the use of AI-driven insights (Atienza-Barba, 2024). By reviewing existing literature, this paper evaluates the synergy between AI and organizational agility.

2. ARTIFICIAL INTELLIGENCE

John McCarthy is the name behind this AI idea and he was the one who had begun his research on the subject in 1955 (Ida, 2024). It was assumed that each learning aspect and other intelligence domains can precisely be described that a machine can stimulate them (Amudha, 2021). The work machines' processes are described by AI. If it is performed by humans, intelligence would be required (Jarrahi, 2018). Artificial Intelligence is 'investigating intelligent problem-solving behaviour and creating intelligent computer systems (Wang, 2019).

Definitions relations to strong and week artificial intelligence are the definitions that differentiate between AI mind and AI partner where the AI partner is equivalent with weak Artificial Intelligence and the AI mind is comparable with strong Artificial Intelligence (Etzioni & Etzioni, 2017). The terms are equal in their scope, but AI mind and AI partner might be more intuitive to a noncomputer scientist. None of the definitions do however provide a framework of how to delimit and differentiate the technology, thus having no practical use (Taylor, & Taylor, 2021). Etzioni & Etzioni (2017) while discussing how to incorporate ethics into AI states that "there are two different kinds of AI. The first kind of AI involves software that seeks to reason and form cognitive decisions the way people do to be able to replace humans. One could call this kind of AI minds. The other kind of AI merely seeks to provide smart assistance to human actors—call it AI partners". Tarran & Ghahramani (2015) in looking at how machines learned to think statistically, adds that AI could be "weak or strong". He further posits that "weak Artificial Intelligence" are systems and applications that specialize in a particular area or niche. Conversely, "strong Artificial Intelligence" a computer that can perform any intellectual task that a human can". "Artificial intelligence is a computer programme designed to acquire information in a way similar to the human brain" Staub et al., (2015). Ramesh et al. (2004). Adds that "Artificial intelligence (AI) is defined as 'a field of science and engineering concerned with the computational understanding of what is commonly called intelligent behaviour, and with the creation of artefacts that exhibit such behaviour'" In his report, Fredriksson (2018) defined artificial intelligence as "the ability to learn from training datasets and from this by itself, continue to learn and draw its own conclusions" (p.18). This definition does not imply how the technology is used, if it is cognitive or non-cognitive, provides no division between different technologies and is consistent with the operations of existing technology. The definition is also avoiding the discussion of how far the technology has come. It is widely expected that Artificial Intelligence will have enormous impact on organizations. Some of which are power shifts; re-assignment of decision-making responsibility, cost reduction, enhanced service, personnel shifts and downsizing among others. However, in this paper, we review how artificial intelligence affects organizational agility. For the purpose of this, the following dimensions of Artificial Intelligence are used: Internet of Things, Neural Networks and Machine Learning.

Internet of Things (IoT)

According to IERC (2010:pg), IoT is a "dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network." Internet of Things (IoT) is a concept and a paradigm that considers pervasive presence in the environment of a variety of things/objects that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications/services and reach common goals (Mashal et al., 2015). It is a feature of a smart world where the real, digital and the virtual are converging to create smart environments that make energy, transport, cities and many other areas more intelligent (Friess, 2016). The goal of the Internet of Things is to enable things to be connected anytime, anyplace, with anything and anyone ideally using any path/network and any service (Schoder, 2018). Internet of Things is a new revolution of the Internet. Objects make themselves recognizable and they obtain intelligence by making or enabling context related decisions due to the fact that they can communicate information about themselves and they can access information that has been aggregated by other things, or they can be components of complex services (Dankan Gowda, 2020).

Neural Networks

Neural Networks (NN) are models that attempt to mimic some of the basic information processing methods found in the human brain. As our brains perform complex tasks, NN modelled after the brain has also been found useful in solving complex problems (Samarasighe, 2006). Also, NN is a massively parallel distributed processor that has a natural propensity for storing experimental knowledge and making it available for use (Dey, 2008). Neural networks are developed

by modelling the human brain, making them functionally similar in two ways. First, information is acquired by networks in neural networks. Secondly, connections between artificial neurons are used to store information. In neural networks, the artificial network is a processor used to store information and to make it functional (Gelir, 1994). Neural networks consist of the combination of constant non-linear functions (Chenoweth, Obradovic & Stephen, 1996) and the authority of neural networks express the capacity of neural networks (Krose & Smagt, 1996). Neural networks, a simple copy of biological neural networks, have very impressive results despite the superficial connections between neural networks. Neural networks have been used in many areas (Gelir, 1994). NN performs a variety of tasks, including prediction or function approximation, pattern classification, clustering, and forecasting (He & Xu, 2009). Nevertheless, its performance is affected by how the setup of the neural networks structure is conducted, and by how data is prepared for it (Ogasawara et al., 2009). Information technology units available in neural networks might look like the neurons in the brain and neural networks consist of many information technology units which are inter-connected (ArulRaj et al., 2021). Information processing units receive inputs from several different units and output is distributed to the other units as inputs (Kalogirou, 2003).

Machine Learning

Machine learning has become one of the main stays of the information technology in the past two decades and thus, an important, but hidden, part of our lives (Alpaydin, 2020). The increasing amount of data that is being generated (and stored) daily by individuals and corporations, demands a smart analysis. It is here where machine learning comes to the stage as a necessary ingredient for technological progress (Smola & Vishwanathan, 2008). Machine learning involves computer algorithms capable of learning to improve their performance of a task on the basis of their own previous experience (Alzubi et al., 2018). It focuses on achieving smart programmable devices and "machines" which learn automatically, by themselves. Basically, it is all about systems learning from data (Alpaydin, 2020). Machine learning is seen as the process of performing tasks by looking at historic data and from that draw generalized conclusions to respond to new situations (Esposito & Esposito, 2020). At the very core, machine learning is a "branch of artificial intelligence employing pattern recognition software that analyses vast amounts of data to predict ... behaviour" (Mena, 2011, p. 1). The ultimate goal of machine learning is to transform apparently dissimilar problems to a set of relatively similar sorts of problems after which the problem can be solved using various algorithms and to –ultimately –generalize the algorithm to examples beyond those in the training set (Smola & Vishwanathan, 2008; Domingos, 2012; Frey & Osborn, 2013). In other words, machine learning algorithms continuously learn from context specific historical data and make future predictions with high internal validity and can autonomously perform routine and non-routine tasks (Busuioc, 2021). Humans are considered too lazy to spend all day in front of a screen and upload data into database so they invent a "machine" which can search, access, upload, save and create database -basically can "learn" by themselves (Costa, 2019). Another point which alludes to the human preference of machine learning is the Internet. Let's imagine the size of data in Internet, no one can sit in front of computer screen all day to upload those data into a machine, just connect that machine with Internet let them be (Yao et al., 2018). The question is how human teach a machine "learn" something? How can we define "learn"? The answer is Neural network. It is a computer system designed for classifying data in the same way human brain does with knowledge (Marr 2016). Based on recognizing image, color, size, text, all kind of elements which data contains, a machine can divide it into difference groups. Then depend on any requirement from human, the machine can give you the group of data you want. You can imagine how much time you can save with machine learning technology in all kind of industry, at the time of free access to internet at anywhere, anytime (Liu et al., 2007).

3. ORGANIZATIONAL AGILITY

Definitions and Dimensions

Organizational agility is increasingly recognized as a vital capability for businesses seeking to thrive in today's fastpaced and highly volatile digital environment (Dikici, 2024). At its core, organizational agility refers to the ability of an organization to rapidly adapt to changes in the market, respond swiftly to customer demands, and innovate continuously (Teece, Peteraf, & Leih, 2016). This concept encompasses not only the speed of response but also the flexibility and resilience that enable an organization to pivot when faced with new challenges or opportunities (Chatwani, 2019).

The definition of organizational agility has evolved alongside the growing complexities of the business environment. Initially, agility was often associated with operational flexibility—the capacity to modify existing processes quickly in response to changes (Doz & Kosonen, 2010). However, as digital technologies have become more embedded in business operations, the definition has expanded to include strategic agility (Tallon, & Pinsonneault, 2011). Strategic agility involves the ability to anticipate and initiate change proactively, often by leveraging digital tools and platforms to gain a competitive edge (Sambamurthy, Bharadwaj, & Grover, 2003).

Organizational agility can be understood through several key dimensions. One critical dimension is operational agility, which refers to the ability to efficiently reconfigure resources and processes to respond to immediate market demands (Saha et al., 2017). This dimension is particularly important in industries where time-to-market is a crucial competitive factor (Tallon & Pinsonneault, 2011). Operational agility is closely linked to the effective use of information technology (IT), which can enhance an organization's ability to sense and respond to changes in real-time (Overby, Bharadwaj, & Sambamurthy, 2006).

Another significant dimension of organizational agility is strategic agility. This involves the capacity to continually realign an organization's strategies to meet changing external conditions. Strategic agility requires not only foresight and innovation but also a culture that supports risk-taking and experimentation (Doz & Kosonen, 2010). In the digital age, strategic agility is often enabled by the adoption of digital platforms that allow organizations to quickly pivot their business models in response to new technological trends or customer preferences (Weill & Woerner, 2018).

A third dimension of organizational agility is portfolio agility, which refers to the ability to manage a diverse portfolio of business units, products, or services, and to reallocate resources swiftly among them based on performance and market conditions (Teece, Peteraf, & Leih, 2016). This dimension is increasingly important in digital ecosystems where businesses must continuously innovate and adapt their offerings to stay competitive.

In summary, organizational agility is a multi-dimensional concept that encompasses operational, strategic, and portfolio agility (Killen, 2015). These dimensions collectively enable organizations to navigate the complexities of the digital business landscape, fostering resilience and adaptability (Moşteanu, 2024). As businesses continue to face rapid technological advancements and shifting market dynamics, the ability to develop and sustain organizational agility will remain a critical determinant of long-term success (Kumkale, 2022).

Agility

In the 21st century, agility is not something that should be chosen in business organizations (Kid, 1995). Organizational expertise and rapid response capabilities to the external environment have become a prerequisite for differentiating effective firms, weakening the integration of market forces where effective business practices are available globally. These ongoing changes require immediate response and adaptability (Ezcon et al., 2020). However, the natural need for growth and competitiveness in other industries hinders the ability of companies to adapt and respond quickly to market changes. The sheer size and strength of the market often find changes that enhance competition and impede the ability to respond quickly (Gerald et al., 2020). Urgent thinking emerged as a management concept in accepting changes in the organization and the need for organizations to respond to the organizational changes. The emergence of earlier concepts such as the nature of competition and flexibility, market direction, dynamic forces (TC et al., 2016), and absorbing forces (kale et al., 2019). This concept was first introduced by government-sponsored research in the US and UK in the 1990s, and US research, which began in 1990, views forces as a barrier to business as an institutional form (Christopher et al., 2000).

Agility is a solution for sustainable development organizations to address these challenges. In the context of sustainable business transformation, organizational excellence is considered essential to a business that contributes to success in a dynamic and competitive environment (Lee et al., 2015; Munteanu et al., 2020). Organizational strengths include the following dimensions: speed, activism, responsiveness, collaboration, flexibility, and knowledge/technology system (Emperor et al., 2013; Gao et al., 2020). Understandably, estimates of organizational size are formed by combining factors directly related, for example, speed, time, and rapid introduction of new products (Iberico-Tafoor et al., 2020). Importantly, if these measures are taken correctly, they can increase the organization's professionalism and contribute to its prosperity during times of turmoil.

Organizational Agility

While organizational flexibility has been studied for the last few decades and many attempts have been made to define agility in the business organizations, most definitions have focused on separate functional areas of the businesses (Phillips, & Wright, 2009). Only recently, organizational agility -as an entire enterprise phenomenon, gained more interest from researchers (Wendler, 2013). Review of various organizational agility definitions in the scientific literature allows identifying common themes and building blocks of organizational agility. In the simplest form, organizational agility can be defined as organization's ability to identify changes in the environment and respond quickly. Some authors (Sambamurthy et al., 2003; Ren et al., 2009; Raschke & David, 2005; Narasimhan et al., 2006) identify agility as organizational capability something that an organization is capable to do with its resources. It refers to organization's ability to identify changes and ability to respond to them. Ability to respond to the changes in the environment depends on the know-how, experience, and knowledge of the organization and its decision makers. Dove (1999) refers to this ability as 'knowledge management'. Unexpected change is also present in many definitions of organizational agility (Ren et al., 2009; Meredith & Francis, 2000; Lu & Ramamurthy, 2011a; Lin et al., 2006; Brown & Bessant, 2003; Nagel & Dove, 1991) as' competitive market opportunities' (Sambamurthy et al., 2003), 'dynamic and continuous change' (Sarkis, 2001); and referred to as changes arising from competitor's actions, consumer preferences, regulatory or legal changes, economic shifts, technological advancements etc. (Overby, Bharadwaj & Sambamurthy, 2005). Ability to respond or 'seize' (Sambamurthy et al., 2003) or 'reconfigure' (Sharifi & Zhang, 2001) is an ability to act in response to the changes and in the situation dictated by the environment and internal resources and abilities.

The main purpose of agility in an organization is to better adjust to change and gain competitive advantage and to take opportunities from changes in the environment and thrive in uncertainty and unpredictability (Saha et al., 2017). Therefore, agile enterprises need a set of capabilities and enablers to respond to such change. The framework of enablers and capabilities

is based on the premise that agile organization can achieve competitive advantage in changing the environment (Ismail et al., 2011).

Agility as a capability

In recent decades, scholars have conceptualized firms as bundles of capabilities (Peng, Schroeder, & Shah, 2008). Moreover, they have examined how 'dynamic capabilities' enable organizational change (Teece, 2007). Such a capability lens has been applied to various phenomena. Agility is one particular phenomenon that has been examined through such a lens (Teece et al., 2016). The papers in this special issue, hence, have also applied a capability lens to better understand organizational agility.

Wenzel (2021), for example, suggests that progress in understanding organizational agility is held back by the assumption that firms primarily react to environmental changes rather than shaping the environment. He shows that this view on organizational agility is rooted in the assumptions that scholars hold about dynamic capabilities. Revising these assumptions, he argues, may advance understanding of agility. when we consider market-shaping, for example, we see that agility not only refers to reacting to changes but can also imply that firms influence market dynamism.

Langholf and Wilkens (2021) build their conceptualization of organizational agility on Felipe et al. (2016) and Panda and Rath (2021). These scholars view organizational agility as a specific kind of dynamic capability. Langholf and Wilkens (2021) use the scale from Hsu and Sabherwal (2012) to measure organizational agility as a specific dynamic capability. This dynamic capability scale seems to be especially appropriate to measure organizational agility, because its parameters reflect actions referring to flexibility and adaptability in an organization.

Walter and Rätze (2021) develop a framework that describes how organizational agility can be promoted in organizations. They link agility literature, dynamic capability literature and literature on organizational learning. This view leads them to reconceptualize organizational agility "as a second-order DC [dynamic capability], which allows organizations to enact different agility capabilities (first-order DCs) to successfully change operational (zero-level) capabilities in a constantly changing business environment" (p. 13).

Meier and Kock (2021) in their case study had viewed the organization of the agile R&D units as "a context-specific manifestation of dynamic capabilities in R&D and innovation management" (p. 16). Teece et al. (2016, p. 29) who arguing that for reducing "costs associated with maintaining a given level of organizational agility" dynamic capabilities aided organizations, is followed by the authors in their organizational agility conceptualization.

Dynamic capabilities are used by these studies as a conceptual lens for understanding the organizational better agility. Thus, the studies show how scholar are aided to embrace the phenomenon.

Agility as a process

Organisational agility is viewed as a process in another conceptual angle. Recently, the need of examining the organizational phenomena namely innovation or change as processual phenomena which have been emphasized by scholars (Cloutier & Langley, 2020; Pentland, Mahringer, Dittrich, Feldman, & Wolf, 2020; Tsoukas & Chia, 2002). In many ways, strategic management and organization theory have bene advanced by this 'processual move'. Thus, for understanding organizational agility, a processual perspective has been useful.

Ritter et al. (2021) acknowledged that a capability perspective's assumptions may possibly become problematic on organizational agility in advancing research. Recent research on the routines of organization is drawn which is viewed as processual routines (Feldman, 2016; Feldman et al., 2021). The generated insights are transferred in this research stream to the research of organizational agility. Many of the authors have shown how a perspective of them can be able to draw attention to the way firms 'become' mor agile, by which an exciting direction is opened for future research.

Walter and Rätze (2021) similarly had conceptualized the capability development. A collective behaviour pattern is represented by organizational agility which should be developed and updated by the actors regularly in the organization (Salvato & Rerup, 2011). There is rise in the agility level and also the organization and its actors learn by enacting the agility of the organization. The processual organizational agility's nature is pointed out as well as the temporality relevance is highlighted to understand the agility.

Agility as microfoundations

Recently, the relevance to unpack the routines and capabilities' microfoundations have been emphasized increasingly by the scholars (Felin, Foss, & Ployhart, 2015; Mahringer & Renzl, 2018; Renzl, Rost, & Kaschube, 2013; Rost, Sonnenmoser, & Renzl, 2019). Always, research scholars are not agreeing to how these microfoundations need to be approached (Pentland, 2011), yet most of the scholars have pointed out that for understanding the organizational phenomenon, everyday practices as well as actions have been significant (Feldman & Orlikowski, 2011).

On the organizational agility's microfoudnations, many studies have shed light in the special issue. The underlying organizational agility process and the actors' actions are analysed in agile organizations by Walter and Rätze (2021), Meier

and Kock (2021) and Langholf and Wilkens (2021). In addition, the managers' roles and actions are stressed by Walter and Rätze (2021) on different levels in the process of capability development and organizational learning. The interplay between the agile methods, organizational agility, team leaders in the agile team and team members' actions are analysed by Langholf and Wilkens (2021). The characteristics' in-depth understanding, agility consequences and antecedents are contributed by Meier and Kock (2021). A practice-oriented approach is suggested to organizational agility (Ritter et al., 2021). In addition, this view also emphasized that no matter wat, everyday actions really matter for organizational agility.

4. CONNECTING AGILE METHODS AND ORGANIZATIONAL AGILITY

There has been a complex relationship between organizational agility and agile methods that has been assumed commonly (see also Ritter et al., 2021). In addition, orgnaziational agility is linked with members' action and agile methods use by Langholf and Wilkens (2021) in agile teams. Yet, a need is always there for unpacking the connections in detail between both aspects: How organization agile is there without agile methods? When its contribution is limited and when agile methods contribute to organizational agility? How agile methods are scaled by organizations in a way that aid to contribute to organizational agility?

In the AI context, the organizational capabilities' impact has been addressed by several studies. In addition, four categories involved in organizational capabilities were identified by Weber et al. (2022) for AI development: stakeholder communication, AI project planning, AI project planning and collaborative development. I support capabilities organizational dimension is identified by Lee et al. (2023), where strategic planning, the collaboration processes, continuous development, cost-benefit analysis or integration respectively, a technological dimension on the basis of the system design and component models are included.

Organizational AI capabilities are structured across five pillars which are organizational structure, intelligent organization, data strategy, organizational culture and human resources (Bettoni et al. 2021). The ability of management is included in the organizational capabilities in the AI field simultaneously for identifying the solutions in order to generate the added values on the basis of AI for experimenting with new solutions for the AI technologies' use (Mikalef et al., 2023).

Another study done by Lada et al., (2023) shown that the AI adoption was influenced significantly by the top management commitment which doubled by the resources' engagement at a strategic level. In addition, decisions' decentralization has been one such factor by which digital transformation is encouraged (Da Silva et al., 2022). In the AI organizational capabilities system context, the organizations' ability is reflected by the digital capabilities for acquiring, deploying, correlating & reconfiguring the IT resources (Werder and Richter, 2022), which is necessary for supporting the innovation-based business models' implementation namely Business Model Innovation (BMI) (Van Tinde et al., 2022).

From the integration perspective, Zhu and Li (2023) has approached digital capabilities on the basis of innovation and supply chains within the digital ecosystem for making sure of data interoperability, whereas the need for correlating the digital capabilities was emphasized by Westenberger, Schuler and Schlegel (2022) with the AI projects' requirements, else there remains a risk in the failures of implementation. At the end, organizational capabilities are in relationship with the AI-Readiness level, which is considered the organizations' preparation level in regards the changes' implementation which involves applications and technologies of AI, therefore support for digital transformation is ensured (Denicolai, Zuccella and Magnani, 2021).

Sipola, Saunila, and Ukko, (2023) had argue that AI serves a pivotal role to ensure the sustainability of a business, structuring the organizational processes at the societal dimension, social & ecological levels etc. (Zhao and Gómez Fariñas, 2023). It is believed that a way is built for AI into people's everyday life, which being used for changing radically and enhancing the business practices for the promotion of sustainable development. Thus, the generative AI use is regarded as one of the technological innovations with effective potential for revolutionizing the society and business (Ooi et al., 2023).

Dynamic conceptualizations of organizational agility

The relevance of considering the processual perspective have been shown on organizational agility (Ritter et al. 2021). In addition, temporality relevance is stressed by (Walter and Rätze 2021) to understand the organizational agility. Many researchers were still seeing it as a capability, although a processual approach has been advanced by these papers for studying organizational agility. Thus, a need for developing more dynamic organizational capabilities' conceptualization is existed. Thus, this gap is addressed in upcoming research.

Top-down and bottom-up views on organizational agility

In this special issue, some researches have looked deeply into certain aspects by which organizational agility is underpinned. For example, organizational agility's enablers and barriers in agile R&D units have been analysed by Meier and Kock (2021). Aspects such as cultural tools, skills, norms could be examined by future research to underpin the organizational agility for the development of a more sophisticated understanding. Moreover, the way these aspects are influenced by different contexts could be examined by this particular research (Mahringer, Rost, & Renzl, 2019).

Yet, there could be one of the alternative tactics for taking one such bottom-up approach, that is to examine how larger changes are led by everyday actions. Therefore, organizational agility may be underpinned. In addition, such view has been more situated and looked at the emergent processes and also how organizational agility being enacted, is also observed (Sele & Grand, 2016). Thus, a fresh view may be provided by such a perspective on organizational agility.

In addition, Walter and Rätze (2021) had pointed out that the process involved in organizational agility could be easily understood by qualitative studies (Spector and Meier, 2014; Teece, 2012). Further, qualitative interviews are used by Meier and Kock (2021) for the development of the characteristics' in-depth understanding, antecedents and agile R&D Units' Organization consequences. One such good example is this study where it is seen how the actors' underlying organizational agility's processes and actions can be analysed.

Meier and Kock (2021) insights are "could be a basis for developing a multi-dimensional measurement scale and thus facilitates future quantitative studies" (p. 16). In addition, Langholf and Wilkens (2021) is showing the way the qualitative and quantitative methods combination can possibly be employed for the association between organizational agility, organizational structures and the actions of individuals. Quantitative data was collected by the authors on empowerment and dynamic capabilities at three points from teams who being worked with agile methods in time and from the teams who put all their efforts with traditional project management methods. In addition, qualitative data was analysed. Thus, organizational agility might be examined by the qualitative and quantitative data triangulation.

The sequentially ordered digital trace data analysis is another possibility (Mahringer & Pentland, 2021). Due to the digital tools' use in firms, these data sources had increasingly become available. There is a deeper understanding of agility which might help to understand clearly from a processual perspective.

5. FINDINGS AND SUGGESTIONS

Research found that a dynamic business environment is driven through AI, efficiency, and adaptability, all of which are interconnected. In 1955, John McCarthy conceptualized artificial intelligence as a system or process that mimics human intelligence for the purpose of making decisions and solving problems. Organizations have benefited from AI technologies including strong artificial intelligence (which replicates full human cognition) and weak artificial intelligence (which is designed for specific tasks). A number of key technologies enable organizations to process vast datasets, predict behaviors, and automate processes. Examples include the Internet of Things (IoT), neural networks, and machine learning. Machine learning and neural networks work together to enhance analytical capabilities, while IoT facilitates connected decision-making on issues such as energy and urban development. It is, however, not easy to distinguish between types of artificial intelligence and the adoption of artificial intelligence faces ethical challenges.

In addition to organizational agility, companies must be able to respond to consumer demands and innovate continuously in order to stay competitive. An agile organization emphasizes operational agility, i.e. "real-time resource reconfiguration"; strategic agility, i.e. "proactive innovation and adaptation"; and portfolio agility, i.e., managing resources across organizational boundaries. In the context of agility, both a dynamic capability and an ongoing process are recognized. Adaptability is framed as the ability to anticipate shifts in information and optimize resources by anticipating them and optimizing them. Developing agility requires leadership, taking risks, collaborating, and using digital tools. Its application may, however, be limited by competitive pressures, organizational size and bureaucratic structures. In order to explore qualitative and quantitative measures of agility, further research is needed. Agile frameworks can assist in achieving sustainable growth.

Organizational agility and agile methods are complementary, but their implementation is complicated. Scrum and Kanban are agile practices that enhance agility, but they need to be contextually adapted and scaled to be effective. In order to achieve agility, organizations must demonstrate strategic planning, collaborative development, and stakeholder communication capabilities. In addition to enhancing agility, AI also helps align processes with societal goals and allocate resources dynamically. Agile methods are more sustainable when incorporated with digital tools and artificial intelligence (AI). Researchers highlight agility's role in influencing daily actions and emerging practices as well as a capability. Agile's enablers and barriers can be better understood by combining qualitative and quantitative approaches, such as dynamic capabilities metrics and digital trace data. A business's ability to compete in rapidly changing environments depends on its ability to integrate AI technologies and agile methods with organization agility frameworks. In order to foster long-term success and resilience, future research should address scaling agile methods, addressing ethical challenges in AI, and measuring agility comprehensively. It is vital that organizations utilize AI technologies in the operational, strategic, and portfolio dimensions, such as IoT, neural networks, and machine learning. A culture of innovation and leadership are essential for scaling agile methods such as Scrum. Implement mixed research methods to improve agility for sustained competitiveness and address ethical challenges in the implementation of artificial intelligence.

6. CONCLUSION

Artificial intelligence improves digital capabilities, internal processes, and external responsiveness, thereby increasing organizational agility (Wamba, 2022). Digital capabilities provide necessary infrastructure, innovation capability, and collaboration tools for successful AI adoption (Gama, & Magistretti, 2023). It is possible for organizations to utilize these capabilities to streamline operations, improve efficiency, and react quickly to changing circumstances (Van Hoek, 2001). The use of AI tools increases the automation of repetitive tasks, the optimization of workflows, and the ability to make data-driven decisions (Aldoseri et al., 2023). Because of internal agility, organizations can better adapt to market changes, meet customer demands, and navigate uncertainty. Agile approaches that are cohesive cascade both internally and externally (Spayd, & Madore, 2020).

A significant increase in agility has been achieved across operations, strategies, and portfolios as a result of integrating Artificial Intelligence into organizational frameworks (Wirtz, & Müller, 2019). As a result of this review, businesses gain the ability to anticipate market shifts, create innovative solutions, and adapt dynamically to change by leveraging AI technologies such as IoT, Neural Networks, and Machine Learning. A major advantage of AI is its ability to facilitate the resource allocation as well as real-time decision-making and enabling the realignment of proactive strategy. Data privacy, ethical considerations, and workforce adaptation should be addressed in future research and practice. In an era of rapidly evolving digital ecosystems, the integration of AI into organization agility frameworks will remain a crucial factor in competitive differentiation and sustainable growth.

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